

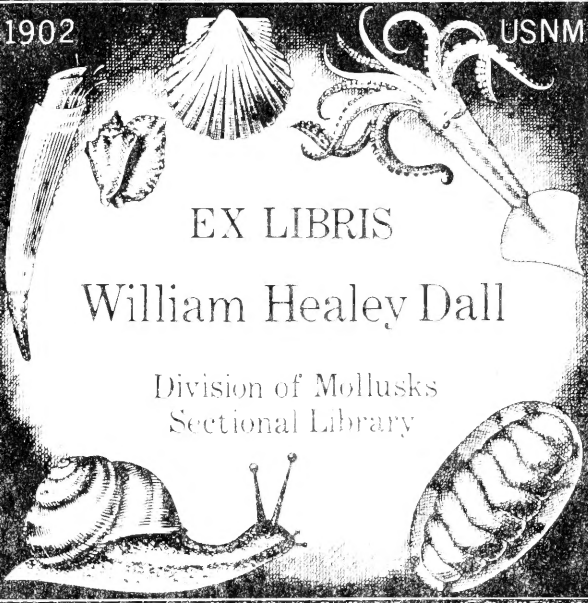
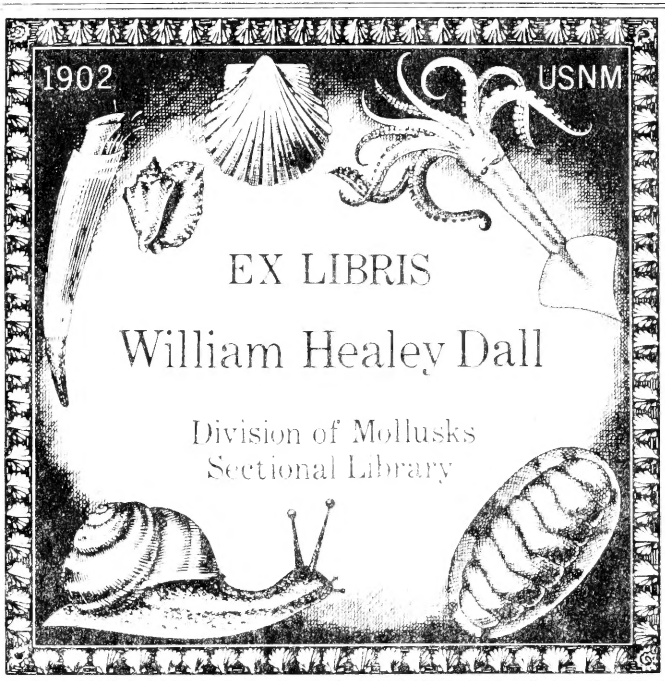
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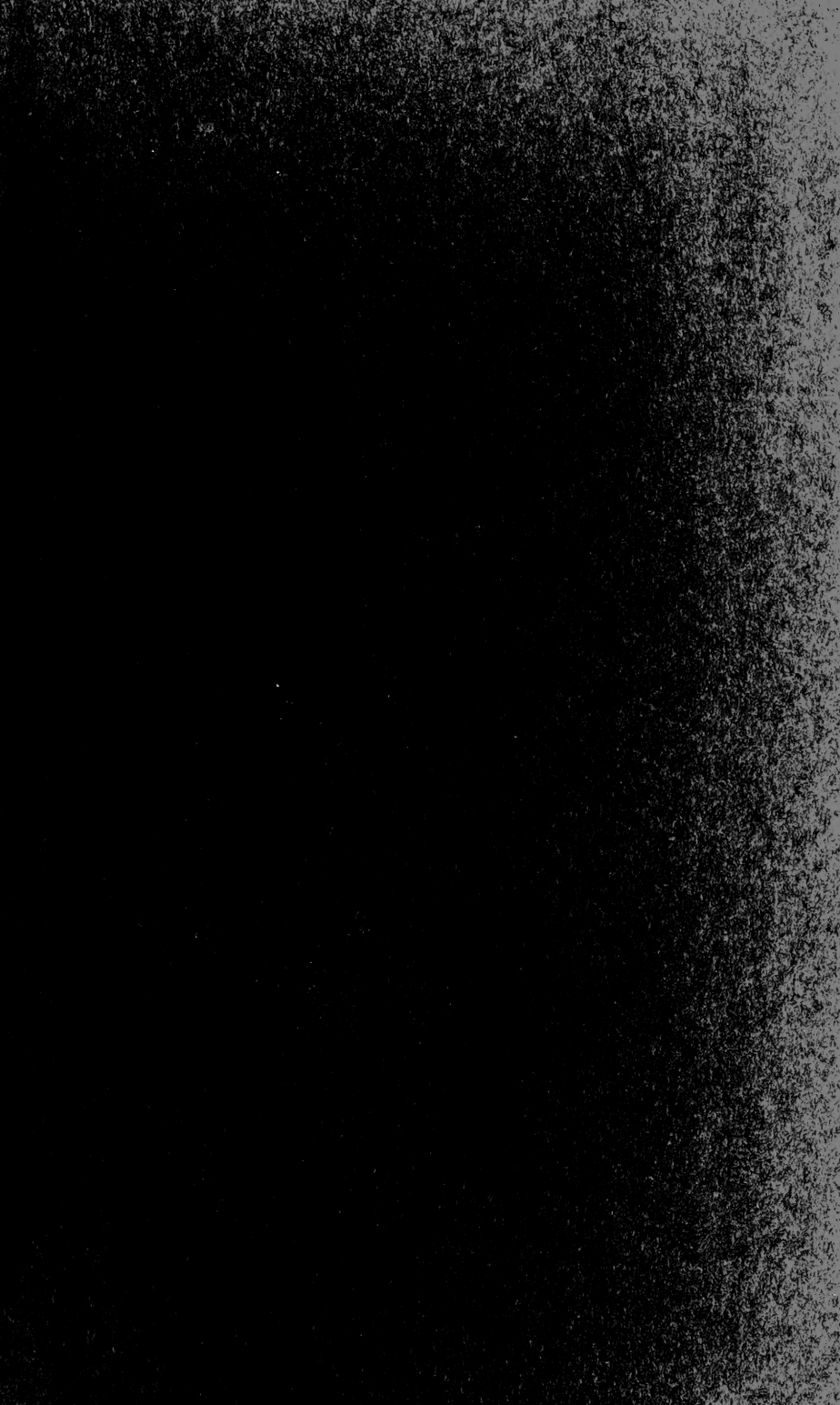
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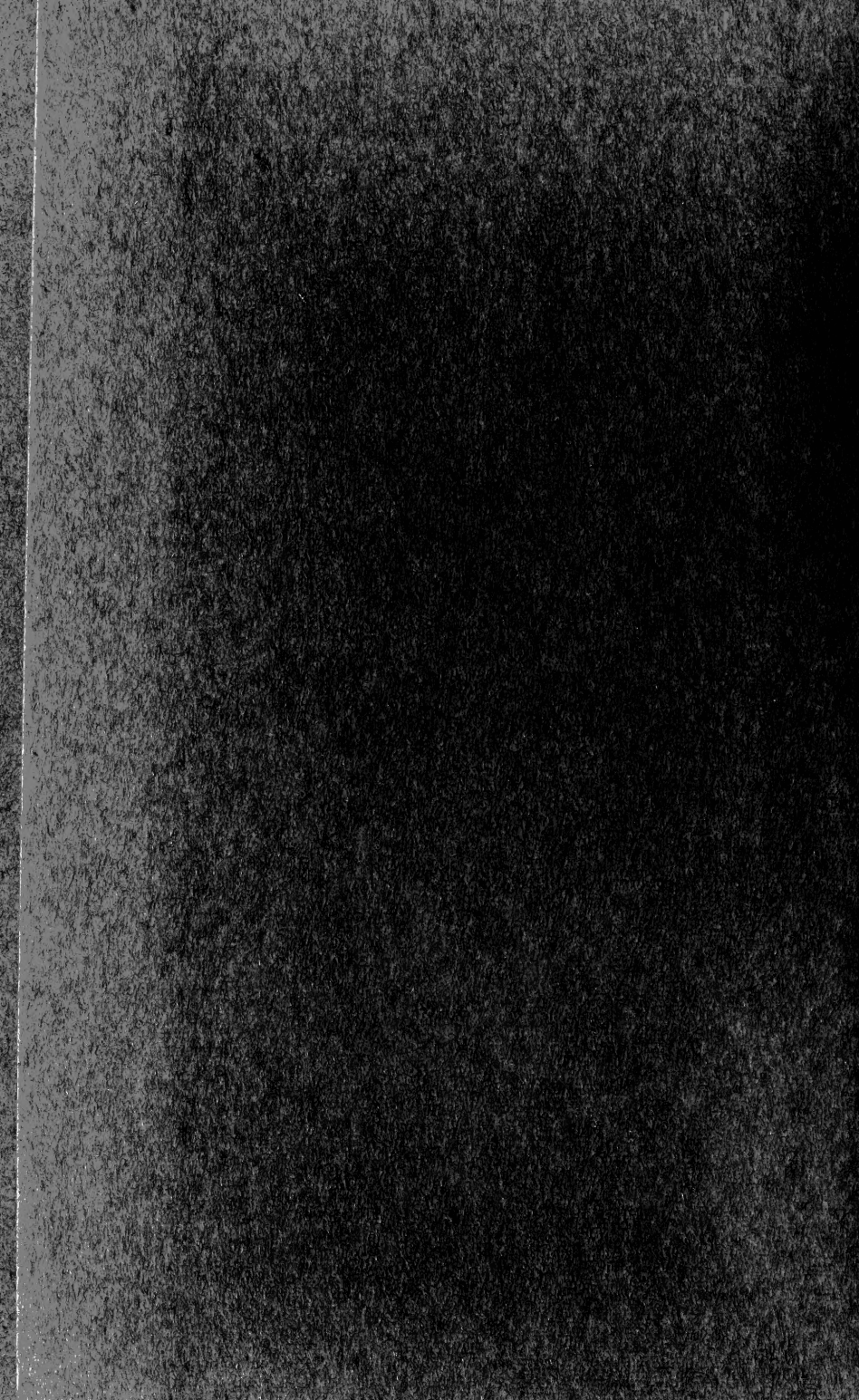
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VOL. XII.
1916—1917.

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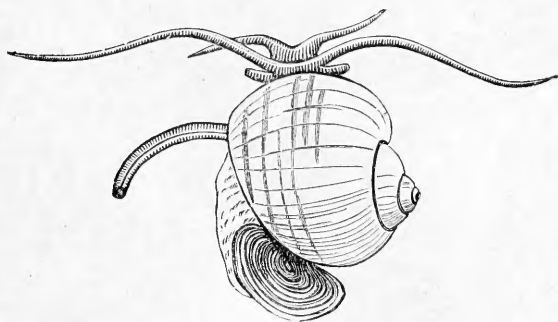
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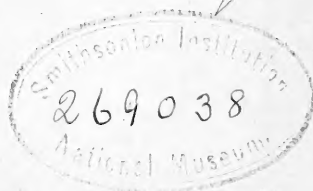
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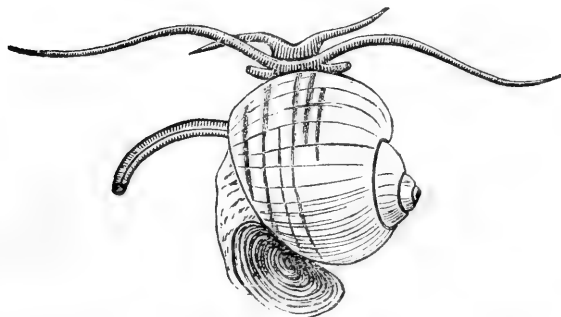
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PROCEEDINGS
OF THE
MALACOLOGICAL SOCIETY
OF LONDON.



Edited under the direction of the Publication Committee.

AUTHORS ALONE ARE RESPONSIBLE FOR THE STATEMENTS IN THEIR RESPECTIVE PAPERS.

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See page iv of this wrapper.

PROCEEDINGS

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MALACOLOGICAL SOCIETY OF LONDON.

ORDINARY MEETING.

FRIDAY, 12TH NOVEMBER, 1915.

The Rev. A. H. COOKE, Sc.D., F.Z.S., President, in the Chair.

Professor A. E. Boycott, F.R.S., was elected a member of the Society.

The following communications were read:—

1. "The occurrence of *Eugyrina gigantea* (Lam.) in British Waters." By the Rev. Dr. A. H. Cooke, F.Z.S.

2. "On a collection of Pelecypoda from the Philippine Islands." By E. A. Smith, I.S.O.

3. "On some new and old Molluscan Generic Names." By Tom Iredale.

Mr. A. S. Kennard, F.G.S., exhibited a bound volume containing plates issued by the Society for Promoting Christian Knowledge, comprising several plates of Mollusca originally contained in Broderip's article on Mollusca in the *Penny Encyclopædia*.

The President exhibited a number of living Helicidæ which were actively crawling about. They had been received from Major Freeman, who had collected them in a condition of æstivation in the Gallipoli Peninsula during the recent military operations.

SPECIAL MEETING.

FRIDAY, 10TH DECEMBER, 1915.

The Rev. A. H. COOKE, Sc.D., F.Z.S., President, in the Chair.

The meeting was convened by the Council for the purpose of submitting a proposal to omit from Rule XVI the words "at 8 p.m." in order to enable the Council to alter the time of meeting so as to make it more convenient for country members to attend. The President formally proposed a resolution to that effect, which was seconded by Mr. R. Bullen Newton, F.G.S., and carried unanimously.

ORDINARY MEETING.

FRIDAY, 10TH DECEMBER, 1915.

The Rev. A. H. COOKE, Sc.D., F.Z.S., President, in the Chair.

The following communications were read:—

1. "Note on the Oligocene of Tampa, Florida, the Panama Canal Zone, and the Antillean Region." By W. H. Dall, Sc.D., LL.D.
2. "Remarks on Dr. Dall's paper." By R. B. Newton, F.G.S.
3. "Description of two new species of *Angasella*." By G. K. Gude, F.Z.S.
4. "A new British locality for *Helix (Euparypha) pisana*, Müll." By the Rev. Dr. A. H. Cooke, F.Z.S.

ORDINARY MEETING.

FRIDAY, 14TH JANUARY, 1916.

The Rev. A. H. COOKE, Sc.D., F.Z.S., President, in the Chair.

The following communications were read:—

1. "The Operculum of the genus *Bursa (Ranella)*." By the Rev. Dr. A. H. Cooke, F.Z.S.
2. "On the Shells of the South African species of *Sepiidae*." By E. A. Smith, I.S.O.
3. "On a volume of plates prepared by Rackett for the second edition of Pulteney's *Dorsetshire Shells* in Hutchins' *History of Dorset*." By Alexander Reynell.
4. "On the dates of publication of Lovell Reeve's *Elements of Conchology*." By Alexander Reynell.
5. "Note on the Carboniferous Goniatite *Glyphioceras vesiculiferum*, de Koninck, sp." By G. C. Crick, F.G.S., F.Z.S.

THE OCCURRENCE OF *EUGYRINA GIGANTEA* (LAM.) IN
BRITISH WATERS.

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 12th November, 1915.

By the kindness of a friend I have come into possession of a specimen of *Eugyrina* (formerly known as *Ranella*) *gigantea*, Lam., from British waters. The specimen, which was alive when taken, measures exactly 5 inches in length, and still retains the operculum. It was trawled (there were several specimens in all) in the deep trough (50 to 100 fathoms) off the Saltees lightship, between Carnsore Point and St. David's Head, in company with *Cassidaria rugosa*, L.

Unless I am mistaken, the discovery of this species constitutes an important addition to the British marine molluscan fauna.

Five specimens were exhibited before the Conchological Society in May, 1915, having been dredged alive off the south-west coast of Ireland in deep water, also with *C. rugosa*. But no precise statement is published¹ as to the locality, which may or may not have been within the British marine area. In any case, the present specimen comes from waters which are essentially British, and the locality is by far the most northern hitherto recorded.

The species is common in the Mediterranean, and it is probably an accident that all Weinkauff's localities (ii, 71) are west of Tarentum. Kobelt (Iconogr. ii, 1901, pp. 11-13) records it from the Atlantic only up to the mouth of the Tagus. The *Travailleur* had many years before dredged it in the Bay of Biscay (Jeffreys, Ann. Mag. Nat. Hist., ser. v, vol. vi, 1880, p. 318). Dautzenberg records² it from the voyage of the *Hirondelle* (1886), from various localities in the Bay of Biscay, from lat. 43° 12' to 45° 48' N. and long. 5° 58' to 11° 52' W., at depths varying from 160 to 510 metres, in fine sand, coarse gravel, mud, and rock. He also adds that it was met with in the Gulf of Gascony by the *Travailleur* and the *Porcupine*, and that it is frequently brought up by the fishing-boats from off Arcachon.

Finally, A. Reynell, recording the results of the cruise of the S.S. *Huxley* to the northern side of the Bay of Biscay in August, 1906, mentions³ *Ranella gigantea* as dredged in 109 fathoms (four living specimens—two male, two female) from lat. 47° 48' N., long. 7° 46' W., adding "the most northerly habitat of this species so far recorded".

It appears doubtful whether Locard's view will hold good, that the Atlantic shells differ sufficiently from the Mediterranean to justify the constitution of two varieties, *atlantica* and *mediterranea*. The form *atlantica* is said to occur in the post-Pliocene of Italy.

In accordance with Dall's classification⁴ of the Ranellidæ and Tritonidæ, the *Ranella gigantea* of Lamarek is now separated from the former group, and is at present the sole occupant in the British Museum Collection of the genus *Eugyrina* of Dall.

¹ Journ. of Conch., xiv, 1915, p. 366.

² Mém. Soc. Zool. France, iv, 1891, p. 607.

³ Journ. Mar. Biol. Assoc., viii, 1909, p. 378.

⁴ Smithsonian Coll., xlvii, 1904, pp. 114-44.

A NEW BRITISH LOCALITY FOR *HELIX* (*EUPARYPHA*) *PISANA*,
MÜLL.

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 10th December, 1915.

DURING a visit to Porthcawl (Glamorgan) in August of the present year, I was struck by the occurrence of *Helix pisana*, Müll., on the sand-hills to the east of the town. Specimens were present in hundreds, clinging, as usual, in masses to the stalks of the herbage.

It seems obvious that the species must have been introduced by the agency of man, and probably within the last few years. Although the 'burrows' at Porthcawl extend for a distance of perhaps two miles along the coast, and offer what seems a suitable habitat throughout, the species only occurs at present, so far as I was able to ascertain, for the few hundred yards immediately adjacent to the town, just where the bathing tents are pitched. It seems clear that the introducer put his specimens down on the first suitable ground he came to, where they at once increased and multiplied, but they have not yet had time to extend their area of occupation over more than a small section of the sand-hills. It is quite probable that the species was introduced from Tenby, which is hardly more than four hours journey from Porthcawl by train.

Not all attempts to colonize *Helix pisana* in Glamorgan have been so successful. Jeffreys made two attempts, at an interval of years, to colonize it on the sand-hills near Swansea, but the experiment failed.¹ According to J. W. Taylor,² "Mr. H. Rowland Wakefield now entirely omits it from his list of Swansea shells, as he has regularly and persistently searched the district for some years past, in conjunction with the local Field Club, without finding a trace of a single shell, though recently he has picked up a few dead specimens at Singleton."

Perhaps one of these local Field Clubs may be able to furnish some definite information as to when and how the Porthcawl colony was started, which seems to have a more brilliant future before it than that at Swansea.

¹ Brit. Conch., i, 1862, p. 208.

² Monograph of the Land and Freshwater Mollusca of the British Isles, i, 1912, p. 394.

THE OPERCULUM OF THE GENUS *BURSA* (*RANELLA*).

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 14th January, 1916.

W. H. DALL, in his well-known and admirable paper,¹ "An Historical and Systematic Review of the Frog-Shells and Tritons," draws up a classification, which results in the following grouping:—

Genus *BURSA*.A. Sub-genus *Bursa*.

Operculum with lateral nucleus:

- (a) Sect. *Bursa* (*spinosa*, Lam.).
- (b) Sect. *Marsupina* (*spadicea*, Mtf., or *crassa*, Dillw.).
- (c) Sect. *Chasmotheca* (*foliata*, Brod.).

Operculum with apical nucleus:

- (d) Sect. *Ranella* (*bufonia*, Gmel.).
- (e) Sect. *Lampadopsis* (*rhodostoma*, Beck.).
- (f) Sect. *Colubrellina* (*conditus*, Gmel.).

B. Sub-genus *Aspa*.Sect. *Aspa* (*marginata*, Gmel.).C. Sub-genus *Bufo*.

- (a) Sect. *Crossata* (*ventricosa*, Brod.).
- (b) Sect. *Bufo* (*scrobilator* [*sic*], L.).
- (c) Sect. *Craspedotriton* (*convolutus*, Brod.).

It will be noticed that the characteristics of the operculum, given in the above classification, affect only one of the three sub-genera (*Bursa*), while of the operculum of the two remaining sub-genera (*Aspa*, *Bufo*) nothing is stated.

Dall further remarks: "According to Adams the *Ranella* have the operculum ovate, with an apical or subapical nucleus, while Gray speaks of it as half-ovate with a central, lateral, or internal nucleus; probably it varies in the different groups as in the Tritons; in *Ranella foliata* it is figured as concentric, with the nucleus mid-lateral. One cannot safely generalize on the character until the operculum of more species is known."

In view of this last remark I venture to put on record the facts, so far as they are known to me, of a considerable number of species of the genus *Bursa*. If students to whom are known the opercula of other species not in the list will gradually add to the number, a more or less complete body of evidence will in the end be accumulated. No final classification of a group can be regarded as settled until full information of this kind is in our possession.

It must be premised that Dall published no list of species contained in each of his several groups or sections, but only a type species in each case. I have therefore worked the list as interpreted by the

¹ Smiths. Coll., xlvii, 1904, pp. 114-44.

Natural History Museum in their show-cases. The only difference between their grouping and Dall's is the nominal substitution of *Tutufa*, Jouss., for the sub-genus he calls *Bufonaria*.

Nothing is commoner than for opercula to be misplaced, turned upside down, outside in, and even located in shells they do not belong to. Great caution is needed in order to avoid mistakes.

| Species whose operculum is known. | Source of information. ¹ | Species whose operculum is not known. |
|-----------------------------------|-------------------------------------|---------------------------------------|
| Sub-genus <i>Bursa</i> . | | |
| Sect. <i>Bursa</i> . | | |
| <i>albifasciata</i> , Sowb. | M.B. | <i>cavitensis</i> , Beck. |
| <i>crumena</i> , Lam. | M.M., J.R.T. | <i>fijiensis</i> , Wats. |
| <i>elegans</i> , Beck. | Ph.D., J.R.T., A.H.C. | <i>neglecta</i> , Sowb. |
| <i>margaritula</i> , Desh. | J.R.T., A.H.C. | <i>nobilis</i> , Rve. |
| <i>nana</i> , Sowb. | M.B. | |
| <i>rana</i> , L. | | |
| (= <i>albifasciata</i> , Rve.). | McA., A.H.C. | |
| <i>spinosa</i> , Lam. | M.M., J.C.M., A.H.C. | |
| <i>thersites</i> , Redf. | J.C.M. | |
| Sect. <i>Marsupina</i> . | | |
| | | <i>crassa</i> , Dillw. |
| Sect. <i>Chasmotheca</i> . | | |
| | | <i>foliata</i> , Brod. |
| Sect. <i>Ranella</i> . | | |
| <i>bufonia</i> , Lam. | M.B., A.H.C. | <i>grayana</i> , Dkr. |
| <i>siphonata</i> , Rve. | J.C.M., A.H.C. | <i>rugosa</i> , Sowb. |
| <i>tuberosissima</i> , Rve. | A.H.C. | <i>venustula</i> , Rve. |
| Sect. <i>Lampadopsis</i> . | | |
| <i>asperrima</i> , Dkr. | M.B. | <i>papilla</i> , Wood. |
| <i>cruentata</i> , Sowb. | Ph.D., J.R.T. | |
| <i>rhodostoma</i> , Desh. | Ph.D., A.H.C. | |
| <i>thomæ</i> , Orb. | M.B. | |
| Sect. <i>Colubrellina</i> . | | |
| <i>calata</i> , Brod. | M.B., A.H.C. | <i>caudisata</i> , Lam. |
| <i>granularis</i> , Bolt. | M.B., M.M. | (= <i>condita</i> , Dillw.). |
| var. <i>affinis</i> , Brod. | M.M., J.R.T. | |
| var. <i>livida</i> , Rve. | Ph.D., M.M. | |
| var. <i>ponderosa</i> . | Ph.D. | |
| <i>pustulosa</i> , Rve. | M.B. | |
| <i>semigranosa</i> , Lam. | J.R.T. | |
| Sub-genus <i>Aspa</i> . | | |
| Sect. <i>Aspa</i> . | | |
| <i>marginata</i> , Gmel. | M.B., McA., A.H.C. | |

¹ In this list, M.B., M.M. mean the British and Manchester Museums, McA. the McAndrew Collection at Cambridge, J.C.M., J.R.T., Ph.D., A.H.C. mean respectively Dr. J. C. Melvill's, Mr. Tomlin's, M. Dautzenberg's, and my own collections.

| Species whose operculum is known. | Source of information. | Species whose operculum is not known. |
|---|------------------------|--|
| Sub-genus <i>Bufonaria</i> (= <i>Tutufa</i> , Jous.). | | |
| Sect. <i>Crossata</i> . | | |
| <i>californica</i> , Hinds. | M.B., McA., A.H.C. | |
| <i>ventricosa</i> , Brod. | J.R.T., A.H.C. | |
| Sect. <i>Bufonaria</i> . | | |
| <i>rubeta</i> , Bolt. | M.B. | <i>coriacea</i> , Rve. |
| <i>scrobiculator</i> , L. | J.C.M., J.R.T. | <i>cumingiana</i> , Dkr. <i>papillosa</i> , A. Ad. <i>ranelloides</i> , Rve. |

With regard to the section *Craspedotriton*, Kesteven has shown¹ that the operculum and radula of *convolutus*, Brod., are those of *Trophon*, not *Bursa*; it is probable, therefore, that *scalariformis*, Brod., and *scalarina*, A. Ad. (= *speciosa*, Ang.), will also prove to be *Trophons*: the section therefore drops out.

The details of the known species are as follows:—

A. Sub-genus *BURSA*.

(a) Section *Bursa*.

General characteristics: operculum rather thin, more or less transparent, almost triangular, with longer side rounded, nucleus sub-lateral, to the left (*i.e.* adjacent to the columella), nearly central, clear of the margin, lines of growth prominent.

1. *albifasciata*, Sowb. A somewhat broken operculum is attached to the tablet in M.B., nucleus to right, sub-lateral, half-way between centre and lower end. In other words, if the operculum belongs to the shell, which I doubt (the shells are Cuming's), the species must be removed, probably to section *Ranella* or *Colubrellina*, from which, conchologically, it is quite distinct.

2. *erumena*, Lam. Nucleus well marked, lines of growth flattened.

3. *elegans*, Beck. As in *spinosa*, not transparent, colour deep brown.

4. *margaritula*, Desh. Rather less pointed at top and bottom than the other species, dark brown, lines of growth not very prominent.

5. *nana*, Sowb. Two opercula are attached to the tablet in M.B. (Cuming's specimens), one rather long, narrow, nucleus sub-terminal, the other more ovate, light-coloured, nucleus sub-marginal, to right, below the centre. It is clear that both of these cannot be the true opercula, and I am inclined to regard them both with suspicion.

6. *rana*, L. Thin, transparent, lines of growth very sharply marked, and occasionally rising into broad raised ridges.

7. *spinosa*, Lam. Not angled, but rounded, against the columella, thicker than in *rana*, lines of growth not elevated.

8. *thersites*, Redf. Rather thin, nucleus very near the margin, a little below the centre.

¹ Proc. Linn. Soc. N.S. Wales, vol. xxvii, 1902, p. 479. Dall, though writing his paper on the Frog Shells in 1904, does not seem to have seen Kesteven's paper, as he expressly says (p. 13), with reference to *scalariformis* and *convolutus*, "their operculum is not known to me."

Sections *Marsupina* and *Chasmotheca*.

It seems doubtful whether these sections embody any valid distinction from *Bursa*, s.str. The operculum of *crassa*, Dillw., does not appear to be known; Dall states that that of *foliata* is as in *rana*.

(b) Section *Ranella*.

General characteristics: nucleus to right, thicker than in *Bursa*, not well marked, lateral, sub-terminal.

1. *bufonia*, Lam. Rounded above, narrower below, nucleus very indistinct, close to the right of terminal margin.

2. *siphonata*, Rve. Rounded above and below, nucleus better marked and rather higher up than in *bufonia*.

3. *tuberosissima*, Rve. Almost exactly as in *siphonata*.

(c) Section *Lampadopsis*.

General characteristics: more or less as in *Ranella*.

1. *asperrima*, Dunk. Thin, ovate, transparent horn-colour, nucleus terminal, well marked, slightly to the left, lines of growth well marked. This operculum differs markedly in character from the others in the section.

2. *cruentata*, Sowb. Thin, rounded above, somewhat angled below, nucleus sub-terminal, to right, fairly well marked.

3. *rhodostoma*, Desh. "Nucleus lateral, submarginal, to the right and sub-terminal, like that of *siphonata*" (Ph.D.).

4. *thomæ*, Orb. Thin, ovate, nucleus sub-marginal, to the left, sub-terminal, indistinctly marked.

(d) Section *Colubrellina*.

General characteristics: operculum ovate, sometimes semi-unguiculate, thickish, narrower below than above, nucleus rather obscure, sub-terminal, or sub-lateral to the right.

1. *granularis*, Bolt., with vars. *affinis*, Brod., *livida*, Rve., *ponderosa*, Rve. The nucleus varies slightly in position; in two typical *granularis* (= *granifera*, Lam.) from M.M. the nucleus is sub-terminal, in a *livida* from M.M. and an *affinis* from J.R.T. it is obscurely sub-marginal, to the right, and sub-terminal. Ph.D. remarks to me: "operc. à nucléus latéral, marginal, situé, soit au dessous du milieu, soit même presque à l'extrémité."

2. *cælata*, Brod. Shape almost semi-unguiculate, nucleus well marked, sub-terminal, but well away from the margin, lines of growth well marked, rising into ridges in old specimens.

3. *pustulosa*,¹ Rve. Shape semi-unguiculate, nucleus almost terminal, closely resembling that of *cælata*.

4. *semigranosa*, Lam. Many consider this species another variety of *granularis*. Operculum thin, nucleus obscure, sub-marginal, to right, sub-terminal, as in *granularis*.

¹ This species, from West Africa, St. Helena, and Ascension, must surely be regarded as distinct from *cælata*, Brod., a Panama shell which does not occur in the West Indies.

B. Sub-genus *Aspa*.Section *Aspa*.

marginata, Gmel. (the only species). Operculum thin, semi-transparent, lines of growth clearly marked. Shape as in *Bursa*, but not so triangular, nucleus similarly situated, slightly more removed from the left margin.

C. Sub-genus *Bufonaria*.(a) Section *Crossata*.

General characteristics: operculum ovate, rounded at both ends, thick, dark horn-colour, lines of growth obscure, a nucleus indicated but not existing, lateral, sub-terminal, to right.

1. *californica*, Hinds. Operculum as in the section. In a remarkably fine and clear specimen from McA. there is almost a visible nucleus on the margin low down on the right.

2. *ventricosa*, Brod. Operculum a little wider than in *californica*, but in other respects generally corresponding.

(b) Section *Bufonaria* (= *Tutufa*, Jous.).

1. *rubeta*, Bolt. (= *lampas*, auctt.). Operculum sub-ovate, not very thick, rounded at top, angled below, nucleus distinct, sub-lateral, to right, well away from margin, below the centre, lines of growth well marked, but not raised in ridges.

2. *scrobiculator*, L. Operculum sub-ovate, rather thin, semi-transparent, rounded above and below, nucleus distinct, sub-lateral, to right, well away from margin, below centre, lines of growth well marked, but not raised in ridges.

On a general survey of the evidence afforded by the operculum, the following points seem to stand out:—

1. There is a large group of *Bursa* (*Bursa*, s.str. + *Chasmotheca* + ? *Marsupina*) with a more or less triangular operculum, nucleus well marked, in the centre of the *left* sub-margin.

2. Closely allied to this group stands the sub-genus *Aspa*, conchologically different, but with an operculum of similar general construction.

3. Another large group (*Ranella* + *Lampadopsis* + *Colubrellina*) possesses an ovate operculum, with nucleus to the *right* or near the extremity, generally less well marked, sub-marginal or sub-terminal. Closely allied to this group, and possibly not separable from it, are the species contained in section *Bufonaria*.

4. Further removed comes a group (*Crossata*) geographically separate from the *Bufonaria* section, and with an operculum not essentially dissimilar to that of certain species of *Triton* (*Lotorium*).

As Dall has remarked, "the *Ranellas* shade very gradually into the forms formerly known as *Triton*, judged by most of their characters," and it is interesting to observe how, on the one hand, *Gyrineum* and *Eugyrina* carry the "*Ranella*" shape of shell, minus the anal sulcus, into the "*Tritons*", while the shell shape of certain

low-spired forms of *Lotorium* is carried into the *Crossata* group of "*Ranella*".

The evidence, then, of the operculum, plus certain other considerations which have appeared in this paper, would lead one to throw out the suggestion that perhaps Dall's classification might with advantage be modified in the following way:—

A. Sub-genus *BURSA*, containing in a single section *Bursa*, s.str., *Chasmotheca*, and probably *Marsupina*.

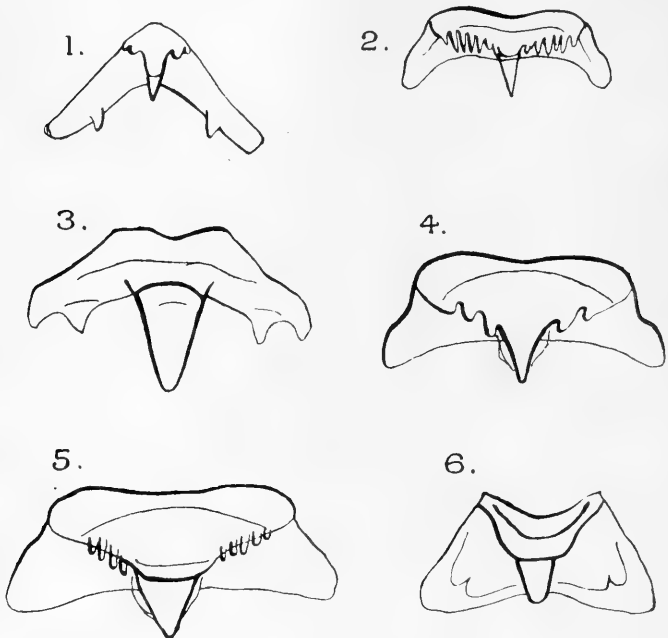


FIG. 1.—Median teeth of:—1. *Bursa granularis*, Bolt., Umkomaas, Natal. 2. *Triton (Lotorium) australis*, Lam., Port Jackson. 3. *Crossata ventricosa*, Brod., Orange Harbour, Tierra del Fuego. 4. (*Triton*) *leucostoma*, Lam., Port Shepstone. 5. *Eugyrina gigantea*, Lam., Algiers. 6. *Crossata californica*, Hinds, San Pedro, Cal. All from Professor Gwatkin's collection.

B. Sub-genus *ASPA*.

C. A sub-genus (*RANELLA* would be a convenient title) including all the sections whose operculum is sub-marginal, generally but not always to the right, or sub-terminal, viz. *Ranella*, *Lampadopsis*, *Colubrellina*, and *Bufonaria*.

D. A sub-genus (call it *CROSSATA* if you like) including the two species *californica* and *ventricosa*, the form of whose shell and shape of whose operculum approximate towards the "*Tritons*".

The evidence of the radula, as kindly given to me by Professor H. M. Gwatkin, may be stated thus:—

An examination of twenty-six species and varieties shows three types of radula.

1. A *Bursa* type, which includes all the typical *Bursæ*, viz. *bufonia*, *cœlata*, *cruentata*, *crumena*, *granularis* and varieties, *pustulosa*, *rana*, *rhodostoma*, *semigranosa*, *siphonata*, *spinosa*, *thomæ*.

Under this type also, but somewhat distinct from it, come (*a*) *marginata*, with radula of so delicate proportions that it stands somewhat apart from the others, and (*b*) *rubeta*, of the typical form, but much stronger and stouter.

2. A Triton (*Lotorium*) type (i.e. a median tooth with strong central denticle and several small side denticles) including *perca*, *pusilla*, *tuberculata*, *vevillum*, and *argus*, but not *gigantea* or *leucostoma*. (N.B. These radulæ of the "Triton" type are by no means typical "Tritons".)

3. A type unlike both *Bursa* and "Triton" proper, and including *californica*, *ventricosa*, *gigantea*, and *leucostoma*. The median exhibits one great central denticle, and is almost bare of side denticles in *californica* and *gigantea*: *ventricosa* combines the big central denticle with the lateral prolongations of a *Bursa* (Fig. 1).

I have to express my thanks to Mr. R. Standen, of the Manchester Museum, to the authorities of the Museum of Zoology at Cambridge, to Dr. J. C. Melvill, and Mr. J. R. Le B. Tomlin for the kind loan of specimens, now exhibited, and also to M. Ph. Dautzenberg for valuable information.

ON A COLLECTION OF PELECYPODA FROM THE PHILIPPINE ISLANDS.

By EDGAR A. SMITH, I.S.O.

Read 12th November, 1915.

PLATE I.

THIS small collection, submitted to me for determination, is not of very special interest beyond the fact that it comprises a number of species not previously recorded from the Philippine Islands, with seven which appear to be undescribed.

The specimens were all collected at Port Galera, a small bay almost completely landlocked, on the north coast of Mindoro, opposite the town of Batangas, on the island of Luzon.

Of the fifty-nine species enumerated rather more than half have already been recorded from the Philippines, and those which appear to be new to the fauna are marked with an asterisk. The identification of the specimens¹ has been much facilitated by the catalogue of the Pelecypoda of these islands published by Dr. J. G. Hidalgo in the Mem. R. Acad. Ciencias Madrid, vol. xxi, 1903, pp. i-v, 1-400, and in the Revista R. Acad. Ciencias Madrid, vol. ii, 1905, pp. 246-312, and vol. iii, 1905, pp. 9-43.

A. LIST OF THE SPECIES.

Family SOLENIDÆ.

- 1*. *Solen sloanii*, Gray (?). Two young valves.

Family CORBULIDÆ.

2. *Corbula crassa*, Hinds.
3. *C. taitensis*, Lamarck.

Family PAPHIIDÆ.

- 4.* *Paphia macrodon*, Deshayes.

Family ANATINIDÆ.

5. *Myodora oblonga*, Reeve.

Family PSAMMOBIIDÆ.

6. *Psammobia squamosa*, Lamarck.
7. *P. layardi*, Deshayes.
8.* *P. philippinensis*, n.sp.

Family TELLINIDÆ.

9. *Tellina (Homala) inflata*, Chemnitz.
10. *T. (Arcopagia) pinguis*, Hanley.

¹ A set of the specimens enumerated has been presented by Professor L. E. Griffin to the British Museum (Nat. Hist.), where the types of the seven new species are also preserved.

11. *T. (A.) carnicolor*, Hanley.
12. *T. (A.) pretiosa*, Deshayes.
- 13.* *T. (Fabulina) valtonis*, Hanley.
14. *T. (F.) rhomboides*, Quoy & Gaimard.
- 15.* *T. (Tellinella) sp.* One valve only, allied to *subtruncata*, Hanley.
16. *T. (Tellinides) ovalis*, Sowerby.

Family PETRICOLIDÆ.

- 17.* *Petricola digitale*, n.sp.

Family VENERIDÆ.

18. *Dosinia histrio*, Gmelin.
- 19.* *D. subalata*, n.sp.
20. *Callista erycina*, Linnæus, var.
21. *C. roseotincta*, Smith.
22. *Pitaria hebræa*, Lamarck.
23. *Circe scripta*, Linnæus.
- 24.* *C. lirata*, Römer.
25. *C. barandæ*, Hidalgo.
26. *Lioconcha picta*, Lamarck.
27. *L. philippinarum*, Hanley.
- 28.* *Antigona (Ventricola) mindoroensis*, n.sp.
29. *A. (Circumphalus) foliacea*, Philippi.
30. *Venus (Chione) recognita*, Smith.
31. *Tapes quadriradiata*, Deshayes.

Family CARDIIDÆ.

32. *Cardium (Lævicardium) biradiatum*, Brugnière.
- 33.* *C. (Trachycardium) nebulosum*, Reeve, juv.
- 34.* *Hemicardium (Fragum) fornicatum*, Sowerby.
35. *H. (F.) hemicardium*, Linnæus.
36. *H. (Lunulicardia) subretusum*, Sowerby.

Family LUCINIDÆ.

- 37.* *Lucina euglypta*, n.sp.
- 38.* *L. transversa*, n.sp.

Family UNGULINIDÆ.

- 39.* *Diplodonta sp.* One valve only.

Family ERYCINIDÆ.

40. *Galeomma argentea*, Deshayes.

Family CRASSATELLIDÆ.

41. *Crassatellites lapideus*, Reeve.

Family CARDITIDÆ.

42. *Cardita canaliculata*, Reeve.

Family ARCIDÆ.

- 43.* *Arca* (*Anomalocardia*) *clathrata*, Reeve.
 44.* *A.* (*A.*) sp. One young specimen.
 45.* *A.* (*Barbatia*) *parva*, Sowerby.
 46. *Glycimeris pectuncululus*, Linn., var.
 47.* *G. planata*, Nevill.
 48. *G. reevei*, Mayer.
 49.* *G. mindoroensis*, n.sp.
 50.* *Limopsis cancellata*, Reeve.

Family MYTILIDÆ.

51. *Modiola flavida*, Dunker.

Family PECTINIDÆ.

- 52.* *Chlamys cristularis*, A. Adams & Reeve.
 53.* *C. blandus*, Reeve.
 54.* *C. nux*, Reeve.
 55. *C. spectabilis*, Reeve, var.
 56.* *C.* sp. One valve.
 57.* *C.* sp. Two young specimens.
 58. *Pecten inæquivalvis*, Sowerby.

Family PLACUNIDÆ.

59. *Placuna* sp. One young valve.

B. NOTES ON SOME OF THE SPECIES.

PAPHIA MACRODON, Deshayes, Proc. Zool. Soc., 1854, p. 339, as *Mesodesma*; Reeve, Conch. Icon., vol. viii, fig. 23.

The locality of this species was not known to Deshayes or Reeve, and Hidalgo has not recorded the species in his list of Philippine Pelecypoda.

CALLISTA ROSEOTINCTA, Smith, Rep. Challenger Lamellibr., 1885, p. 136, pl. i, figs. 6-6b.

When describing this species I suggested that it probably attained larger dimensions than those then given. In a series of specimens in the present collection one example is 20.5 mm. in length, which is only 3 mm. larger than the type. I am now inclined to think that it does not become much larger. The general tone of colour is rather like that of "*Dione festiva*" as given by Reeve (Conch. Icon., vol. xiv, *Dione*, pl. i, fig. 2). Usually there are at intervals zones of a darker tint than the ground colour, and in some specimens there are distinct, more or less interrupted rays. In the fresh specimens at hand the interior of the valves is whitish round the margin, but purplish elsewhere, with a pale ray from the umbo downwards. All the specimens have the tips of the umbones rosy pink.

ANTIGONA (CIRCOMPHALUS) FOLIACEA, Philippi, Abbild., vol. ii, 1846, p. 107, pl. v, fig. 1.

The specimens in the present collection belong to that form of the species figured by Reeve (Conch. Icon., vol. xiv, figs. 109b and 110)

as *Venus tiara*, Dillwyn, and by Sowerby (Thes. Conch., vol. ii, 1853, pl. clviii, figs. 125, 126) also as *tiara*.

This variety differs from the typical form of the species, as figured by Philippi, in having the concentric laminæ more prominently foliated posteriorly, a groove down the dorsal slope, a little distance from the margin, cutting through the lamellæ and thus forming an upper or marginal series of short lamellæ.

GLYCIMERIS PECTUNCULUS (Linn.), var.

The single specimen in the present collection is flatter than usual, and the costæ are more slender than in normal examples, and consequently the intervening grooves are broader. Another slight distinction is the absence of brown colour on the hinge-plate, a conspicuous feature in *G. pectunculus* and *G. muskatensis*, Melvill. The latter attains much larger dimensions than those given by the author of his type. Specimens in the British Museum from Muscat, presented by Dr. Jayakar, are 41 mm. high, 43 long, and 27 in diameter, in fact almost double the size of Mr. Melvill's shell.

GLYCIMERIS REEVEI (Mayer), Viertelj. Naturf. Ges. Zürich, vol. xiii, 1868, p. 23, as *Pectunculus*.
= *Pectunculus angulatus*, Reeve (*non* Lamarck), Conch. Icon., vol. i, fig. 30.

A number of young shells 16–19 mm. in length appear to be immature examples of this species. At this stage of growth the sculpture is more raised, the radiating threads and concentric striæ which cross them producing a granose surface. The radiating threads are in groups of about four or five on the middle of the valves, the groups being marked off by pale striæ. At the sides they are not in groups, and between them the grooves exhibit very short bristles. The colour is variable, usually light or dark brown with irregular white blotchings.

GLYCIMERIS PLANATUS (G. & H. Nevill), Journ. Asiat. Soc. Bengal, vol. xliii, pt. ii, 1874, p. 29, pl. i, figs. 16, 16a, as *Pectunculus*.

This Pecten-like species has hitherto been known only from the Andaman Islands. The colour was described as "white, mottled, and variegated with brown." The specimens from the Philippine Islands are white spotted with red, the spots being only on the radiating ribs, and disposed in irregular concentric rows. The interior is white with a faint purplish stain below the umbones down the middle of the valves. One or two of the costæ on each side near the hinge-line are slender, simple, and not grooved down the middle like those on the rest of the shell. The largest specimen is 20.5 mm. in height, 21 long, 10.5 in diameter. A specimen from the Andaman Islands in the British Museum is about the same size.

C. DESCRIPTIONS OF THE NEW SPECIES.

PSAMMOBIA PHILIPPINENSIS, n.sp. Pl. I, Figs. 16–18.

Shell transversely elongate, slightly inequilateral, anterior portion rather the longer, sharply rounded at both ends, somewhat more

acuminate behind, white with a few remote brown marks on the dorsal margins both in front and behind the umbones; both dorsal margins only slightly oblique, ventral margin little arcuate in the middle, but curving upward at both ends; valves thin, sculptured with fine growth-lines, crossed by fine threads which radiate from the umbones, the thread towards the hinder end being more distinct than those in front; upon the posterior excessively fine striæ are observable which curve from the margin towards the other radiating threads; umbones brown at the tip, in the form of a minute glossy boss or knob of a different texture to that of the rest of the shell; interior of valves glossy white; hinge-characters normal; pallial sinus tongue-like, rounded at the end, not reaching quite half-way across the valves.

Length 8·5, height 4·75, diameter 3 mm.

This species resembles *P. candidula*, Deshayes, somewhat in form, but it is very differently sculptured. The generic term *Gari*¹ of Schumacher is used by some authors as being anterior to *Psammodia* of Lamarck, but to employ a word with a genitive termination as a genus hardly seems admissible.

PETRICOLA DIGITALE, n.sp. Pl. I, Figs. 7, 8.

Shell small, sub-quadrate, rather convex and inequilateral, white, slightly iridescent, thin, sculptured with excessively fine criss-cross raised threads, so that the surface presents a punctate appearance rather like a thimble; here and there at intervals shallow waves of growth are also observable; anterior end obtusely rounded, posterior broader, curvedly sub-truncate, ventral margin straightish, not much curved; anterior dorsal edge oblique, slightly curved, posterior longer, straighter, less descending; lunular area large, defined by a distinct curved impressed line in each valve, extending from the umbo to the end of the dorsal slope; the surface, unlike the rest of the shell, for the most part exhibits little punctation, but merely the most delicate growth-striæ. Umbones raised a little above the hinge-margin, contiguous, smooth, with only delicate growth-striæ; three cardinal teeth in the left valve, the central one thick, Λ -shaped, the others oblique, one on each side divergent from the umbo; right valve with two divergent slender teeth which fall, when the shell is closed, one on each side of the central tooth of the left valve; adductor scars large, anterior pyriform, posterior a little broader; pallial sinus large, broad, ascending high and beyond the middle of the valve, rounded at the end; hinge-ligament occupying about half the posterior dorsal margin, yellowish.

Length 6, height 5·5, diameter 4 mm.

This shell has not the appearance of being the young of a larger form, since it is considerably convex, and rather like certain forms of *Sphærium* or *Kellia* in general aspect. The surface to the naked eye appears smooth, and the punctate or thimble-like appearance of the surface is only visible under a lens.

¹ From the Latin *garum*, a fish-sauce, made from the fish *garus*.

The young of *P. lapicida* (Chemnitz) Gmelin, has somewhat the form of this species, but the sculpture is different, being coarser, and it has no definite lunular area. A single valve from Flinders Passage, North Australia, recorded in my report on the *Challenger* Lamelli-branchiata, p. 118, belongs to the present species and not to *P. lapicida*.

DOSINIA SUBALATA, n.sp. Pl. I, Figs. 11-13.

Shell subcircular, moderately convex, rather thin, white with rosy tips to the umbones, very delicately concentrically striated at first and then rather more distantly towards the base, the threads between the striæ smooth upon the central part of the valves and becoming finely lamellar both anteriorly and behind; lunule elongate-cordate, prominent in the middle, fairly striated; escutcheon raised and keeled down the middle, defined by a shallow depression in each valve extending from near the umbones nearly the whole length of the posterior dorsal margin; the valves at this part consequently exhibit a narrow wing-like prominence; interior of valves whitish; anterior adductor scar narrow, elongate, posterior pyriform; pallial sinus long, tongue-like, extending some way beyond the middle of the valves, blunt at the end; hinge normal.

Length 25, height 24, diameter 11 mm.

Allied to *D. lucinalis*, Lamarek, of which *D. striatissima*, Sowerby, is a synonym. The concentric sculpture of the present species, however, is finer, and it lacks the radiating striæ of *D. lucinalis*. The form of the latter is somewhat different, being shorter in proportion to the height. The pallial sinus is considerably longer in *D. subalata*.

D. calata, Reeve, is even more closely related, and differs only in having stronger lamellæ in front and behind, a larger and much deeper dorsal area marked off by a sharper cristate keel, and a slightly shorter pallial sinus.

ANTIGONA (VENTRICOLA) MINDOROENSIS, n.sp. Pl. I, Figs. 1-3.

Shell sub-globose, very inequilateral, white, with four curved, sub-equidistant, reddish rays, concentrically delicately lamellated, the lamellæ being thin, erect, and cross-striated on the lower side; between the lamellæ the surface exhibits fine thread-like lines, four or five in each interval, also excessively minute curved radiating striæ; lunule broadly cordiform, brown, sunken except in the middle, where it is a little raised; marked with fine raised lines of growth; escutcheon deep, defined by a sharp keel in the left valve, upon which the lamellæ terminate; the portion of the escutcheon in the right valve is smaller than that of the left and less sharply defined, the lamellæ extending further over towards the edge of the valve; umbones yellowish or pale brown at the smooth tips which curve forward over the lunule; interior of the valves white outside the pallial line, very faintly tinted with a kind of flesh tint within the pallial line, which is shortly angularly sinuated; inner edge of the valves very finely crenulated all round excepting on the hinder dorsal margin, the crenulations on the edge of the lunule being finer than those on the ventral edge; anterior adductor scar ovate, posterior larger, sub-reniform.

Length 30, height 28, diameter 16 mm.

A specimen in the British Museum, said to come from Hong-Kong, is a little larger than the Philippine specimen, being 37 mm. long, 35 high, and 21 in diameter.

V. rigida, Dillwyn, of which *V. pilula*, Reeve, is a synonym, in some respects resembles the present species. It is, however, rounder, more globose, differently coloured, has less erect and less delicate lamellæ, and the spotting on the escutcheon, in the left valve only, is peculiar. It is a West Indian shell.

LUCINA EUGLYPTA, n.sp. Pl. I, Figs. 4-6.

Shell irregularly rounded, inequilateral, white, concentrically finely closely lamellated and radially costate between the lamellæ, which are finely frilled through crossing the costæ; valves moderately thick, with a depression marking off a wing-like portion below the straight posterior dorsal margin; lunule very small, deep, under the umbones, which are contiguous, but the tips curl away over the lunule; beyond this there is another ill-defined lunular space enclosed by a slight curved depression on the valves; there are no radiating costellæ upon the hinder wing-like portion of the valves, or upon the lunular space, and consequently the concentric lamellæ are simple and not frilled; interior of the valves white, with the lower margin slightly denticulated; posterior adductor scar pyriform, anterior narrow, long; dentition normal.

Length 17, height 16, diameter 9 mm.

This species bears some resemblance to *L. gemma*, Reeve, in respect of the wing-like hinder part of the valves. There is a great difference in the surface ornamentation of the two species. *L. gemma* has no radiating costæ between the concentric lamellæ, which are beautifully denticulate or serrate. It is also a much flatter species than that now described.

LUCINA TRANSVERSA, n.sp. Pl. I, Figs. 9, 10.

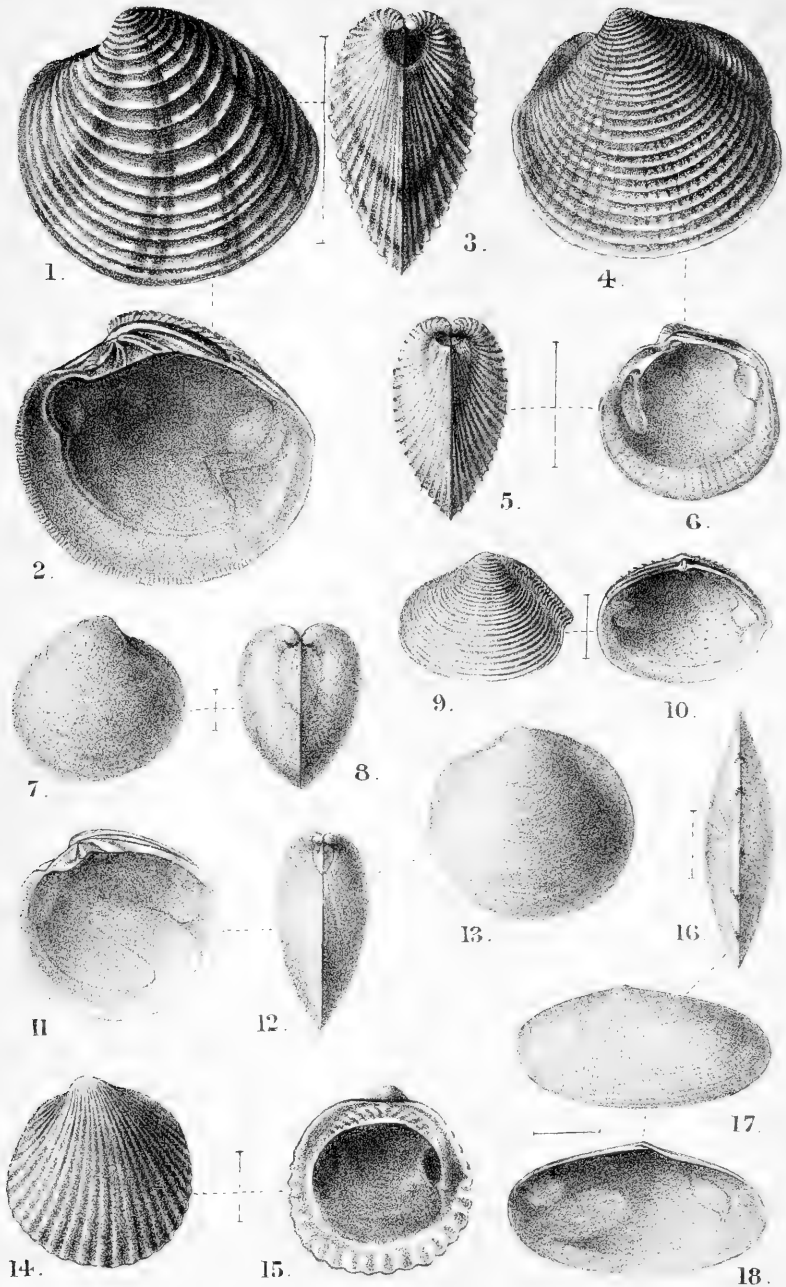
Shell oblong, transverse, almost equilateral, white, concentrically finely ridged, finely yet roughly radiately striated between the concentric ridges or liræ; valves rounded in front with a cristate keel behind, marking off an elongate, lanceolate escutcheon exhibiting only fine growth-lines; lunule sunken, elongate, marked with fine lines of growth; umbones smooth at the tips, contiguous; the posterior keel, which is crested with the concentric lamellæ, forms a point at the hinder end of the valves; interior white; posterior adductor scar rounded except above, where it is as if truncate; anterior scar short, irregularly ovate.

Length 10.75, height 8, diameter 4.75 mm.

Allied to *L. fabula*, Reeve, but more closely concentrically ridged, and not so strongly or regularly striated between the ridges. There are also differences in form.

GLYCIMERIS MINDOROENSIS, n.sp. Pl. I, Figs. 14, 15.

Shell small, irregularly rounded, slightly inequilateral, whitish, with small scattered pinkish spots or dots upon the radiating costæ;



J. Green del. lith. et imp.

these are about twenty-four in number, rounded, sub-equal, excepting a few on each side near the umbones which are more slender. The sulci between the ribs and the costæ also are crossed by very fine crowded lamellæ; the valves are rather thick, having the shorter side (that towards which the umbones incline somewhat) rather straight, the opposite end and the ventral margin being broadly curved. The interior is white, stained on the anterior side with reddish brown; lower and lateral margins coarsely dentate; hinge-teeth, about twelve, arranged in a curved line; anterior adductor scar roundish, posterior elongate-oval.

Length 9, height 9, diameter 5.5 mm.

Somewhat resembling *G. hoylei*, Melvill & Standen, from Torres Straits, but with the umbones more curved over anteriorly, higher in proportion to the length, fewer and coarser hinge-teeth, the ribs are devoid of tubercles, and the concentric fine raised striæ or lamellæ are continuous on and between the costæ.

Although it is impossible to say that the shell described is adult, it does not look as if it would attain much larger dimensions.

For so small a shell the hinge-plate is very thick, and the teeth are strong. The lines of growth are very crowded, and, being continuous over and between the ribs, they have a wavy appearance.

EXPLANATION OF PLATE I.

- Figs. 1-3. *Antigona (Ventricola) mindoroensis*, n.sp.
 ,, 4-6. *Lucina euglypta*, n.sp.
 ,, 7, 8. *Petricola digitale*, n.sp.
 ,, 9, 10. *Lucina transversa*, n.sp.
 ,, 11-13. *Dosinia subalata*, n.sp.
 ,, 14, 15. *Glycimeris mindoroensis*, n.sp.
 ,, 16-18. *Psanmobia philippinensis*, n.sp.
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ON THE SHELLS OF THE SOUTH AFRICAN SPECIES OF THE
SEPIIDÆ.

By EDGAR A. SMITH, I.S.O.

Read 14th January, 1916.

PLATE II.

SOME time ago a collection of Mollusca from South Africa was sent me for determination by Mr. H. C. Burnup, of Maritzburg, Natal. It contained a number of "bones" or shells¹ of cuttlefishes, the identification of which necessitated the study of all the South African forms.² Since the collection contained some new species which had to be described, it seemed it might be useful to offer at the same time some notes on all the South African forms. Although I am unable to give any account of the animals of the new species, the shells appear to possess certain constant reliable characters by which the species can be recognized.

SEPIA VERMICULATA, Quoy & Gaimard.

Sepia vermiculata, Quoy & Gaimard, Voy. Astrolabe, Zool., vol. ii, 1832, p. 64, pl. i, figs. 1-5; d'Orbigny & Férussac, Hist. Nat. Céphal. acétab., 1848, p. 279, pl. iii *bis*, figs. 1-4*b*, copied from Q. & G.

Hab.—Cape of Good Hope (Q. & G.).

M. d'Orbigny suggested that this species and *S. hierredda* of Rang are synonymous, and, judging from the shells only, I am inclined to think he was correct. Certain differences which have been described in the coloration of the animals of the two forms may not, I think, be of much importance.

SEPIA HIERREDDA, Rang.

Sepia hierredda, Rang, Mag. de Zool., Classe V, Mollusques, 1837, p. 75, pl. c; d'Orbigny & Férussac, Hist. Nat. Céphal. acétab., 1848, p. 268, pls. xiii, xviii.

Hab.—Port Elizabeth, Cape Colony, Tongaat Beach, Natal, Lagos, Guinea Coast, Sierra Leone (all Brit. Mus.); Goree, Cape of Good Hope (d'Orb. & Fér.); Goree (Rang).

A large shell of this so-called species from Lagos, presented to the British Museum by Sir Alfred Moloney, is about 230 mm. in length.

This form is narrow, elongate, rather pointed at the anterior end, considerably thick about the middle of the ventral side. The chitinous margin spreads over the dorsal surface at the hinder end. The back is pale down the middle, becoming very pale reddish at the sides. There is scarcely any noticeable central ridge and the surface is finely granulated, the granules sometimes ranged in series following the lines of growth down the middle of the back.

¹ Sepiostaire, sepium, or sepiion.

² Here limited to the coasts of Natal and Cape Colony.

SEPIA ZANZIBARICA, Pfeffer.

Sepia zanzibarica, Pfeffer, Abhandl. Naturwiss. Verein Hamburg, vol. viii, Heft ii, No. 6, 1884, p. 9, figs. 11, 11a.

Hab.—Tonga, Natal (H. C. Burnup); Zanzibar (G. Pfeffer).

A single shell from Tonga agrees in every respect with the description and figure, but is much larger, having a length of 255 mm. The dorsal surface, not referred to by Dr. Pfeffer, is coarsely wrinkled towards the posterior end, the wrinkling becoming gradually more feeble anteriorly.

This species is remarkable for the very broad, deep central depression on the ventral side, and for the great development of the deep inner cone, which is lined with a thick calcareous deposit and has a chitinous outer covering. The yellowish chitinous margin of the shell is well developed all round, and united above, but free from the end of the inner cone. The spine is short and strong, and arises from a much thickened shelly margin. Colour white, excepting an obscure reddish ray on each side, diverging from the posterior end.

SEPIA ACUMINATA, n.sp. Pl. II, Figs. 3, 4.

Shell elongate elliptical, conspicuously tapering and becoming pointed anteriorly; striated area flattish or a little concave, occupying more than half the total length, with a shallow central groove and a few faint striæ radiating from the hinder end, causing the curved transverse striæ to be a little wavy. Chitinous margin broad posteriorly, thinly lined with callus, which is a little thickened beneath the spine, the thickening being ridged or striated. Limbs of the inner cone thickened, united behind, forming a rounded angle, horn-colour. Spine moderate, rounded, not keeled, generally directed slightly dorsally. Dorsal surface reddish, excepting the corneous margin, having a faint central ridge, finely wrinkled and granulated.

Length 103, greatest width 36, greatest thickness 9 mm.

Hab.—Port Elizabeth (J. H. Ponsonby and H. A. Spencer); Tonga Beach, Natal (H. C. Burnup).

A small specimen, 35 mm. in length, described by Dr. G. Pfeffer as *S. venusta*¹ (= *venustoides*, Hoyle) from Zanzibar apparently closely resembles the young of this species.

A specimen from Tonga, 46 mm. in length (pl. ii, fig. 4), differs from other examples of the same size in having the chitinous margin more widely developed posteriorly, and the striated area is longer and divided into three distinct areas, one on each side, and a central one, twice as broad as the laterals. The latter are concave and separated from the central area by a keel or ridge. The striæ on both lateral and central areas are elegantly curved.

¹ Abhandl. Naturwiss. Verein Hamburg, vol. viii, Heft ii, No. 6, 1884, p. 12, figs. 15, 15a.

SEPIA PAPILLATA, Quoy & Gaimard. Pl. II, Figs. 1, 2.

Sepia papillata, Quoy & Gaimard, Voy. Astrolabe, Zool., vol. ii, 1832, p. 61, atlas, pl. i, figs. 6-14.

Shell elongate ovate, in adult specimens sometimes contracted somewhat anteriorly; striated area a little concave, with a median groove or depression which is faintly continued upon the last loculus; inner cone shallow, rounded at the end, its limbs, of a pale brownish colour, reaching almost half the total length, spreading more or less, and sometimes somewhat pointedly produced posteriorly; spine very obtuse and short, with an excavation or pit between it and the margin. The dorsal surface has a feeble central rounded ridge, with a faint depression on each side, and is finely wrinkled everywhere, excepting towards the hinder part, where the wrinkling becomes coarser. The colour of the dorsal surface is pale reddish excepting the posterior thin sides, which are whitish.

Length of Quoy's type 76 mm., width 37.

Hab.—Port Elizabeth (J. H. Ponsonby and H. A. Spencer); Tongaat Beach, Natal (H. C. Burnup); Cape of Good Hope (Quoy & Gaimard).

One of the specimens presented to the British Museum by Mr. Spencer is 134 mm. in length and 60 in width.

In general structure this species resembles *S. mestus*, Gray,¹ from Australia, but differs in the absence of the keeled spine, in the expansion of the limbs of the inner cone being more narrowly produced posteriorly, and in rather coarser dorsal wrinkling. The almost obsolete spine appears to be a constant feature both in young and old specimens.

Quoy & Gaimard do not describe this feature, but it is quite possible they may have regarded it as an abnormality in their specimen, since there is no evidence that they had other examples. However, their figure 12, although somewhat crude, sufficiently shows that their shell had an obtuse spine similar to those in the series I have examined. It should be noted also that the limbs of the inner cones are rather variable. Sometimes, as in the *Astrolabe* figure, they do not expand much posteriorly. On the contrary, in some specimens they spread considerably, and become rather pointed posteriorly. I have given the above particulars, since the description in the *Astrolabe* is very superficial and incomplete.

SEPIA JOUSSEAUMI, Rochebrune.

Sepia jousseaumi, Rochebrune, Bull. Soc. Philom. Paris, sér. VII, vol. viii, 1884, p. 117.

Hab.—Cape of Good Hope (Rochebrune).

This unfigured species is known only by the brief inadequate description. The shell or 'sepium', as it is termed by Steenstrup, is described as "ovoïde, atténué en avant, arrondi en arrière, à ailes large, armé en arrière d'un mucron obtus; face dorsal très finement

¹ Type figured by Hoyle in *Challenger Cephalopoda*, pp. 123, 135.

tuberculeuse; face ventrale concave en arrière, dévisée par un gorge médiane peu profonde, très convexe dans la première moitié”.

The length of the body is given as 61 mm., and consequently the shell would be almost as long.

The only other South African species which has the spine short and blunt is *S. papillata*. The animal of that species, however, does not agree with the description of *S. jousseaumi*, since no mention is made of the occurrence of closely arranged tubercles so characteristic of *S. papillata*.

SEPIA BURNUPI, Hoyle.

Sepia burnupi, Hoyle, Journ. Conch., vol. xi, 1904, p. 27, pl. i.

At the above reference I am of opinion that Dr. Hoyle has included two, if not three, distinct species: (1) The form which I retain as *burnupi* is that figured on pl. i, figs. 188, 189. (2) Figs. 190, 191 represent a second species or possibly the female of the above. (3) Fig. 192 is a third species having several distinguishing features.

The above conclusions have been arrived at through the study of a further series of specimens sent by Mr. Burnup. These I submitted to Dr. Hoyle, and he writes “I agree with you that there are three forms”, but he definitely considers No. 2 the female of No. 1, which I now regard as the type of *burnupi*. He may be right in his conjecture, but until the animals are known it is a case of uncertainty, and therefore I have suggested a distinctive name for this form in the meantime.

No. 1. SEPIA BURNUPI, Hoyle. Pl. II, Fig. 5.

Sepia burnupi, Hoyle, *partim*, pl. i, figs. 188, 189.

This form has the central groove in the ventral surface conspicuously deep, and the marginal limbs are very prominent and closer together. Between them and the outer chitinous margin the surface exhibits very peculiar curved indented striæ, which are not present in No. 2 (*incerta*). The spine is only slightly recurved. The dorsal surface exhibits a central raised fillet, not very strongly defined, and marked with transverse wrinkles or lines of growth. It is of rosaceous tint, excepting the sides anteriorly, which are covered with yellowish epidermis. Largest specimen (probably not adult) 61 mm. in length, 13 in width.

Hab.—Tongaat Beach, Natal (H. C. Burnup).

No. 2. SEPIA INCERTA, n.sp. Pl. II, Fig. 6.

Sepia burnupi, Hoyle, *partim*, pl. i, figs. 190, 191.

The central groove on the ventral surface is not so deep as in *S. burnupi* (No. 1), and the marginal limbs are wider apart. They converge to a sharp point, form a distinct inner cone, and are united to the chitinous margin of the outer cone. The space between the marginal limbs of the inner cone and the outer chitinous margin is quite smooth, and not striated as in *burnupi*. The spine is more distinctly curved towards the dorsal surface than in *burnupi*. This surface has a conspicuous rosy central stripe, from end to end, much

more defined than in *burnupi*, and the central fillet is more prominent. Largest specimen, if perfect, 134 mm. in length, 19.5 in width. Another example is 77 mm. long, and 14 in diameter.

Hab.—Tongaat Beach, Natal (H. C. Burnup); Port Elizabeth, Cape Colony (H. H. Spencer in Brit. Mus.).

No. 3. *SEPIA CONFUSA*, n.sp. Pl. II, Figs. 7, 8.

Sepia burnupi, Hoyle, *partim*, pl. i, fig. 192.

This species is of the same form as *S. incerta*, but is peculiar in having the marginal limbs of the inner cone quite lateral, the surface on each side the central ventral groove regularly convex, and a different kind of striation. Another distinguishing feature is the presence of longitudinal striæ (fig. 8) down the middle of the dorsal surface. These are particularly strong towards the posterior end of the largest specimen examined, but they continue the whole length of the central fillet. The dorsal rosy stripe is narrower in this species than in *incerta*. The character of the inner and outer cone, also of the spine, is similar to that of *S. incerta*.

Largest specimen, if perfect, would measure 130 mm. in length and 19 in width.

Hab.—Tongaat Beach, Natal (H. C. Burnup); Port Elizabeth, Cape Colony (H. H. Spencer in Brit. Mus.).

SEPIA AUSTRALIS, Quoy & Gaimard. Pl. II, Fig. 9.

Sepia australis, Quoy & Gaimard, Voy. Astrolabe, Zool., vol. ii, 1832, p. 70, pl. v, figs. 3-7.

Sepia capensis, d'Orbigny, Hist. Nat. Céphal. acétab., 1848, p. 278, pl. vii, figs. 1-3; pl. xii, figs. 7-11, after Q. & G.; pl. xvii, figs. 18-19.

Sepia sinope, Gray, Cat. Cephalopoda, 1849, p. 106.

Hab.—Agulhas Bank (Q. & G.); Port Elizabeth (H. C. Burnup).

The name *S. sinope* was substituted by Gray for the *S. australis*, Q. & G. (*non* d'Orb.), and he quoted a single imperfect shell in the British Museum collection which was labelled "China". No information concerning its acquirement is attached to the specimen, and consequently in all probability the locality cannot be relied upon. It certainly belongs to the present species.

This is one of the smallest South African forms, and the shell is not likely to be confounded with that of any other species. It is very flat, very acuminate posteriorly, gradually widening towards the middle and then gently narrowing towards the rounded anterior end. The ventral side exhibits a conspicuous central groove which broadens in front. There is also a depression on each side near the lateral margins, so that the surfaces may be said to exhibit three furrows, one central and two lateral. The dorsal surface has a distinct central cretaceous ridge marked off by a shallow depression on each side. The surface is then smooth and somewhat glossy, except towards the lateral margins, which appear to have a yellowish epidermal covering. The smooth areas and the lateral portions of the surface exhibit delicate yet distinct lines of growth. A remarkable characteristic feature, not noticed in any of the descriptions,

is the presence of a short acute dorsal keel adjoining the delicate terminal spine. It is situated upon the centre of the curved hinder portion of the shell. The limbs of the small inner cone are thread-like and quite close to the outer margin.

The name *Sepia capensis*, according to d'Orbigny, was employed by him in 1826, six years before *S. australis* was described by Quoy and Gaimard. Since, however, no confirmation of that statement could be found Dr. Hoyle¹ upholds the latter name, at the same time changing the *S. australis*, founded by d'Orbigny upon an Australian form, to *Sepia novæ-hollandiæ*.

SEPIA INSIGNIS, n.sp. Pl. II, Fig. 10.

Shell elongate, acutely pointed in front, rounded at the posterior end, which is surrounded by a very broad chitinous margin, extending along the sides more than half the length of the shell; the calcareous portion is white beneath but pinkish dorsally; the test is thin, with a narrow ventral groove obliquely striated on each side, then longitudinally obtusely ridged, the striæ being continued over the ridges, forming an angle, and then extending to the chitinous margin, but being interrupted posteriorly by the limbs of the inner cone. These converge to a small rounded end over the moderately deep inner cone, where the cross-striæ are remarkably conspicuous. The dorsal side is curved, obtusely keeled or angled down the middle, and besides delicate lines of growth it exhibits a fine wrinkling posteriorly and very delicate granulation elsewhere. There is no terminal spine,² the end being merely a pale rounded boss.

Length 26, diam. 8 mm.

Hab.—Tonga Beach, Natal (H. C. Burnup).

The two specimens examined agree in every detail, but whether they are the young stage of a species which attains larger dimensions is uncertain. However, the form is so remarkable that I have not hesitated to describe it as new.

HEMISEPIUS TYPICUS, Steenstrup.

Hemisepius typicus, Steenstrup, Dansk. vidensk. Selsk. Skrift., ser. v, vol. x, 1875, pp. 465-82, and pp. i-iv in French, pl. i, figs. 1-10, pl. ii, fig. 1.

Hab.—Table Bay, Cape of Good Hope (Steenstrup).

HEMISEPIUS (?) TUBERCULATUS (Lamarck).

Sepia tuberculata, Lamarck, Mém. Soc. Hist. Nat. Paris, Ann. vii, 1799, p. 9, pl. i, figs. 1A, B, animal; Montfort, Hist. Nat. Moll., vol. i, 1805, p. 274, pl. vii, figs. 1-6, animal and shell.

Spathiosepiion tuberculatum, Rochebrune, Bull. Soc. Philom. Paris, sér. vii, vol. viii, 1884, p. 93.

Hab.—? (Lamarck); Cape of Good Hope (Montfort).

Montfort states that his figures were taken from Lamarck's types,

¹ Proc. R. Phys. Soc. Edinburgh, vol. xvii, 1909, p. 266.

² This may indicate immaturity.

which at one time formed part of the collection of the Prince of Orange. He also mentions the fact that in the catalogue of the collection, in Dutch, the Cape of Good Hope is given as the locality of the specimens.

D'Orbigny has considered Lamarck's *S. tuberculata* the same as *S. papillata* of Quoy & Gaimard, but it seems to me doubtful whether they even belong to the same *genus*, and it is possible that *S. tuberculata* may even be identical with the preceding species (*Hemisepius typicus*).

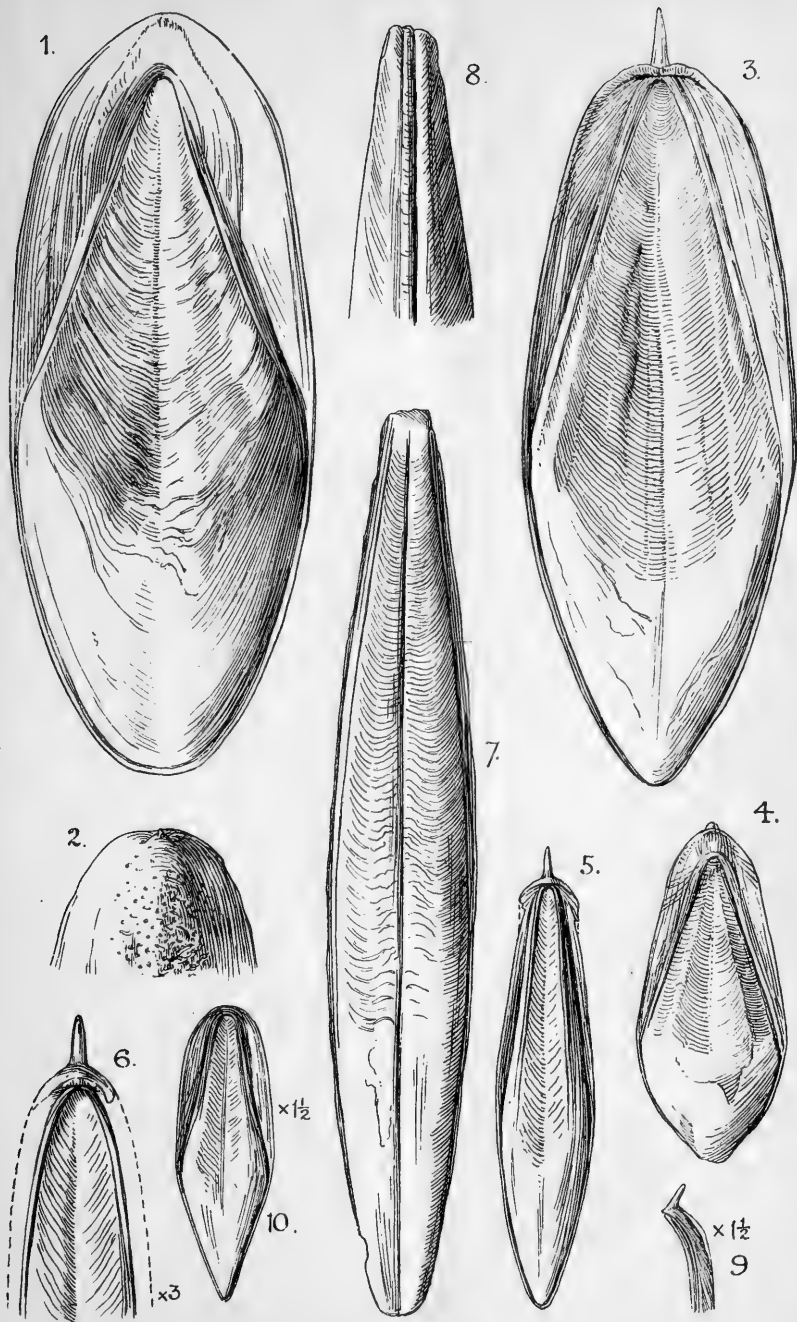
Sepia affinis, d'Orbigny,¹ is not a *Sepia*, but evidently belongs to the genus *Sepioteuthis*, and although said by d'Orbigny and others to be the same as *Sepioteuthis sepoidea* (Blainville, 1823), it is not likely to be identical considering the remoteness of the localities—West Indies and South Africa.

Hab.—Cape of Good Hope (Montfort).

EXPLANATION OF PLATE II.

- Fig. 1. *Sepia papillata*, Q. & G. Ventral surface.
 ,, 2. Id. Posterior end of dorsal side to show the blunt short spine.
 ,, 3. *S. acuminata*, n.sp. Ventral surface.
 ,, 4. Id., jun., abnormal. Ventral side.
 ,, 5. *S. burnupi*, Hoyle. Ventral surface.
 ,, 6. *S. incerta*, n.sp. Posterior end of ventral side.
 ,, 7. *S. confusa*, n.sp. Ventral surface.
 ,, 8. Id. Posterior end of dorsal side.
 ,, 9. *S. australis*, Q. & G. Lateral end of hinder end to show dorsal keel.
 ,, 10. *S. insignis*, n.sp. Ventral surface.

¹ *Sepia affinis*, d'Orbigny, Ann. Sci. Hist. Nat., vol. vii, 1826, p. 156; La Sèche truitée, Montfort, Hist. Nat. Moll., vol. i, 1805, p. 265, pl. vi.



SOUTH AFRICAN SEPIIDÆ.



ON SOME NEW AND OLD MOLLUSCAN GENERIC NAMES.

By TOM IREDALE.

Read 12th November, 1915.

THE names here dealt with are such as have attracted special attention while determining Mollusca from Lord Howe Island in connexion with Kermadec and Norfolk Island forms. Complications have ensued so that it seems convenient to expound some of my solutions herewith. I am very gratified at the continuation of the criticism, in correspondence as well as in print, of my previous notes by Dr. Dall, M. Cossmann, and Mr. Hedley. It is my custom to acknowledge the work of such, and I would here record the fact that a paper by Dr. Dall on the "*Orthaulax pugnax* Zone", published "Jan. 21, 1915", was not received in England, owing to the unusual conditions existing, until the first week in September, 1915. Consequently notes written and published by me long after the first date do not mention this paper, while I was dealing with names that occurred in it. The points wherein my conclusions differ from those arrived at by Dr. Dall will be considered later. It is necessary to make this apology, since all systematic malacologists are so deeply indebted to Dr. Dall's writings, whether his conclusions be absolutely accepted or otherwise. I have received one criticism of my previous notes in which the advice was tendered to "go slow" and lessen the risk of proposing synonyms. I might remark that in cases such as are hereafter set out it is quite impossible to do otherwise than "go slow", though, in the present chaotic state of classification, that does not obviate the chance of creating unacceptable names. It is only by the co-operation of other workers, through the publication of incomplete notes, that the truth can be arrived at in very complex cases.

ANARITHMA, nov. gen.

From a dredging made by Mr. Roy Bell in 15-20 fath. off Lord Howe Island I sorted out some half-dozen shells whose beauty greatly pleased me: my tentative attachment was "*Columbella sensu latissimo*", with distinct leanings towards the Turridæ. Mr. Edgar A. Smith generously helped me in the same manner as when dealing with many other shells, and I now record the results of our search. It was found that owing to its peculiarities the shell had received (at least) *six* specific names, three writers assigning it to *Columbella*, one to *Cythara*, one to *Mitra*, and one to *Clavatula*. Following up its history I found it had been placed, at various times, under no less than *thirteen* genera or sub-genera. It correlates with no known genus at all well, hence I allot it one for itself. Before taking this action, many generic names had to be considered, and I give notes on these to receive criticism.

It had better first be stated that the genus name is proposed for the shell commonly known as "*Columbella lachryma*, Gaskoin",

which I consider conspecific with *Clavatula metula*, Hinds, and my conclusions will be quickly followed by the synonymy here given:—

ANARITHMA METULA (Hinds).

- Clavatula metula*, Hinds, Proc. Zool. Soc., Oct. 1843, p. 44. Ex Mus. Belcher. *Hab.*—(?). Zool. Voy. Sulphur, pl. vii, fig. 12.
- Mitra lachryma*, Reeve, Conch. Icon., *Mitra*, sp. 258, fig. 258, March, 1845. Ex Mus. Metcalfe. *Hab.*—(?)
- C[olombella] pamila*, Chenu, Illust. Conch., pl. xxii, 1848. *Hab.*—(?)
- Columbella lachryma*, Reeve, Conch. Icon., *Columbi* sp. 125, fig. 125, Nov. 1851. Ex Gaskoin MS. In Mus. Cuming. *Hab.*—(?)
- Cythara garrettii*, Pease, Proc. Zool. Soc., 1860, p. 147. In Mus. Cuming. Sandwich Islands.
- Columbella pusiola*, Schmeltz, Mus. Godeff. Cat., iv, p. 88, May, 1869, *nomen nudum*. Fiji, Samoa. (*Anachis pusiola*, Dunker, Malak. Blatt., vol. xviii, p. 157, 1871. Fiji.
- Columbella lachryma*, Hervier, Journ. de Conch., vol. xlvii, Dec. 26, 1899, p. 380; Lifu. Var. *a*, *producta*, p. 381; Lifu. Var. *b*, *abbreviata*, p. 381; Lifu. Var. *γ*, *nitescens*, p. 382; Lifu.
- Columbella sublachryma*, id., p. 382, pl. xiv, fig. 1; Lifu. Var. *a*, *spherica*, p. 384; Lifu.

The wanderings of the names from genus to genus may be recorded individually in chronological order.

Since Hind's *metula* was described from a private museum, it was probably inaccessible to most workers. Hence Reeve copied Hind's figure, but placed it in his genus *Pleurotoma*, sp. 238, Nov. 1845, not recognizing it as his *Mitra lachryma* just previously figured. Tryon, again, copied Reeve's figure when he placed it in *Mangilia* (Man. Conch., vol. vi, 1884, p. 269, pl. xvi, fig. 59), the figure gaining no accuracy in the process. H. & A. Adams, in the Gen. Rec. Moll., vol. i, 1853, p. 96, placed *metula* in *Defrancia*, and *Mitra lachryma*, p. 178, in *Turricula* (*Pusia*). The unique type of *metula* was later acquired by the British Museum, and from the study of it Pace (Proc. Malac. Soc., vol. v, 1902, p. 106, April) classed it with the Columbelloidæ, but without any note as to its identity. I believe this is the first time it has been recognized as conspecific with "*lachryma*". As indicated above, Reeve described a *Mitra* and later a *Columbella* under the same specific name "*lachryma*". It appears probable that Gaskoin, to whom the latter name was accredited, had recognized the Reevean *Mitra* in a shell in the Cuming Collection, and Reeve was ignorant of this fact. Chenu was the first to place it in *Colombella* [*sic*], and of course, not concerned with *Clavatula* and *Mitra*, gave it a new specific name "*pamila*". Pease, ignorant of the preceding history, called it *Cythara garrettii* when he procured it at the Sandwich Islands, this being the first locality ascertained.

Carpenter, in the Proc. Zool. Soc., 1865, p. 516, wrote a note upon Pease's manuscript(?) names, observing "*C[ithara] garrettii* is a *Mitrella*". I have great respect for the accuracy displayed by Carpenter, and cannot understand how he should have blundered so badly in this instance, since Pease's names had been published in the

same journal in 1860. Dunker described *Anachis pusiola*, comparing it with *C. garrettii*, Pease, and almost immediately afterwards Schmeltz (Mus. Godeff. Cat., v, Feb. 1874, p. 127) synonymized both *C. pusiola*, Dkr., and *C. garrettii*, Pse., with *Columbella lacryma*[sic], Gaskoin. Hervier made a detailed study of this shell and its relations, writing: "Elle paraît être le type d'un petit groupe intéressant, caractérisé par son galbe spécial, son mode de sculpture, et la conformation de son ouverture." He describes three varieties: of "*abbreviata*" he notes, "Cette forme serait-elle le *C. pusiola*, Dunker, ou même le *C. linigera*, Duclou? Je n'ai pu m'en convaincre"; and of "*nitescens*," "Cette forme correspond-elle au *C. gracilis*, Reeve, des îles Fidji, qui paraît décrite et figurée sur un échantillon jeuné?" He then added a species *C. sublacryma*, with a variety *sphaerica*.

I have studied the figure of *C[olumbella] linigera*, Chenu, *Illust. Conch.*, 1846, pl. xvii, figs. 13-14, and would not associate it with this species, but believe it is referable to another shell also recovered from these Lord Howe 15-20 fathom dredgings, which is a true *Zafra*. I will elaborate this point later.

I have not found a *C. gracilis*, Reeve, and conclude Hervier referred to *Citharopsis gracilis*, Pease (*Amer. Journ. Conch.*, vol. iv, Nov. 3, 1868, p. 97, pl. xi, fig. 20: Paumotus). The figure appears to be drawn from an adult specimen which should be classed under *Seminella*. I would record Tryon's remark under *C[olumbella] gracilis*, Pease (*Man. Conch.*, vol. v, 1883, p. 167): "Pretty constant in form, but varying in sculpture and coloring. Pease described it from a not perfectly adult specimen. Dunker described the adult under the name of *C. pusiola*. A portion of the original set of the latter species is before me. Mr. Garrett believed *C. pusiola* to = *C. lacryma*, Gaskoin." There is little close affinity between "*C. lacryma*" and "*C. gracilis*", so I at present cannot understand Tryon's note.

However much "*lacryma*" varies—and there is a considerable amount of limited variation—it is an easily recognizable shell. As Hervier noted, it is marked by a striking facies. It has, however, been referred to several groups, and these need consideration. When Pace reviewed Columbelloid names (*Proc. Malac. Soc.*, vol. v, April, 1902) he observed much confusion in connexion with the names *Citharopsis*, Pease, and *Seminella*, Pease, and concluded, p. 42, "It will be best, in my opinion, to restrict the name *Citharopsis* to the very distinct group of *C. lacryma* (Rve.), which species is one of those enumerated by Pease, and *Seminella* to the group of *C. troglodytes*, Sow."; and p. 44, "If *C. lacryma* (Rve.) is correctly referred to the Columbellidæ, Cantraine's *Mitra olivoidea* must accompany it . . . the columella folds are unlike those of *Mitra*, and resembles rather the peculiar split tooth which is met with in so many Columbellidæ." I do not conclude from this that Pace considered *C. lacryma* (Rve.) congeneric with *Mitra olivoidea*, Cantraine; the latter is the type of *Mitrolumna*, Bucquoy, Dollfus, & Dautzenberg, and I would not place "*lacryma*" in the same genus, and in this opinion Mr. E. A. Smith agrees. It was probably due to Pace's comments that Hedley

wrote (Proc. Linn. Soc. N.S.W., vol. xxxviii, 1913, pp. 324-5) when advocating the usage of *Zafra*, A. Adams: "This genus has been neglected and misunderstood. . . . Here H. Adams referred a new species, *Zafra pupoidea*, thereby misleading Nevill, Fischer, and Tryon to transfer *Zafra* to the Pleurotomidæ, with *Z. pupoidea* for type. But H. Adams emphasized his own error by noting that *Seminella* of Pease [type *Columbella garretti*, Tryon] was equivalent to *Zafra*. Another name for 'the minute ribbed Columbelloidæ occurring in the Indo-Pacific region is *Citharopsis*, Pease, type *Columbella lachryma*, Reeve (*Mitra lachryma*, Reeve, 1845 = *Columbella pamila*, Chenu, 1848)'" Hedley then gave a list of Australian shells he proposed to refer to *Zafra*, and on p. 328 introduced a new sub-genus *Retizafra*, with *Pyrene gemmulifera*, Hedley, as type.

This necessitated the investigation of *Seminella* and *Citharopsis*. In the Amer. Journ. Conch., vol. iii, Jan. 2, 1868, p. 233, Pease wrote: "A group of small shells inhabit Polynesia, represented by *Cithara ornata*, Pse., *varia*, Pse., etc., which have been referred by Dr. Carpenter to the genus *Anachis*, A. Ad. Species also occur on West Coast of America and in the West Indies, which differ but slightly from the Polynesian. Perfect specimens are rarely met with. Having collected a few of each species, I find they present the following characters: Smooth, shining, colours sometimes iridescent, more or less closely ribbed longitudinally, and striated transversely; ribs continuous; aperture narrow, outer and inner lips denticulate or lyrate within, inner lip bordered by a slight callosity, outer lip sinuated at or near its junction with the body-whorl. The denticulations are often worn off, and the sinus is shallow or entirely disappears, as the edge of the lip is sharp and thin." p. 234: "I agree with Dr. Carpenter that they should be classed with *Columbellinæ*, but not with *Anachis*, A. Ad., which appears to be a conglomerate genus. *C. miser*, *pacifica*, etc., are not very closely related to the strongly-ribbed Panamic forms, nor to the small iridescent species of Polynesia. I would therefore propose that the latter should be separated under the name of *Seminella*."

Apparently no *Cithara ornata* had been described by Pease, but *Cythara varia*, Pease, had been published in the Proc. Zool. Soc., 1860, p. 147. Consequently this species, by monotypy, became the type of *Seminella*. Carpenter, in the Proc. Zool. Soc., 1865, p. 516, observed "*C[ithara] varia*, Pse., is probably an *Anachis* = *Columbella virginea*, Gld. (from type)".

In a well-known work quoted as the "Donum Bismarckianum", 1871, the name was changed. In the introduction it is recorded that part of this appeared as a paper by Langkavel alone in the Programm Friedrichs-Werderschen Gymnasium. I had not seen this quoted, and found it was not available in the British Museum (Natural History) Library. I indicated my want to Mr. Alexander Reynell, who is becoming famed for his craft in securing rare conchological works, and in this case he immediately procured a copy, from which, by his permission, I make the following notes. In April, 1871, there

appeared in the Programm Friedrichs-Werderschen Gymnasium the article by Langkavel alone on a collection of South Sea shells. This article ran into 35 pages, accompanied by 4 plates with explanation. The first 24 pages are exactly the same as those of the better known "Donum Bismarckianum", but in the latter reprint 43 additional pages appear instead of only 11. That is, the 35 pages of the Programm have in the "Donum" been extended to 67. The 4 plates are the same, absolutely, but in the only copy of the Programm seen these are uncoloured, whereas they are coloured in the "Donum". All the figures therefore date from the Programm as well as the first 24 pages; the majority of the rest of the matter is, of course, novel in the "Donum". This note is here interposed because in the Programm, p. 23, Langkavel proposed the new name "*Columbella (Seminella) Peasei*, nobis. *Cythara varia*, Pease, P.Z.S., 1860, p. 147. *Seminella*, v., Pse., A. J. C., iii, 1867, 233, 234". This change was made on account of the prior *Columbella varia*, Sowerby, 1832. On the same page was recorded *Columbella (Seminella) lacrima* [sic], Gaskoin, *Cythara garrettii*, Pse., being given as synonym. Figures of both these species appear on pl. i, figs. 17, 18, but unfortunately they are not very good. No reference to *Columbella virginea*, Gould, was made by Langkavel.

Tryon (Man. Conch., vol. v, 1883, p. 245) included both species in *Columbella*, using *peasei* as the specific name of the former, and, apparently ignorant of Carpenter's note, also included (p. 180) *Columbella virginea*, Gould, remarking that the type was probably lost. It seems that fortunately such is not the case, but, anyhow, in the British Museum there is preserved a specimen of *virginea*, Gould, received direct from Gould by Cuming, and therefore a paratype; this authentic specimen agrees exactly with authentic specimens, probably types, of Pease's *C. varia* in the same collection. *Columbella virginea* was described by Gould in the Proc. Bost. Soc. Nat. Hist., vol. vii, Sept. 1860, p. 335: China seas; and a tedious search for priority is obviated by the fact that there is a prior *Colombella* [sic] *virginea*, Duclos, Monogr. Colomb., 1840, pl. ii, figs. 15, 16. At present I regard *Seminella* as a well-marked generic group.

Apparently further considering the matter, Pease, in the same Journal (vol. iv, pt. 3, Nov. 3, 1868, p. 97), correctly proposed "*Citharopsis*, nov. gen. Description. T. parva, fusiformi, longitudinaliter costata, nitida, interdum iridescente; labro superne emarginato, intus lirato aut denticulato; apertura angusta. Remarks. I establish the above genus to include a group of small, bright shining species, resembling *Anachis* in the character of their aperture and in being longitudinally ribbed or partially so, and *Cithara* in general shape and emargination of outer lip. Mr. Cuming has placed one species with the Tritons (*T. pusillus*, Pse.). Mr. Gaskoin attached the name of *Columbella lachryma* to another; Dr. Carpenter connects them with *Anachis*, and I have described several as *Cithara*. They evidently belong to the Columbellidæ". Two species were then described, *Citharopsis ornata*, p. 97, pl. xi, fig. 49, from Tahiti, and *C. gracilis*, p. 97, pl. xi, fig. 20, from the Paumotus.

Tryon, in the *Man. Conch.*, vol. v, 1883, p. 168, ranged the species under *Columbella*, renaming *Citharopsis ornata*, Pse., *Columbella garrettii*, Tryon. This name has been accepted, but it was invalid on account of *Cythara garrettii*, a synonym of *C. lachryma*, Reeve. Again, authentic specimens of *Citharopsis ornata*, Pse., are preserved in the British Museum, and these are absolutely true *Zafra*, and have even been determined as variants of *troglydytes*, Souverbie. Further, there is a prior *Cytharopsis*, A. Adams, *Ann. Mag. Nat. Hist.*, ser. III, vol. xv, April 1, 1865, p. 322. *C. gracilis*, Pse., as noted above, I determine to be a true *Seminella*.

The only other species mentioned in relation with *Citharopsis*, viz. *T(riton) pusillus*, Pse., may be here commented upon. This shell was described in the *Proc. Zool. Soc.*, 1860, p. 434, as *Triton pusilla* from the Sandwich Islands, the type being preserved in the British Museum in the Cuming Collection. Tryon, in the *Man. Conch.*, vol. iii, 1881, p. 31, ranged it under *Triton* in the sub-genus *Epidromus*, and on pl. xvi, fig. 156, gave a figure, observing, "Figured from a typical example in Coll. Acad. Phila." Mr. J. R. Le B. Tomlin, identifying shells received from the Sandwich Islands, showed me this species, and I immediately recognized it as one of my puzzling forms. It very rarely occurred in this Lord Howe dredging, and also rarely as a sub-littoral shell at Norfolk Island. When looking up Chenu I observed the same species as *C[olombella] isomella*, *Illust. Conch.*, 1846, pl. ix, figs. 7-8, and Mr. Tomlin has told me he has made, independently, the same determination. It is curious to quote Tryon's remarks concerning this species (vol. v, p. 173)—"The present species may possibly be a small *Pleurotomoid*."

The variation displayed by this species appears to be great, as I suggest all the shells from Lifu are conspecific, though Hervey differentiated these into three species with many varieties as follows in the *Journ. de Conch.*, vol. xlvii, 1899, p. 358, *Columbella lifouana*, pl. xiii, fig. 6: Lifu. p. 359, var. *a*, *rusolineata*, and p. 360, var. *β*, *intermissa*. On p. 360, *Columbella isomella*, Duclos, with p. 361, var. *a*, *transversa*, var. *β*, *subfelina*, pl. xiii, fig. 7, and p. 362, var. *γ*, *notata*. On p. 362, *Columbella striatula*, Dunker, with p. 363, vars. *a*, *sulphurea*, *β*, *rubicunda*, *γ*, *subcarnea*, *δ*, *lineolata*, and *ε*, *immaculata*.

It is possible that there may be more than one species, but as my few specimens also show variation I conclude we have here a very variable species.

I propose to designate this generically by the new name:—

ZAFRONA, nov. gen.

and name *Colombella* [*sic*] *isomella*, Duclos, as type. I think *C. burnupi*, E. A. Smith (*Journ. Conch.*, vol. x, Oct. 1, 1901, p. 112; pl. i, fig. 2: Natal), is congeneric, and I note it is there recorded "The radula is columbelloid".

I hope later to deal in detail with the species referable to the above-named genera, but would observe that *Zafra* seems easily limited, though the species vary in size, sculpture, and shape. Thus some are very small, 2 mm., to comparatively large, 5 mm., from slender to

obese, and from closely sculptured to almost smooth. Hedley's beautiful figures and descriptions in the Proc. Linn. Soc. N.S.W., vol. xxxix, pt. 4, 1915, pp. 740-5, pl. lxxxiii, figs. 68-72, 74, 75, 77, of typical *Zafra* should enable the easy recognition of this genus. I am doubtful about the inclusion of *Pyrene lurida*, and have written to Mr. Hedley for his further opinion. I, however, have not the least doubt in rejecting *Columbella abyssicola*, Brazier, from this association. Mr. Hedley has furnished splendid illustrations of this shell in the Proc. Linn. Soc. N.S.W., vol. xxxii, Oct. 25, 1907, pl. xix, figs. 40-3, and these show the generic characters of quite another group, of which I have a magnificent species in these same dredgings. Other smooth "Columbelloids" I will treat at a later opportunity, but would just summarize this note as follows:—

Genus ANARITHMA, nov. gen.—Here proposed for *Clavatula metula*, Hinds. Hervier has added other species to this group, which I will later discuss. It must be repeated that these are preliminary notes published for the sake of criticism, and later I will develop any points indicated.

Genus ZAFRA, A. Adams.—Hedley has discussed this at the places quoted previously, and I have noted minor points where we differ for further consideration. *Citharopsis*, Pease (not *Cytharopsis*, A. Adams), is an absolute synonym.

Genus SEMINELLA, Pease.—Type, *Seminella varia* (Pease). I consider this a well-marked group, which I will elaborate later. For the purpose of criticism I would cite as members *Columbella leta*, Brazier, Proc. Linn. Soc. N.S.W., vol. i, 1877, p. 232, and *Zafra purpurea*, H. Adams, Proc. Zool. Soc., 1873, p. 206, pl. xxiii, fig. 3.

Genus RETIZAFRA, Hedley.—I think, in view of the complexity of these small "Columbelloids", it would be best to at once consider *Retizafra* as a genus. Through all the variation of *Zafra* no close approach to these reticulate shells is found, and as we might proceed almost directly from *Zafra* into *Seminella*, and thence to *Euplica*, while on the other hand we can grade into a quite smooth shell, I cannot demonstrate a subgeneric value for *Retizafra*.

Euplica was provided by Dall (Bull. Mus. Comp. Zool. (Harv.), vol. xviii, June, 1889, p. 187) with *Columbella turturina*, Duclos, as type. To this genus belongs *Columbella versicolor*, Sowerby, though this shell has been commonly classed in the same sub-genus as *C. tyleri*, Gray, which I refer to *Pyrene*. I will elaborate the relationships of this species later, as I have to deal completely with all the above-named species.

Genus ZAFRONA, nov. gen.—Introduced for *Columbella isomella*, Duclos. The forms at present ranged by me under this name will be reviewed later, as will most of the other species referred to previously.

This note may appear lengthy, but I have endeavoured to limit my remarks to the generic names concerned, and I will fully review the species when I later report on the collections named. Only one further point will I touch on now, and that is the family name. I maintain it should be called Pyrenidæ, not Columbellidæ, while

I agree with Dall and Hedley that *Pyrene* is a distinct genus from *Columbella*. I have been questioned as to my argument, the only rule in this connexion reading "The name of a family is formed by adding the ending *-idae* . . . to the root of the name of its type genus". The only type genus of a family I can recognize is the oldest genus admitted in the family. The selection of any other would cause as much confusion as there is in recognizing the type species of a genus at present, and give rise to even more complications.

TRIVIA.

In these Proceedings, vol. viii, 1909, p. 288 et seq., H. O. N. Shaw gave some "Notes on the genera *Cypræa* and *Trivia*". These notes were of special value as therein was accepted the fact that the "Descr. Cat. Shells by J. E. Gray", usually quoted as of 1832, was never published at that date, but only existed in proof.

Shaw endeavoured to trace the first publication of the new species generally credited to the above-named Catalogue. There is, and always will be, great difficulty in fixing the first user of a manuscript name, when such name has been made commonly available to all contemporary workers. Consequently I now show that most of the data, as regards generic names, provided by Shaw, must be amended, but do not suggest my own results are final. These must be regarded as simply stepping-stones, and my facts are open to further correction as soon as published.

Thus, according to Shaw, *Luponia* and *Trivia* dated from the Conchological Manual of Sowerby, 1839; *Aricia* from H. & A. Adams, 1854; and *Naria* from Gray, 1857. I had noted *Luponia* occurred in Sowerby's Conch. Illus., *Cypræadæ* [*sic*], p. 12, published in Nov.-Dec. 1837, when I referred to the *Penny Cyclopædia*, vol. viii, and found that Broderip monographed the *Cypræidæ* on pp. 254-9, and that his account was based on Gray's "Descr. Cat." Broderip wrote: "Mr. Gray, whose arrangement we select, as being, in our opinion, the best which has hitherto appeared." This article was published in *June, 1837*, or earlier, so that the above four generic or subgeneric names date from here as they all occur in this essay.

On p. 255 *Cypræa* is subdivided into sub-genera, the sub-genus *Cypræa* being accompanied by two illustrations, one of *Cypræa childreni*, Gray, with figs. *a, b* in text, loc. (?); and the other of *Cypræa adamsonii*, Gray, two figures in text, from Pacific Ocean (?). On the same page the sub-genus *Aricia* was proposed with species *Cypræa guttata*, *moneta*, etc. On p. 256 the sub-genus *Naria* appears with only *Cypræa irrorata*, Gray, described from South Seas with two figures in text. Again, the genus *Luponia* is defined (p. 256) with only the species *Luponia algoensis*, figured and described, followed by genus *Cypræovula*, with *C. capensis* alone. Then comes the genus *Trivia*, which is divided into four sections:

Section *a*, *Trivia carnea*, fig. 2 in text and described.

| | | | |
|------------|------------------|---|---|
| β , | <i>europæa</i> | „ | „ |
| γ , | <i>pediculus</i> | „ | „ |
| δ , | <i>pustulata</i> | „ | „ |

In the Proc. Zool. Soc., 1847, p. 142, Gray designated as type of his own genus *Trivia*, *Cypræa europæa*. Consequently we retain *Trivia* in its accepted usage. It is possible that the specialist will find it worth while to examine this article carefully, and I note that *Trivia carnea* may be *sanguinea*, but no change seems necessary in the species-names as given by Shaw. I, at present, am only concerned with *Trivia*, which I now quote as of Broderip, *Penny Cyclopædia*, vol. viii, June, 1837, p. 256 (*ex* Gray MS.).

I would add that the Natural History articles contained in the *Penny Cyclopædia* were reprinted under the name *English Cyclopædia*, edited by C. Knight, who had the articles brought up to date. In this case the article Cypræidæ appears in *Natural History*, vol. ii, 1854, coll. 281-9, but nothing of importance is appended in this later publication.

LAMBIS, Bolten, 1798.

I would just note that the type of this genus, by tautonymy, would be *L. lambis*, which appears to be a form of the shell known as *Pterocera lambis*, and consequently *Lambis* would displace *Pterocera*, Lamarck, which dates from 1799.

DUNKERIA, Carpenter.

This name was introduced as a sub-genus of *Chemnitzia* by Carpenter in the Cat. Mazatlan Shells, B.M., 1857, p. 433, with the diagnosis "Chemnitzia, anfractibus tumidis, decussatis". No type was named and four species were attached, viz. *D. paucilirata*, *subangulata*, *cancellata*, and *intermedia*.

Fischer (Man. Conch., p. 790, Aug. 31, 1885) ranked *Dunkeria* as a sub-genus of *Turbonilla*, naming *D. paucilirata* as example. This is not type designation according to the International Rules, but in the Proc. Biol. Soc. Wash., vol. xvii, Feb. 5, 1904, p. 8, Dall and Bartsch definitely named as type the first species, as Fischer had selected. The Rules read, "Such designation is not subject to change," but the same authors in the U.S. Nat. Mus., Bull. 68, Dec. 13, 1909, p. 12, gave as type *D. subangulata*, the explanation for their action being given on p. 120 as follows:—

"Doctor Carpenter, after diagnosing *Dunkeria laminata* (Ann. Mag. Nat. Hist., 1865, p. 396), writes: 'This beautiful Fenelloid species may be regarded as the type of the group of *Dunkeria*.' Unfortunately this species was not included in the original list, hence cannot serve as type for the group. We had selected the first species, *Dunkeria paucilirata*, of the four cited by Carpenter in his Mazatlan Catalogue, for the type in our Synopsis of the Genera, Subgenera, and Sections of the Family Pyramidellidæ. Since then we have seen Doctor Carpenter's material in the British Museum, and we find that *Dunkeria paucilirata* is a *Pyrgisculus*, and that the second species, *Dunkeria subangulata*, resembles *D. laminata* in form and sculpture, and this bears out the author's intent of typifying the group. *D. cancellata* must be removed to *Pyrgisculus* and *D. intermedia* to *Evalina*."

The argument here presented is not valid, and since I drew up

this note Dr. Bartsch has kindly written me "to carefully note . . . the rules . . . and to hold to them absolutely rigidly". It is somewhat unfortunate that my first instance of the rigid application of the Rules should be in connexion with one of Dr. Bartsch's own rulings. I, however, would remedy this matter by proposing

BARTSCHELLA, nov. gen.

with *Dunkeria subangulata*, Carpenter, as type.

On Dall & Bartsch's conclusions, *Dunkeria* would replace *Pyrgisculus*, while *Bartschella* will come into use for the group *Dunkeria*, Dall and Bartsch, 1909.

A matter of dates may here be stated. In quoting *Dunkeria* I observed that Dall & Bartsch wrote "Cat. Mazatlan Shells, 1856". In the Proc. U.S. Nat. Mus., vol. xlix, July 24, 1915, p. 34, Bartsch has explained this, writing: "His report, Catalogue of the Collection of Mazatlan Shells in the British Museum, was published in parts during the years 1855-1857, the part dealing with our genus appearing in 1856." This is not quite correct, so that it seems necessary to publish the facts at once in order to avoid complications later.

In the Cat. Lib. Brit. Mus. (Nat. Hist.), vol. i, 1903, p. 318, under Carpenter (P. P.), an edition published at Warrington is recorded with the dates "1855-57". This, however, is only a re-issue of the London edition with a new title-page and preface, and the dates 1855-7 are therefore wrongly given. It was published later than the London edition, and the dates only refer to the proof-sheets, not to publication. The Mazatlan Catalogue was "Printed by P. P. Carpenter, Oberlin Press, Warrington", but was published in one item by the British Museum authorities after June, 1857. A preface was written by John Edward Gray, signed "April 22, 1857". The first sheet bears the signature "July 1855 b", the second "Aug. 1855 c", the third "Aug. 1855 d", and so on, the last bearing "June 1857 yy". The signatures have been mistaken by Bartsch for dates of publication, but Carpenter, on p. 546, wrote, "The proof-sheets of this work having been submitted to several naturalists, and fresh sources of information having been obtained during its progress, the following errors have been discovered and additions made."

ELUSA, A. Adams.

Elusa was proposed by A. Adams in the Ann. Mag. Nat. Hist., ser. III, vol. vii, April, 1861, p. 297, with only species *E. teres*. He later included in the genus his *Pyramidella subulata* of the Thes. Conch., vol. ii, 1855, p. 815, pl. clxxii, fig. 13; Proc. Zool. Soc., May 16, 1855, p. 177, pl. xx, fig. 6. This species was erroneously given as the example by Fischer (Man. de Conch., p. 787, Aug. 31, 1885). This error prejudiced writers such as Hedley, Smith, and Melvill, who utilized *Elusa* for *subulata*. It escaped the notice of these writers that A. Adams had been anticipated in his selection of *Elusa* by Walker in the List Spec. Lepid. Insects, B.M., pt. xvi, p. 202, 1858.

I am publishing this note to draw attention to the fact that Dall & Bartsch (Proc. Biol. Soc. Wash., vol. xvii, Feb. 5, 1904, p. 5) have provided as substitute for this misuse of *Elusa* the name

TROPÆAS, Dall & Bartsch,

introduced for *Pyramidella subulata*, A. Adams.

They did not explain that *Elusa* was typified by *E. teres*, which they considered generically distinct from the former, nor that *Elusa* was also invalid. In the U.S. Nat. Mus., Bull. 68, Dec. 13, 1909, pp. 28-9, they did, however, place *Elusa* as an absolute synonym of *Turbonilla*, without, however, adding any remarks. In the meanwhile the misuse of *Elusa* has been continued by Melvill, Schepman, and Hedley, and it is to prevent the further perpetuation of this error that I have given this explanation.

NOTE ON THE OLIGOCENE OF TAMPA, FLORIDA, THE PANAMA CANAL ZONE, AND THE ANTILLIAN REGION.

By WILLIAM H. DALL, Sc.D., LL.D.

Read 10th December, 1915.

THE line dividing the Oligocene from the Miocene in Europe is less distinct than in America, and the particular horizon at which it should be drawn has long been a subject of controversy between Continental palæontologists. In his comparative study of the fossils of Martinique and Panama,¹ M. Cossmann, in referring them to the Miocene, acknowledges (p. 3) that this conclusion is not final, and that it is possible that his views might be modified. Nevertheless, in a recent criticism of my monograph of the Tampa fauna,² in the *Revue Critique de Paléozoologie*, 1915, p. 119, he takes me severely to task for adopting a different view. In general it is of very slight importance by what name we call a fauna provided that it is clear how we define it, and in my introduction to the Miocene volume of the Maryland Geological Survey I have shown that the typical Miocene (Chesapeake) of Eastern America is to be correlated with the Miocene of North Germany and Denmark, and not with the warm-water Miocene of South Europe. Our warm-water Miocene of Virginia and the Carolinas (Yorktown) may be the equivalent of the latter, but it is absent in Florida, where a faunal abyss separates the typical Chesapeake Miocene from the uppermost Oligocene of the Alum Bluff and Oak Grove horizon.

Ordinarily I do not consider that it is well to enter into controversy upon matters of opinion, as time usually settles such questions to the general satisfaction, but when statements of fact are concerned it is not advisable to leave errors uncorrected lest the reader of them may be misled. In the review in question certain statements are made which require correction.

The geological Tertiary column in the Floridian region is very complete, and ties up with the Panama and Antillian Tertiary absolutely, so far as the correlation between the horizon represented by the *Orthaulax pugnax* zone of Tampa is concerned. There is no doubt whatever of their equivalence in fauna. Both M. Cossmann and myself agree in regarding this horizon as probably equivalent with at least the lower part of the Aquitanian of France. Whether this be called Miocene or Oligocene is of little consequence, provided we understand clearly how these terms are defined. M. Cossmann considers that *Megatylotus* is characteristic of the Oligocene, and states that it is absent from the Tampa fauna, which therefore from his point of view cannot be Oligocene. Now the name *Megatylotus* is based on the *Natica crassatina* of Deshayes, which is an Eocene species in both Europe and America, but reaches up to the lower bed at Vicksburg,

¹ Journ. de Conch., vol. lxi, 1913, pp. 1-64.

² Bull. U.S. Nat. Mus., No. 90, 1915.

Mississippi, which is Lower Oligocene. The American form is hardly varietyally distinct from the European and was named *Ampullinopsis* by Conrad twenty years before Fischer separated it. The "genus" is in my opinion but sectionally distinct from *Ampullina*, Bowdich (1822), of which there are in the Tampa fauna three species. No species of this group occur in either division of our American Miocene, which accords with M. Cossmann's view as to the European Miocene.

M. Cossmann complains that the two species of Tampa *Orthaulax* figured are represented by imperfect specimens, but since no complete specimen has ever been known this could not well be helped.

M. Cossmann states that I base my attribution of the Tampa horizon to the Oligocene on the presence in it of *Orbitolites floridanus*, Conrad. Since I have never held nor expressed such an opinion I am at a loss to understand upon what he bases this absolutely incorrect assertion, especially as I have in numerous publications given other grounds for my opinion.

It is regrettable, in view of the many useful and extensive works on palæontology published by M. Cossmann, that he adheres to an obsolete nomenclature and persists in defying the International rules. His completely erroneous view of Bolten's work will be appreciated by those who have read the introductory pages of my recently published Index to the Museum Boltenianum.

I am glad to be able to announce that the sparsely fossiliferous limestone forming the basis of the Floridian peninsula has recently been determined by Dr. C. Wythe Cooke, of the U.S. Geological Survey, to belong to Upper Eocene (Jacksonian). This rock was throughout the earlier literature correlated with the Lower Oligocene (Vicksburgian), and I have been much criticized for maintaining their distinctness since 1892,¹ when I separated it, together with its culminating phase the Ocala Limestone, under the name of the Peninsula Limestone. The palæontologic evidence was at that time insufficient to determine its exact position, and it is satisfactory to have the matter settled.

¹ Bull. U.S. Geol. Surv., No. 84, 1892.

REMARKS ON DR. DALL'S PAPER.

By R. BULLEN NEWTON, F.G.S.

Read 10th December, 1915.

IN this paper Dr. Dall replies to a criticism made by M. Cossmann (*Revue Critique de Paléozoologie*, 1915, p. 119) on his "Monograph of the Molluscan Fauna of the *Orthaulax pugnax* zone of the Oligocene of Tampa, Florida", M. Cossmann being in favour of regarding the Tampa beds as of Miocene instead of Oligocene age. Both authors agree, however, that they belong to the Aquitanian stage of the Tertiary series, so that the chief point for discussion is whether the Aquitanian horizon is to be correlated with the Oligocene or the Miocene. M. Cossmann urges that the absence of *Megatylotus crassatina* in the Tampa beds is against their being referred to the Oligocene, although in support of this view a better reason, I think, might have been advanced from the fact that no Nummulites are found in those deposits. It has been long recognized that Nummulites died out at the end of Oligocene times, being replaced by Lepidocycline Foraminifera in the succeeding Aquitanian and later stages of the Miocene period, and hence European stratigraphists have favoured the Aquitanian being regarded as the oldest Miocene. Dr. Dall appears to have misunderstood the true horizon of the naticoid shell referred to by M. Cossmann as *Megatylotus crassatina*, which is essentially Oligocene, and not known either in the Eocene or Miocene deposits of Europe. This mollusc is more particularly characteristic of the Stampian or upper part of the Oligocene, being typical of certain beds of the Paris Basin known as the "Sables Supérieurs"; the species likewise occurs in similar deposits of England, having been recorded from the Hempstead Beds of the Isle of Wight (R. B. Newton, Syst. List British Oligocene and Eocene Mollusca, British Museum, 1891, p. 241).

It is to be regretted, as pointed out by Dr. Dall, that M. Cossmann is against the adoption of Boltenian names, which are now so widely accepted by conchologists.

DESCRIPTION OF TWO NEW SPECIES OF *ANGASELLA*.

By G. K. GUDE, F.Z.S.

AMONG a number of shells of the genus *Glyptorhagada*, submitted to me for examination by Mr. G. C. Leman, there occurred a single specimen labelled *G. bordaensis*, Tate, which bears no resemblance to that species, and belongs in fact to a different genus, and since it differs from all known forms I venture to append a diagnosis.

Mr. Leman informs me that together with a number of odd shells it was left by Dr. Cox with a dealer, to whom they were sold on the latter's death, and from whom they were purchased in Sydney.

While examining the species of *Angasella* in my collection I came across a shell labelled *A. hinsbyi*, Brazier, which was purchased from Messrs. Sowerby & Fulton as far back as 1900, but the name never having been published—like so many other of Brazier's—I take this opportunity of giving a description.

In a previous paper of mine—these Proceedings, vol. xi, 1915, p. 321, bottom line—a mistake has crept in with reference to the measurement of a shell in Mr. Ponsonby's collection, the altitude being given as 23.5 mm. This should read 11.5 mm.

FIG. 1.—*Angasella lemani*, n.sp.FIG. 2.—*Angasella hinsbyi*, n.sp.*ANGASELLA LEMANI*, n.sp.

Shell moderately umbilicated, subglobular, white, rather solid; the nepionic whorls smooth and shining, the later whorls dull and rather regularly plicate-costate, the costæ somewhat waved at the periphery, becoming more distant on the last whorl; a few of the later ones anastomosing; the interstices finely granulated; spire conoid, apex exserted, suture rather deep. Whorls $4\frac{3}{4}$, convex, slightly angulated at the periphery, becoming rounded towards the aperture, increasing slowly at first, the last $\frac{1}{4}$ whorl rather suddenly, shortly and abruptly deflexed in front, and contracted behind the peristome. Aperture oblique, ovate-rotundate; margins approximate, united by a thin callus on the parietal wall; peristome slightly thickened and reflexed, upper margin slightly ascending, outer and basal margins regularly curved, columellar margin slightly dilated and receding, impinging upon the umbilicus, which is deep and moderately wide at the last $1\frac{1}{2}$ whorls, and contracts suddenly at the earlier whorls.

Diam. maj. 15·5, min. 13·5 mm.; alt. $9\frac{3}{4}$ mm.

Hab.—Cape Borda, Kangaroo Island, South Australia.

Type in Mr. Leman's collection.

The nearest ally of this new species is *A. oligopleura*, Tate, but the latter is much more depressed in the spire, the whorls are less compressed, and the last whorl is less angular at the periphery, while in the new species the last whorl is not angulated around the umbilicus, the costæ are more distant and regular, the aperture is more rounded and the margins more approaching. It is also allied to *A. phillipsiana*, Angas, but that form has a wider umbilicus, the aperture is less rotundate, the last whorl descends more, the peristome is almost continuous, while the costæ are much less prominent. Yet another but more distant ally is *A. arcigerens*, Tate, which, however, is still more depressed, and has the whorls flattened above, with a shallow suture, while the costæ are still more distant, as well as more elevated, and compressed. I have much pleasure in associating with this new species the name of the owner of the type.

ANGASELLA HINSBYI, n.sp.

Shell narrowly umbilicated, subglobular, brown, rather thin, the nepionic whorls finely granulated, the next earlier whorls plicate-striate, the later ones—about $1\frac{3}{4}$ —gradually becoming finely plicate-costate, the costæ being rather crowded and irregular, some more or less anastomosing. Spire convex, apex somewhat sunken, suture rather deep. Whorls $4\frac{1}{4}$, rather elevated, rounded above, slightly flattened below, at first subangulated at the periphery, tumid and dilated at the aperture, and subconstricted below behind the peristome, very shortly and slightly descending in front. Aperture oblique, ovate-rotundate; margins approaching, united by a thin callus; upper margin arcuate, outer and lower margins regularly curved, columellar margin broadly dilated and ascending, slightly overhanging the deep and rather narrow umbilicus.

Diam. maj. 17, min. 14 mm.; alt. 12 mm.

Hab.—Mitchell District, Silvertown, New South Wales.

Type in my collection.

Quite a distinct form, differing from all the other species of *Angasella*, especially in its dark colour and the tumid whorls. Mr. Ponsonby possesses a specimen which measures $19\cdot5 \times 16\cdot25 \times 12\cdot5$ mm., while Mr. Leman has three specimens from the Beddome Collection, one of which is a little more depressed in the spire, measuring $16\cdot5 \times 13\cdot5 \times 10\cdot25$ mm.

BIBLIOGRAPHICAL NOTES.

- I. ON A SET OF THE PLATES PREPARED BY THE REV. THOS. RACKETT (?) TO ILLUSTRATE THE SHELLS DESCRIBED IN THE SECOND EDITION OF HUTCHINS' *HISTORY . . . OF THE COUNTY OF DORSET*.
- II. ON LOVELL REEVE'S *INITIAMENTA CONCHOLOGICA, OR ELEMENTS OF CONCHOLOGY*, WITH THE ASCERTAINED DATES OF PUBLICATION OF THE PARTS.

By ALEXANDER REYNELL.

Read 14th January, 1916.

I. THE CONCHOLOGICAL PLATES AS PREPARED FOR THE SECOND EDITION OF HUTCHINS' *HISTORY OF DORSET*.

THESE consist of twenty-three coloured quarto plates numbered in manuscript and bound to form a volume. Seventeen of these plates, before alteration, were used by Da Costa to illustrate his *British Conchology*, published in 1778. The remaining plates, six in number, were specially prepared and engraved by Peter Mazell, who, according to Bryant's *Dictionary of Painters and Engravers*, last edition, was an English engraver who flourished about 1761-97 and worked for Pennant and Boydell. It would be interesting to have further particulars of this artist.

The volume contains a separate loose manuscript index to the figures on each plate, and also a sheet of four pages of foolscap paper endorsed as follows:—

“References to the descriptions Nos. & Plates in Volume the 8th of the Linnean Transactions as to those which are to be contained in the Plates relating to Shells in Hutchings Hist. Dorset and Dr. Pulteney's work for that publication.

“N.B. the Number on the left of each Species refers to the figures of the Genera in L. S. Transactions, and the Number of the Figure in the work of Dr. P. & to the Figures by Dr. Maton & Rev^d T. Rackett in their Plates to Hutch. Hist. Dorset.”

The references cover three pages of foolscap paper in double columns.

With reference to the plates, several have additional engraved and coloured figures stuck on, and these in some cases eliminate species which appeared in Da Costa's before-mentioned work and which had not been found in Dorset: for instance, on plate xii (plate xv in Da Costa) the figures of Da Costa's *Mya margaritifera* has been covered with figures of what are called on the index slip *Tellina fabula* and *Tellina donacina*. The source of these extra figures has not been ascertained; perhaps they were specially prepared for the History. Hutchins' *History of Dorset* being a folio, two of these quarto plates were printed on a sheet, with the exception of plate xxiii, which appears by itself.

When Maton & Rackett's "Descriptive Catalogue of the British Testacea", which appeared in the eighth volume of the Transactions of the Linnean Society, was reprinted, the plates under consideration were mostly bound up with it, frequently with a manuscript title-page mentioning that they were the plates of the shells described in Hutchins' *History of Dorset*, second edition. My own copy bears such an inscription, as do those belonging respectively to the British Museum (Natural History) [Dr. J. E. Grey's copy] and to Mr. Le Brockton Tomlin, who kindly brought his copy for inspection. These inscriptions are not in Dr. Maton's holograph, and the Rev. Thomas Rackett's does not appear to be known.

I have to thank Mr. B. B. Woodward for the interest he took in this volume of plates and for the trouble he went to in confirming details and obtaining additional particulars.

II. LOVELL REEVE'S *ELEMENTS OF CONCHOLOGY*.

The date of publication of this work is usually given as 1860, but this is far from correct as regards the first volume. There are in existence volumes with the following title-page:—

"Initiamenta Conchologica | Or | Elements of Conchology, | Comprising | The Physiological History of Shells | And | Their Molluscous Inhabitants, | Their Structure, Geographical Distribution, Habits, Characters, | Affinities, Arrangement, and Enumeration of Species. | By | Lovell Reeve, A.L.S., etc., | Author of the 'Conchologica Iconica'. | [Here follow eight lines from Milton's "Paradise Lost", Book iii] | London: | Printed & Published By | Reeve, Brothers, King William Street, Strand; | 1846."

This is followed by a two-page preface dated from King William Street, Strand, February 20, 1846. Some years ago when I came across my copy I compared it with that in the British Museum (Natural History), and found they both agreed. They consist of 160 pages of letterpress and plates A-I and 1-xxxvii. These, with the exception of the title-page and preface, are the same as in the *Elements*.

Recently I obtained a complete copy of the work. From the information gathered from these two copies it is evident that there was a big gap in time between the publication of the first 160 pages, etc., and the rest of the book. The 1846 title-page was issued with Part I. Mr. C. Davies Sherborn kindly confirmed this by a reference to Engelmann.

Unfortunately the parts of the complete copy I have been able to inspect had been prepared (?) for binding, *i.e.* the title-pages and plates had been separated from the text; but the title-page of Vol. II was probably issued with Parts XV and XVI. The data as regards Parts III-XIII are taken from an incomplete but untouched series.

The title-page for Vol. I, issued with Part XII, differs from that issued with Part I, which I have previously given in full. The preface also was entirely rewritten, and is dated from Hutton Brentwood, November 30, 1859. The number of the parts issued is

filled in in manuscript after Part X, the same setting being used for the covers to Parts XI–XVI.

The dates of publication and contents of the parts are as follows:—

| No. of Part. | Date of Issue. | Number of Pages. | Lettered Plates. | Numbers of Figured Plates. | |
|---------------|----------------------------|--|------------------|----------------------------|---|
| I | 1846 | Title-page, Preface, and pp. 1–16 | A, B, C | 1 and 2 | |
| II | undated | 17–32 | D | 3–6 | |
| III | „ | 33–48 | E | 7–10 | |
| IV | „ | 49–64 | F | 11–14 | |
| V | „ | 65–80 | G | 15–18 | |
| VI | „ | 81–96 | H | 19–22 | |
| VII | „ | 97–112 | I, K | 23–25 | |
| VIII | 1848 | 113–128 | L | 26–29 | |
| IX | 1848 | 129–144 | M | 30–33 | Plates 32–3 numbered in roman numerals. |
| X | 1849 | 145–160 | N | 34–37 | Plates xxxvi and xxxvii numbered xxvi and xxvii in error. |
| XI | 1859 | 161–224 | O | 38 | |
| XII | 1859 | 225–256, vol. i, with title-page and preface, 1–16, vol. ii, | | 39–40 | Plates 39–40 numbered in roman numerals. |
| XIII | | 17–64 | | 41–42 | Plates 41–42 numbered in roman numerals. |
| XIV | 1859 | 65–112 | ? | ? | |
| XV } XVI } | 1859 issued together | 113–203 including index | ? | ? | |

On the front covers of Parts IV–X there appears a figure in lithograph of the shell and animal of “The Tiger Cowrey (*Cyprea Tigris*) from the ‘Voyage de l’Astrolabe’; *Quoy*”; this in the subsequent parts is replaced by the monogram of R. L. in an ornamental design. On the inside of the front cover of Part XI is the following notice:—
“Arrangements for the Completion of the | ‘Elements of Conchology’. |

“The publication of the *Elements of Conchology* commenced on the plan of issuing in each number a sheet of sixteen pages of letterpress and five plates.

“At the end of the tenth number it was found that not a third of the letter-press was published, whilst the illustrations were nearly exhausted.

“Difficulties arising out of this and other circumstances concurred to delay the progress of the Work; but the Author has been assiduously occupied upon it during the past twelvemonth, and submits the following arrangement for its completion.

“It is proposed to complete the Work in six Numbers, to appear at intervals of a month, each containing two plates and from forty to fifty pages of letter-press.”

Parts I–X were published by Reeve Bros., King William Street, Strand (Fortin, Masson, et Cie, Paris, also appears on the covers), and Parts XI–XVI by Lovell Reeve, 5 Henrietta Street, Covent Garden.

In conclusion, since each genus has a long list of species attached and the parts were being issued *pari passu* with those of the same author's *Conchologica Iconica*, it is possible that a thorough search through the nomenclature may lead to some revisions. Amongst the genera dealt with the following are suggested as requiring investigation, viz. *Cymbium*, *Ricinula*, *Typhis*, *Pyrula*, *Mangelia*, *Fastigiella*, *Cerithium*, and *Monoptygma*.

NOTE ON THE CARBONIFEROUS GONIATITE *GLYPHIOCERAS*
VESICULIFERUM, DE KONINCK SP.

By G. C. CRICK, F.G.S., F.Z.S., of the British Museum
(Natural History).

[Published by permission of the Trustees of the British Museum.]

Read 14th January, 1916.

IN 1910, in the Proceedings of the Yorkshire Geological Society, Dr. Wheelton Hind described and figured (vol. xvii, part 2, pp. 106, 107; pl. vi, figs. 2, 2a, 2b), from the "Carboniferous Limestone of Elbolton, near Cracoe, Yorkshire (Upper Dibunophyllum zone)", the only example of De Koninck's *Goniatites vesiculifer* which he had found during his many years' work on the Carboniferous Limestone of Great Britain and Ireland. The differences, however, between his description and that of De Koninck were so great that I wrote to Dr. Hind expressing a wish to see the specimen. He very kindly granted my request, and my best thanks are due to him for the loan of the fossil.

The specimen is very well represented in Dr. Hind's figures 2 and 2a.

In his description¹ of the species De Koninck clearly states² that it was when the shell had lost its last whorl that on each side of the peripheral area could be seen a longitudinal vesicular band which was formed during the growth of the animal. These bands are raised and attain a relatively considerable size,³ forming a very prominent feature in a specimen which has lost its body-chamber. They are apparent on the floor of the body-chamber, and have their greatest height at the base of the body-chamber, their height gradually decreasing towards the aperture of the shell; they seem to be of a vesicular character, their surface having a reticulated appearance. They evidently existed from an early stage, and since they were not absorbed during the growth of the animal, as the animal grew forward in its shell and formed new septa, the dorsal (inner) edge of each septum necessarily crossed these bands. When therefore the outer whorl (including not only the body-chamber but some of the septate part of the shell) is removed, leaving its floor attached to the preceding whorl, these longitudinal bands are seen to be crossed by the adherent

¹ L. G. de Koninck, Ann. Mus. Roy. Hist. Nat. Belgique, Sér. Paléont., tom. v (Faune du calc. carb. Belgique, pt. ii), 1880, p. 109, pl. xlix, figs. 10, 11.

² His actual words are: "Lorsque la coquille a perdu son dernier tour de spire, on aperçoit sur chacun de ses côtés une bande longitudinale saillante composée d'une innombrable quantité de petites vésicules, qui s'est formée pendant le développement de l'animal; ce dépôt donne à la section de la spire une forme particulière que je n'ai rencontrée chez aucune autre espèce de *Goniatites*."

³ Being between 4 and 5 mm. wide and about 2 mm. high where the diameter of the shell is about 20 mm.

dorsal edges of the septa. This appears to us to be the aspect presented by Dr. Hind's specimen, for notwithstanding its size (22.5 mm. in diameter) the fossil has evidently lost not only its body-chamber but also nearly a complete whorl of the septate part of the shell, whilst the floor of the missing septated portion and that of the posterior portion of the body-chamber still adheres to the penultimate whorl. We venture to think, then, that Dr. Hind's description is based upon a specimen which has lost its body-chamber and nearly a complete whorl of its septated part, whilst De Koninck's description refers to a shell possessing the outer whorl, the aspect of the shell in these two conditions being entirely different.

Thus De Koninck describes the peripheral arc as regularly convex (*régulièrement arquée*), the aperture of the shell as semilunar and nearly as wide as high, whilst Dr. Hind states that "the periphery is broad, gently convex, separated on each side from an inflated margin by a longitudinal sulcus", and that "below the rolled margin the side of the whorl is flattened and depressed", De Koninck's description evidently referring to the outer whorl of the shell, and that of Dr. Hind to the penultimate whorl after the removal of the outer whorl.

Again, De Koninck mentions only incidentally the nature of the surface of the test, observing, in comparing his species with Phillips' *Goniatites stenobolus*, that in *Goniatites stenobolus* one never meets with the vesicular matter with which the surface of *Goniatites vesiculifer* is covered (*chargé*).

Now Dr. Hind describes the 'ornamentation' as follows: "The sides of the shell are adorned by a number of small, elevated curved radiating costæ, which pass from the edge of the umbilicus and become lost on the swollen band. Between the ribs the lateral surface is covered with numerous regular longitudinal lines. The surface of the inflated part is finely punctate. Test thin." A close examination of the fossil shows that the surface of each longitudinal band is reticulated, these reticulations passing on the peripheral side into fine irregular transverse striæ, and on the lateral area into fine more or less regular transverse striæ crossed by somewhat coarser and fairly-regular longitudinal (spiral) striæ, giving the surface between the band and the edge of the umbilicus a finely-cancellated appearance, the longitudinal lines being somewhat stronger than the transverse. The reticulated and the cancellated surfaces are crossed at fairly regular intervals by the dorsal edges of the septa of the outer whorl, which has been subsequently removed. Our explanation, therefore, of the 'ornamentation' described by Dr. Hind is that it refers to the floor of the outer whorl as it appears attached to the penultimate whorl when the rest of the whorl is removed, the so-called 'curved radiating costæ'¹ on the side of the shell being the dorsal edges of the septa of the missing outer whorl. Having submitted this interpretation of the feature of the specimen to Dr. Hind it is

¹ It may also be pointed out that these costæ constitute the broad curve on each side in the drawing of the suture-line given by Dr. Hind.

satisfactory to be able to state that he considers it highly probable that this interpretation is correct.

The condition of Dr. Hind's fossil already mentioned explains the chief difference between the suture-line figured by him and that figured and described by De Koninck, for whilst De Koninck has described and figured that portion of the septal suture which is usually figured and described, viz., the portion extending from the umbilicus on one side over the periphery (or venter) to the umbilicus on the other side, that is to say, its lateral and ventral portions, Dr. Hind has figured the edge of the septum as it appears on the inside of the dorsal (inner) portion of the outer whorl, when the floor of this whorl remains attached to the penultimate whorl on the removal of the outer whorl itself; that is to say, he has figured the dorsal portion of the septal suture¹ (see Fig. 1, D). Portions, however, of the peripheral and lateral parts of the septal sutures are visible near the anterior end of the specimen on the natural internal cast.² They are indicated in the accompanying figure (Fig. 1, A). Unfortunately some of the peripheral surface of the specimen has here been ground away, so that the course of the septal suture cannot be traced over the peripheral portion of the natural internal cast, but this portion of the septal suture can be seen at a point a little further back (where the shell has a diameter of 18·4 mm.) on the median portion of the periphery, and is shown in the accompanying figure (Fig. 1, B). The septal suture, so far as it can be made out, is reproduced in the accompanying figures (Fig. 1, A-D).

The measurements of Dr. Hind's specimen are: Diameter of shell, 22·5 mm. (100); thickness of whorl, 12·5 mm. (55·5); height of whorl, 11·5 mm. (51); ditto above preceding whorl, 7·0 mm. (31·1); width of umbilicus, 3·0 mm. (13·3). The corresponding measurements of De Koninck's specimen as taken from his figure are: Diameter of shell, 19 mm. (100); thickness of whorl, 10·5 mm. (55·2); height of whorl, 10 mm. (52·6); ditto above preceding whorl, 5·25 mm. (27·5); width of umbilicus, 3·0 mm. (15·7). It will thus be seen that the relative dimensions of the two specimens agree fairly well.

Notwithstanding the differences, therefore, which are apparent between De Koninck's description and that of Dr. Hind, we think these can be satisfactorily explained, and that the English fossil is certainly very near to, and probably identical with, De Koninck's species.

The horizon and localities of this species given by De Koninck are the Carboniferous Limestone of Visé, Belgium (assise VI), and the Carboniferous Limestone of Settle, Yorkshire. The specimen described and figured by Dr. Hind was from the Carboniferous Limestone of Elbolton, near Cracoe, Yorkshire (Upper Dibunophyllum

¹ The broad curve on the lateral area of the whorl figured as part of the septal suture is also described by Dr. Hind as part of the ornament of the shell.

² These are indicated in Dr. Hind's fig. 2 by the curved lines close to the anterior end and in front of the longitudinal vesicular ridges.

zone), and the same author desires me to say that since writing his paper he has recognized in the collection of Mr. John Smith, of Dalry, Ayrshire, five examples of the species from Poolvash in the Isle of Man.

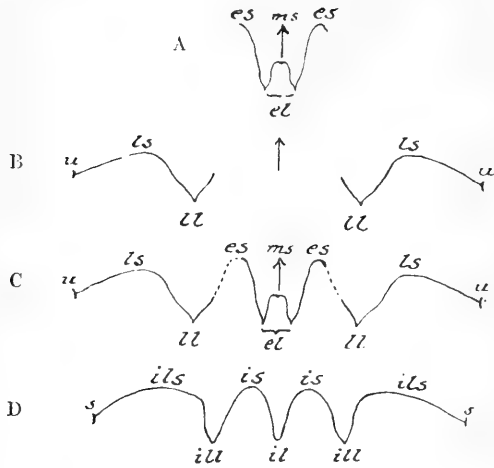


FIG. 1.



FIG. 2.

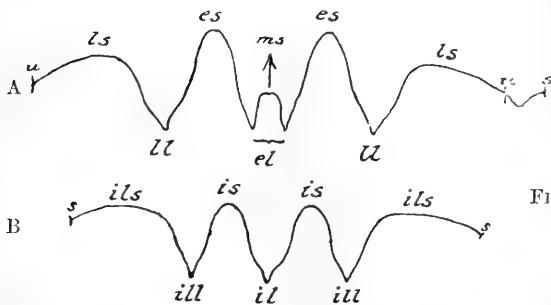


FIG. 3.

FIG. 1.—*Glyphioceras vesiculiferum* (L. G. de Koninck).

A, median part of the ventral portion of a septal suture, $\times \frac{2}{1}$.

B, the lateral portions of the ventral part of another septal suture, $\times \frac{2}{1}$.

C, composite figure of the ventral portion of the septal suture, formed by combining Figs. A and B, the dotted portion being supplied.

D, the dorsal portion of the septal suture.

Drawn from a specimen in the collection of Dr. Wheelton Hind, from the Carboniferous Limestone of Elbolton, near Cracoe, Yorkshire, figured in Proc. Yorkshire Geol. Soc., vol. xvii, part 2, 1910, pl. vi, figs. 2, 2a, 2b.

FIG. 2.—Reproduction of de Koninck's figure of the septal suture of his *Goniatites vesiculifer*.

FIG. 3.—*Glyphioceras sphaericum* (W. Martin).

A, ventral and lateral portions of a septal suture, $\times \frac{2}{3}$.

B, the dorsal portion of a septal suture, $\times \frac{2}{3}$. For comparison with Fig. 1, C and D.

Drawn from the example, from the Carboniferous Limestone of Derbyshire, figured by J. Sowerby, Min. Conch., vol. i (part 10, April, 1814), p. 116, pl. liii, fig. 2, now in the British Museum collection [no. 43871].

In all the figures *el* = external (or ventral) lobe; *es* = external saddle; *il* = internal (dorsal, columellar or antisiphonal) lobe; *ill* = internal lateral lobe; *ils* = internal lateral saddle; *is* = internal (or dorsal) saddle; *ls* = lateral saddle; *ms* = median (or siphonal) saddle; *s* marks the position of the suture of the shell; and *u* indicates the position of the margin of the umbilicus. The arrow marks the median line of the peripheral area and points toward the aperture.

There is also an example in the British Museum Collection [Geol. Dept., register no. C. 18509], but unfortunately the locality is unrecorded. It is much smaller than Dr. Hind's example, being only 12.5 mm. in diameter. It is well preserved, though incomplete, being composed of only the septated part of the shell. On the periphery of the youngest part of the last whorl, immediately in front of the present anterior end of the specimen, the dorsal edge of the last septum is clearly seen, showing that the specimen lacks the whole of the body-chamber. The longitudinal vesicular ridges are quite prominent, extending on one side of the shell over the whole length of the outer whorl and on the other side to within a short distance of the anterior end of the specimen, being highest at the commencement of the whorl and gradually decreasing in passing forwards, until near the anterior end each becomes little more than a relatively coarse meshwork on the periphero-lateral surface of the specimen. On the peripheral side each vesicular ridge passes into somewhat coarse transverse rugæ, which soon become very indistinct, and in turn pass into exceedingly fine transverse lines which occupy the greater part of the median area; whilst on the umbilical side each ridge passes into very fine rugæ, the whole of the lateral area being crossed also by exceedingly fine longitudinal lines, imparting to this portion of the fossil a very fine cancellated appearance. The portions of the peripheral area adjacent to the vesicular bands bear also extremely fine longitudinal lines, which at the anterior end of the specimen seem to pass beneath the vesicular band, and to be lacking on the median portion of this area. The surface of the anterior end of the specimen bears exceedingly fine growth-lines, which have an almost radial direction on the inner half of the whorl, form a shallow sinus on the outer half, an obtuse crest

on the periphero-lateral area, and a broad shallow hyponomic sinus on the periphery. These growth-lines probably constituted the only ornaments of the test.

The meshwork surface passing into the fine irregular striæ on the peripheral area and into the finely-cancellated structure on the lateral area doubtless represents the so-called 'Runzelschicht' or 'wrinkle-layer', which has been recognized and described in quite a number of ammonoids, and which is comparable with the structure in the recent *Nautilus* known as the 'black-layer', which is seen on the peripheral surface of the early part of the last whorl and immediately in front of the aperture.

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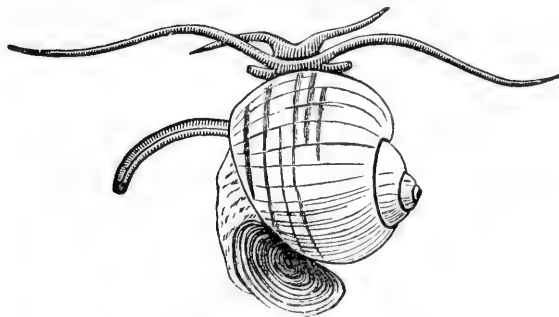
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Conchological Society of Great Britain and Ireland.

HON. Sec. : Rev. L. J. SHACKLEFORD, Taranaki, Vernon Avenue,
Blackpool.

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Members are elected by ballot, after nomination on a form signed by at least two members.

Meetings are held by kind permission at the MANCHESTER MUSEUM on the SECOND WEDNESDAY in each month from SEPTEMBER TO JUNE.

The Journal of Conchology, the organ of the Society, is issued quarterly to all Members.

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For information concerning the

MALACOLOGICAL SOCIETY OF LONDON

See page iv of this wrapper.

INCOME AND EXPENDITURE FOR THE YEAR ENDED DECEMBER 31, 1915.

| Dr. | £ s. d. | Cr. | £ s. d. |
|--|-----------------|------------------------------------|-----------------|
| To Balance from last year | 33 18 0 | By Cost of "Proceedings"— | |
| " Annual Subscriptions— | | Printing and Postage | £66 16 1 |
| Ordinary Members | £29 8 0 | Illustrations | 12 2 3 |
| Corresponding Members | 17 14 8 | | <hr/> 78 18 4 |
| " Annual Subscriptions in arrear— | 47 2 8 | " Printing Circulars | 2 0 0 |
| Ordinary Members | £2 2 0 | " Linnean Society— | |
| Corresponding Members | 2 2 0 | Expenses incurred by use | |
| " Annual Subscriptions in advance— | 4 4 0 | of Rooms | £3 3 0 |
| Ordinary Members | £2 2 0 | Gratuities to Attendants | 2 0 0 |
| Corresponding Members | 2 1 6 | | <hr/> 5 3 0 |
| " Entrance Fees | 4 3 6 | " Secretary's Expenses | 2 17 1 |
| " Life Member | 1 11 6 | " Balance | 45 9 6 |
| " Sale of "Proceedings" | 7 7 0 | | <hr/> £134 7 11 |
| " Donations | 30 9 9 | | |
| " Dividend on £50 Metropolitan 2½% Stock | 4 6 6 | | |
| | 1 5 0 | | |
| | <hr/> £134 7 11 | | |

SPECIAL FUND.

To Balance from last year £20 0 0 | To Balance in hand 1st January, 1916 £20 0 0

We have this day examined the accounts of the Treasurer of the Malacological Society of London, and we find the above statement to be correct.

JOHN H. PONSOBY-FANE, Hon. Treasurer.
January 29, 1916.

A. S. KENNARD } Auditors
FRANCIS W. READER }

ANNUAL GENERAL MEETING.

FRIDAY, 11TH FEBRUARY, 1916.

The Rev. A. H. COOKE, Sc.D., F.Z.S., President, in the Chair.

The Rev. E. W. Bowell and Mr. A. E. Salisbury were appointed scrutineers.

The following report was read:—

“Your Council, in presenting their twenty-third Annual Report, have much pleasure in again recording a year of continued progress.

“The papers printed during the past year have maintained their usual standard of excellence.

“It is with considerable regret your Council have to record the loss by death of a prominent member, Mr. J. J. MacAndrew, F.L.S., while owing to resignation and other causes six more names have been removed from the Society’s rolls.

“During the year two new members have been elected, so that the membership of the Society on December 31st, 1915, stood as follows:—

| | |
|---------------------------------|-----|
| Ordinary members | 69 |
| Corresponding members | 87 |
| | 156 |
| Total | 156 |

“The financial condition of the Society continues in a satisfactory state, considering the adverse influence of the protracted war. We still hold £50 in Metropolitan stock, and the balances on the ordinary special accounts are well maintained.

“The usual three parts of the ‘Proceedings’, Parts 4–6, completing Vol. XI, have been issued during the year. They comprise 164 pages of text, illustrated with 5 plates and 28 text-figures.

“The following authors have very kindly assisted in the cost of these illustrations, or have furnished drawings or photographs for reproduction: The Rev. E. W. Bowell, Prof. A. E. Boycott, G. C. Crick, R. B. Newton, J. R. le B. Tomlin, and B. B. Woodward.

“Further, the thanks of the Society are especially due to the Council of the Linnean Society, through whose kindness it has been permitted, since the year 1894, to hold its meetings in Burlington House.”

On the motion of Mr. Tom Iredale, seconded by Prof. A. E. Boycott, the above was adopted as the Annual Report of the Society.

The following were elected Officers and Council for the year 1916:—

President.—J. R. le B. Tomlin, M.A., F.E.S.

Vice-Presidents.—The Rev. A. H. Cooke, Sc.D., F.Z.S., A. S. Kennard, F.G.S., R. Bullen Newton, F.G.S., Alexander Reynell.

Treasurer.—J. H. Ponsonby Fane, F.Z.S.

Secretary.—G. K. Gude, F.Z.S.

Editor.—E. A. Smith, I.S.O.

Other Members of Council.—Professor A. E. Boycott, M.D., F.R.S., G. C. Crick, F.G.S., Tom Iredale, Charles Oldham, E. R. Sykes, F.L.S., B. B. Woodward, F.L.S.

On the motion of the Rev. E. W. Bowell, seconded by Prof. A. E. Boycott, a vote of thanks was passed to the retiring Officers and members of the Council, and to the Auditors and Scrutineers.

The Rev. Dr. A. H. Cooke proposed a vote of sympathy to Mr. E. A. Smith and his family in his serious illness, which was passed unanimously, and the Secretary was requested to write to Mrs. Smith to this effect.

ORDINARY MEETING.

FRIDAY, 11TH FEBRUARY, 1916.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

The following specimens were exhibited:—

By the President: *Pleurotomaria salmiana*, Rolle, from Tosa, Japan; some rare species of *Marginella*, including *fulminata*, Kien., *guillaini*, Petit. *melvilli*, T. & S., *hirasei*, Bavay, *retusa*, Loc., *osteri*, Jouss., *lata*, Jouss., *pulvis*, Jouss., and *micans*, Petit; a number of forms of Trochidæ and Arculariidæ from the Mediterranean, showing that, although there has been undoubtedly too much 'splitting', the number of species is larger than is generally supposed.

By the Rev. A. H. Cooke: A further series of *Purpura lapillus*, L., from various parts of the British Isles, illustrating variation; a number of drawings of the radulæ of the *Purpura* group (*Purpura*, *Acanthina*, *Cuma*, *Vexilla*, *Pinaxia*, *Concholepas*, *Rapana*, *Choras*, *Topas*, *Sistrum*), from specimens in Professor Gwatkin's collection.

By Mr. G. K. Gude: A series of the genus *Caithaica*, including many extremely rare species, such as *subtilistriata*, Andr., *holdereri*, Andr., *ohlmeri*, Andr., *cucunorica*, Mldff., *futterereri*, Andr., *hermanni*, Gude, *retteri*, Rosen, *funki*, Ancey, *sturanyana*, Kob., all from Central Asia.

By Mr. Tom Iredale: A beautiful collection of Tasmanian Chitons, forwarded by Mr. W. L. May, of Sandford, Tasmania, that has facilitated the detection of several errors, both of omission and commission, that had previously escaped notice.

By Mr. R. Bullen Newton: Normal and sinistral forms of *Marginella bifido-plicata*, Edwards, from the Upper Eocene, Barton, Hants.

By Mr. A. Reynell: Manuscript of Henry Lee's paper on the anatomy of the oyster; manuscript of Gassies' paper on *Bulimus truncatus*; conchological illustrations or figures of new and rare genera and species of shells drawn by Henry Denny, 1834.

ORDINARY MEETING.

FRIDAY, 10TH MARCH, 1916.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. G. C. Crick exhibited an unusually large Rhyncholite, or calcareous part of the upper mandible of a *Nautilus*-like Cephalopod,

which, although not definitely localized, was with much probability of correctness believed to be from the Inferior Oolite of Dorset. The fossil was among the largest recorded examples, being, although imperfect at each end, more than 50 mm. long.

The following communications were read:—

1. "Note on *Triphora smithi*, Sowerby, and *T. gracilior*, Smith." By E. A. Smith, I.S.O.
2. "Note on the occurrence of the Larva of a Cestode Worm in *Polita rogersi*." By Prof. A. E. Boycott, M.D., F.R.S.
3. "Note on *Pholas costulata*, Goodall." By the Right Hon. Lord Walsingham.

ORDINARY MEETING.

FRIDAY, 14TH APRIL, 1916.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. W. James Wintle was elected a member of the Society.

Prof. A. E. Boycott exhibited *Planorbis* from a pond near Radlett, Herts. The specimens of a dark colour were taken in August, 1915; some small pale forms, with striæ more marked, were their progeny. The original specimens were provisionally referred to *P. levis* when compared with *P. albus*, which occurs plentifully in neighbouring ponds.

The following communications were read:—

1. "Note on Holocene Marine Mollusca from the Aran Isles." By J. R. le B. Tomlin, M.A., F.E.S.
2. "Notes on a small collection of Helicoid Land Shells from Wiak Island, Dutch New Guinea, with descriptions of two new species of *Papuina*." By H. C. Fulton.
3. "Notes on the family Ampullariidæ (continued). The genus *Lanistes*." By G. B. Sowerby, F.L.S.
4. "On two editions of Duméril's *Zoologie Analytique*." By T. Iredale.

ORDINARY MEETING.

FRIDAY, 12TH MAY, 1916.

The Rev. A. H. COOKE, Sc.D., F.Z.S., Vice-President, in the Chair.

The following communications were read:—

1. "Descriptions of new Mollusca." By G. B. Sowerby, F.L.S.
2. "Solander as a Conchologist." By Tom Iredale.
3. "Misnamed Tasmanian Chitons." By Tom Iredale and W. L. May.

The Rev. Dr. A. H. Cooke exhibited a series of *Purpura succincta*, Mart., and the var. *textiliosa*, Lam., ranging from Caloundra, Queensland, to Western Australia; also from Tasmania, Norfolk Island, and New Zealand. Many of the specimens were recently received from Dr. Verco, a letter from whom was read.

Mr. A. Reynell exhibited a bound volume of autograph letters from various palæontologists and conchologists, including S. P. Woodward, F. E. Edwards, the Rev. Thomas Wiltshire, W. E. Smith, Sir Joseph Prestwich, Canon A. M. Norman, George Johnston, N. T. Wetherell, S. V. Wood, Dr. Hugh Falconer, Milne Edwards, E. Charlesworth, J. Beete Jukes, and H. Nyst.

Mr. G. B. Sowerby exhibited a specimen of *Argonauta tuberculosa* of extraordinary size (10 × 8 inches).

ORDINARY MEETING.

FRIDAY, 9TH JUNE, 1916.

Mr. A. S. KENNARD, F.G.S., Vice-President, in the Chair.

Dr. Florentino Felippone was elected a member of the Society.

The following communications were read:—

1. "Note on *Erato guttula*, Sow." By J. R. le B. Tomlin, M.A., F.E.S.

2. "On an undescribed Ammonoid from the Lower Greensand (Aptian) of Kent." By G. C. Crick, F.G.S., etc.

3. "(a) Note on *Helix scytodes*, Pfr.; (b) *Martensia* versus *Mertensia*." By G. K. Gude, F.Z.S.

Prof. A. E. Boycott, F.R.S., exhibited a number of specimens of *Bithynia tentaculata* from various Hertfordshire localities, the female forms preponderating; also several specimens of *Pupilla umbilicata* from Cheltenham and Hertford, showing a range in size from 2.5 to 4 mm.

OBITUARY NOTICE.

It is with much regret we have to record the death of William Tompson Bednall. He was born at Leicester in August, 1838, and educated at the Philological School, London. His first employment was at the Jermyn Street Museum of Practical Geology, then under the direction of Sir H. B. De La Beche.

In 1853 he emigrated to Australia and entered the service of the *Register*, a prominent newspaper of Adelaide, South Australia. In 1874 he edited a paper at Port Darwin in the Northern Territory. But after two years in the Tropics he returned to the *Register*, upon which he was engaged till his retirement in 1908. For several years his health was delicate, and he died on July 25, 1915, in his 77th year, leaving a family of one married daughter and three sons.

All his life he was an enthusiastic conchologist. He is associated with two splendid species which he discovered in the Northern Territory, *Voluta bednalli* and *Murex bednalli*. Besides these two, of which he was especially proud, the specific *bednalli* was adopted for Australian members of the following genera: *Acanthochites*, *Chiton*, *Drillia*, *Epidromis*, *Helix*, *Pecten*, *Trigonia*, and *Unio*. For many years he was honorary curator in Conchology to his State Museum.

He was one of the founders of the Royal Society of South Australia, to the publications of which he contributed six articles on Australian Mollusca. His best work was an article on the Polyplacophora of South Australia in the 'Proceedings of the Malacological Society of London' (vol. ii, 1897, pp. 139-59, pl. xii and figs.). His last conchological paper, also on Polyplacophora, written in association with E. H. V. Matthews, appeared in the same journal (vol. vii, 1906, pp. 91-2, pl. ix).

C. HEDLEY.

NOTE.

THE OCCURRENCE OF THE LARVA OF A CESTODE WORM IN *POLITA ROGERSI*. (Read 10th March, 1916.)—In January, 1915, a specimen of *P. rogersi*, B. B. Woodw., was found near Radlett (Herts) which showed on dissection the presence of larvæ of some cestode worm in the lower part of the liver. The cysts, some twenty in number, seem to lie free in the cavities of the liver; they are about 0·4 mm. in diameter, with a pretty tough outer skin. On rupturing this, the scolex is delivered, showing a bilobed appearance, with the head sunk in a pit at one end. There are numerous calcareous bodies. The hooks are, as far as I can see, eighteen or twenty in number and about 0·05 mm. long. The other host of the parasite is presumably something which eats the snail; birds and voles suggest themselves. The foot and tissues of the snail had the peculiar pinkish appearance which is sometimes seen in *P. rogersi* (*Lancashire Naturalist*, vol. vii, 1914, p. 311). The eggs of the tapeworm can evidently pass uninjured through the masticatory apparatus of the snail, which affords further evidence that the radula is a prehensile rather than a grinding apparatus.

A. E. BOYCOTT.

P.S.—Since writing the above I have found apparently the same parasite in six out of ten specimens of *Polita cellaria* (the *scharffi* form) and in two of twenty-one *P. nitidula* collected in August at Sopwell Nunnery, near St. Albans. Mr. Bowell, who was with me, recollects that mouse fæces were abundant where the snails were. *P. rogersi* was not found. A large number of *Polita* have been examined from other localities in South Hertfordshire with negative results.

NOTE ON *TRIPHORA SMITHI*, SOWERBY, AND *T. GRACILIOR*, SMITH.

By the late EDGAR A. SMITH, I.S.O., F.Z.S., etc.

Read 10th March, 1916.

TRIPHORA SMITHI was described by Mr. G. B. Sowerby in these "Proceedings" (vol. vi, p. 175) from a single shell preserved in the collection of the late Admiral Keppel. At the time (September, 1904) the locality was unknown, and the unique shell was referred to as "larger than any other known species of the genus" excepting *T. princeps*, described by Mr. Sowerby at the same time, also from an unknown locality. The object of this note is to point out that *T. smithi* had previously been described by myself as *T. gracilior*, that the species when adult is quite as large as *T. princeps*, and also to give its geographical distribution as far as at present known.

The description of *T. gracilior* was published on November 15th, 1903, in Stanley Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes* (vol. ii, p. 614, pl. xxxv, figs. 18, 19). The species was founded on a single shell from the Maldive Islands, which is preserved in the British Museum. It is 5 mm. shorter than Mr. Sowerby's type, also in the national collection, having a length of 28 mm. In the year 1907 the Museum acquired a large selection of shells from an extensive collection made at the Andaman Islands by the late Rev. J. L. T. Warneford, and among the specimens obtained was a fine example of *T. gracilior*, which if the top of the spire had not been broken off must have measured almost 60 mm. in length.

Mr. Sowerby has given the number of whorls of *T. smithi* as thirty-five, but in my examination of the type I can count only twenty-six. Perhaps Mr. Sowerby may have allowed nine extra whorls for the top of the spire which is wanting, but I do not think it would have consisted of so many. He described the whorls as having 2-4 spirals, which is vague and not quite accurate, since each whorl bears three spirals, the uppermost, below a fine sutural thread, being a little more slender than the other two. The latter also are slightly affected by faint longitudinal depressions, giving them an obscurely beaded appearance. This is noticeable in the types both of *smithi* and *gracilior*, but is hardly apparent in the very large Andaman specimen. The space between the second and third keel is a little broader than that which separates the first and second, and the suture is filo-carinate. The labrum in the adult is a trifle effuse, and exhibits within three grooves, which correspond to three of the external spirals or carinæ, namely, the two peripheral ones close together and one above more remote. The columella has a well-defined callus extending from the junction of the outer lip above to the end of the oblique anterior canal, which is not closed.

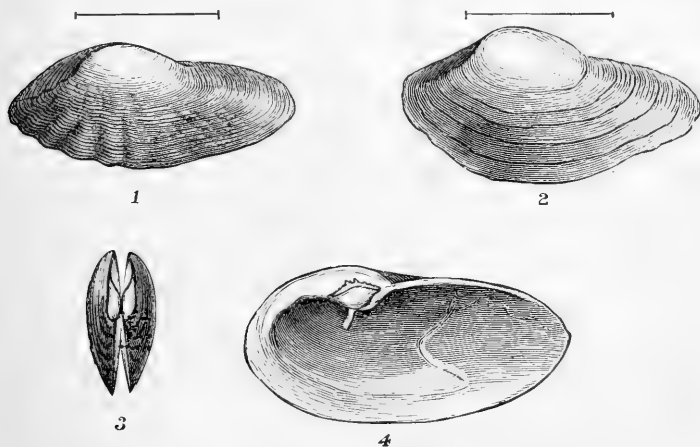
In conclusion, I may add that the figure of *T. smithi* does not give any idea of the true sculpture of the species. That of *T. gracilior* in Mr. Stanley Gardiner's work is fairly accurate.

NOTE ON *PHOLAS COSTULATA*, GOODALL.

By the Right Hon. Lord WALSHINGHAM, M.A., LL.D., F.R.S., etc.

Read 10th March, 1916.

IN 1890 I communicated to the Norfolk and Norwich Naturalists' Society some remarks on a species of *Pholas* dredged by my father off Hill Head, near Gosport, about 1819, and these were published in the fifth volume of the Society's Transactions (pt. 1, pp. 79-86, with figures) accompanied by two interesting letters from Dr. J. Goodall (then Provost of Eton College), to whom the specimens had been sent, and who suggested (*loc. cit.*, p. 80) the name *Pholas costulata*, since he considered it a distinct species allied to *P. candida*. In the same communication is included a letter from Mr. Edgar A. Smith, I.S.O. (then in charge of the Conchological Collections at the British Museum, Natural History), to whom I sent the original specimens, and who expressed the opinion that they represented a depauperated form of *P. candida*.



Pholas costulata, Goodall.—Original woodcut, from the Trans. Norf. and Norwich Nat. Soc., vol. v, pt. 1, 1890, p. 85; taken from Mr. Smith's drawings. Figs. 1 and 2, two sketches showing sculpture and variation in form (enlarged). Fig. 3, dorsal view (natural size), accessory plate removed. Fig. 4, interior, showing hinge characters, etc.

On December 28th last I found on the beach at Hove, Sussex, a small block of chalk, evidently bored by *Pholas*, and cut from it three specimens, two small and one larger (of which one valve was unfortunately broken). I at once recognized these as similar to the species in my grandmother's collection. I searched for several days on the same beach and found many blocks of chalk and shale, containing numerous specimens of *P. parva* and some other shells, but *P. candida* was not represented, nor could I find any further specimens of *P. costulata*.

Pholas costulata differs from *P. candida* in the more convex ventral margin; in the less evenly rounded anterior end, which is more inclined to become angular; in the more attenuated and more widely gaping posterior end; and in the greater thickening of the shell on the dorsal margin by the base of the internal tooth or myophore; as well as in the external ribbing, as pointed out by Dr. Goodall.

I am not greatly concerned with the question whether conchologists will accept the name *costulata*, Goodall, as representing a species truly distinct from *candida*, but I have seen no intermediate forms, and should at once recognize any similar specimens. My personal interest in the subject is specially due to the unexpected coincidence that again connects it with my family. It is somewhat remarkable that a grandson, at the age of 72, should practically rediscover a British shell known to his grandmother as a new species in 1820, which has escaped recognition and publication from that time to this, except in the paper above mentioned.

P.S.—On the 6th of October, 1916, I spent several hours in searching for more specimens of *Pholas costulata*. Failing to find it on the beach where I had first met with it, I visited the coast between Black Rock and Rottingdean to the east of Brighton. Beneath the cliffs, at low tide, many acres of broken chalk-beds are exposed, and these are plentifully bored by *Pholas*. *P. parva* was in great abundance, solid and detached blocks of chalk containing many examples; in the latter case no living specimens were found. *P. candida* also occurred, but quite sparingly. I was unable to discover a single specimen of *P. costulata*, and am inclined to think that those found at Hove must have come from some other, submarine bed of chalk, rather than from that underlying the cliffs toward Rottingdean.

NOTE ON SOME HOLOCENE MARINE SHELLS FROM THE
ARAN ISLES, CO. GALWAY.

By J. R. LE B. TOMLIN, M.A., F.E.S.

Read 14th April, 1916.

MR. KENNARD sent me, some little time ago, a sample of blown sand of Holocene age which he had received from Mr. R. A. Phillips, of Cork. The latter writes that he collected it from a low-lying, sandy marsh at Killeany Bay, Inishmore, Aran Isles, Galway, where there was blown sand covered with grass, and the material was actually obtained from a pit excavated by the wind in this ground.

For convenience of reference the names are given according to the last Conchological Society's list (Journ. Conch., vol. x, 1901, pp. 10-26). The remains of bivalves are in such fragmentary condition that it is only possible to identify them in one or two cases. The following is the list of species:—

- | | |
|--|--|
| <i>Mytilus edulis</i> , L., several. | <i>Bittium reticulatum</i> (da C.), com- mon. |
| <i>Cardium</i> sp.(?), fragments common | |
| <i>Saxicava arctica</i> , L., one valve. | <i>Triforis perversa</i> (L.), one. |
| <i>Acmea virginea</i> (Müll.), two. | <i>Cerithiopsis concatenata</i> , Conti, one. |
| <i>Gibbula cineraria</i> (L.), two. | <i>Odostomia turrata</i> , Hanley, one. |
| <i>Phasianella pullus</i> (L.), common. | <i>Brachystomia rissoides</i> (Hanley), one. |
| <i>Lacuna divaricata</i> (F.), one. | <i>Pyrgulina interstincta</i> (Mont.), three. |
| <i>L. parva</i> (da C.), one. | <i>Eulima bilineata</i> (Alder), one. |
| <i>Littorina rudis</i> (Maton), several. | <i>Cæcum imperforatum</i> (G. Ad.), four. |
| <i>Rissoa parva</i> (da C.) and var. <i>interrupta</i> , Ad., both equally common. | <i>C. glabrum</i> (Mont.), one. |
| <i>Alvania punctura</i> (Mont.), two. | <i>Buccinum undatum</i> , L., one. |
| <i>Manzonina costata</i> (J. Ad.), three. | <i>Purpura lapillus</i> , L., one. |
| <i>Onoba striata</i> (J. Ad.), very common. | <i>Mangilia costata</i> (Don.), one. |
| — var. <i>aculeus</i> , Gld., one. | <i>Clathurella linearis</i> (Mont.), two. |
| <i>Cingula semistriata</i> (Mont.), three. | <i>Tornatina truncatula</i> (Brug.), three. |
| <i>Barleeia rubra</i> (Mont.), one. | |

NOTE ON THE *ERATO GUTTULA* OF SOWERBY AND ON
MARGINELLA SCHEPMANI, N.N. FOR *M. ABYSSICOLA*,
SCHEPMAN.

By J. R. LE B. TOMLIN, M.A., F.E.S.

Read 9th June, 1916.

I. *ERATO GUTTULA*, Sowerby.

SOWERBY'S *Erato guttula*¹ was correctly referred to the genus *Marginella* by Weinkauff,² but he is wrong in suggesting its identity with *M. osteri*, Jouss., or *M. serrata*, Gask. Smith³ correctly unites it with *M. triplicata*, Gask. Sowerby's figure is all but unmistakable, and quite lately I found an interesting confirmation of Smith's verdict on an old tablet from Dr. Gray's collection in one of the British Museum drawers, marked "*Marginella guttula*, Sowerby, Isle of France", and bearing examples of the shell we generally know as *M. triplicata*, Gask. For the future the species must be called *M. guttula*, Sow., since this name is twelve years earlier than Gaskoin's.

This change invalidates *M. guttula*, Reeve (1865), which I regard as a perfectly distinct species, and not a variety of *M. arena*, Kiener, as indicated by Tryon and others. I propose, therefore, to rename it *M. pericalles*. Very beautiful living specimens of it were collected in Bermuda by Colonel Peile.

II. *MARGINELLA ABYSSICOLA*, Schepman.

This species is described in the *Prosobranchia of the Siboga Expedition*, pt. iv, p. 260, pl. xviii, fig. 8 (September, 1911), from a single example dredged in the Banda Sea. Locard,⁴ however, described a *Gibberula abyssicola* in 1897 from the Travailleur and Talisman Expedition, and since *Gibberula* is, in my opinion, a division of very slight importance, and certainly not of generic value, I propose to call the Siboga shell *Marginella schepmani*, after the painstaking author of the monograph.

¹ Conch. Illust., Cypræadæ, p. 16, pl. vii, fig. 50.

² Conch. Cab., p. 156.

³ Proc. Malac. Soc., vol. ix, p. 21.

⁴ Exp. Sci. du Travailleur et du Talisman, vol. i, p. 130, pl. iv, figs. 22-5.

NOTES ON THE FAMILY AMPULLARIIDÆ.

By G. B. SOWERBY, F.L.S.

(Continued from Vol. VIII, pp. 345-364, and Vol. IX, pp. 56-64.)

Read 14th April, 1916.

Genus LANISTES, Montfort, 1810.

THE genus *Lanistes* embraces all the sinistral species of the family,¹ and I see no valid reason for separating *Meladomus* (Swainson) from it; still less can I agree with Bourguignat in dropping the name *Lanistes* in favour of *Meladomus*. Bourguignat gives as his reason that the prior name was used by Humphrey (*Museum Calomnianum*, 1797) for a species of *Mytilus*, but it has been very properly decided that these mere catalogue names should have no status as to priority. Moreover, my copy of the Mus. Calonn. makes no mention of "*Lanistes*", but "*Lanatus*" stands for a variety of *Mytilus discors*.

The genus *Leroya*, Grandidier (Bull. Soc. Malac. France, iv, 1887, p. 185), I place as a sub-genus having spiral sculpturation.

In compiling the following list of species and synonyms I have been compelled, after comparing numerous examples, to place in the synonymy many names that have generally been accepted as applied to valid species. There are others of which I have not seen sufficient numbers to enable me to decide whether they are good species or not; these I have allowed provisionally to stand.

1. LANISTES CARINATUS, Olivier.

Helix bolteniana, Chemnitz, Conch. Cab., vol. ix, 1786, p. 83 [non binom.].

Cyclostoma carinatum, Olivier, Voy. Emp. Ottom., vol. ii, 1804, p. 39.

Ampullaria carinata, Lamarek, Anim. sans Vert., vol. vi, pt. 2, 1822, p. 179.

A. bolteniana, Philippi, Mon. Amp., 1850, p. 20, pl. vi, figs. 4, 5.

A. aegyptica, Ehrenberg, [MS. in] Mus. Berol., Jickeli, Fauna Moll. N.-O. Afrika, Nova Acta Acad. Cæs.-Leop., xxxvii, 1874, p. 227.

Meladomus boltenianus, Bourguignat, Moll. Égypte, 1879, p. 41.

Ampullaria bicarinata, Nevill, Moll. Ind. Mus. Calcutta, Pt. ii, 1884, p. 14. This is scarcely separable even as a variety. The peripheral and umbilical keels are generally more or less prominent in the earlier stages of development.

A. depressa, Nevill, Moll. Ind. Mus. Calcutta, Pt. ii, 1884, p. 14. The more or less depressed examples cannot be definitely separated from the typical form.

¹ The only sinistral *Ampullaria* of which I have heard is a "subvar. sinistrorsa" of *A. globosa*, described by Nevill in the Indian Museum, Calcutta, which is probably unique (Hand List Moll. Ind. Mus., pt. ii, 1884, p. 2).

Lanistes duveyrarianus, Revoil, Bull. Soc. Malac. France, vol. ii, 1885, p. 99, pl. vi, fig. 5.

Hab.—River Nile.

2. LANISTES BOURGUIGNONI, Putzeys.

Putzeys, Bull. Soc. Roy. Malac. Belg., vol. xxvii, 1898, p. 23.

Hab.—Mouth of Linoma River, Congo.

3. LANISTES CONGICUS, Böttger.

In Schepman's notes on Leyden Mus., vol. xiii, 1891, p. iii.

Hab.—Congo.

4. LANISTES FOAI, Germain.

Bull. Mus. Hist. Nat. Paris, vol. xi, 1905, p. 256.

Hab.—Upper Congo.

5. LANISTES GRASSETI, Morelet.

Journ. de Conch., vol. xi, 1863, p. 267, pl. x, fig. 2.

Hab.—Madagascar.

In this species the vertical riblets are unusually prominent, giving the shell somewhat the appearance of a bulbous *Épitonium*.

6. LANISTES GUINAIUS, Lamarck.

Cochlea guinaica, Chemnitz, Conch. Cab., vol. ix, 1786, p. 8 [non binom.].

Ampullaria guinaica, Lamarck, Anim. sans Vert., vol. vi, pt. 2, 1822, p. 178.

Hab.—Lagos, Gaboon, etc.

7. LANISTES HOLOSTOMA, Morelet.

Journ. de Conch., vol. viii, 1860, p. 191.

Hab.—Guinea.

8. LANISTES INNESI, Pallory.

Bull. Inst. Égypt., ser. iv, No. 3, 1902, p. 91.

Hab.—Upper Nile.

9. LANISTES INTORTUS, Lamarck.

Ampullaria intorta, Lamarck, Anim. sans Vert., vol. vi, pt. 2, 1822, p. 179.

A. intorta, Philippi, Mon. Amp., 1850, p. 23, pl. vi, fig. 3.

Lanistes plicosus, Martens, Novitates, vol. v, 1877-9, p. 191, pl. clvi, figs. 3-5.

Hab.—Zambi (Mayumbe), Congo (Dupuis & Putzeys).

10. LANISTES JOUBERTI, Bourguignat.

Meladomus jouberti, Bourg., Icon. Anim. Moll. Tanganyika, 1888, pl. vi, fig. 6.

Hab.—Lake Tanganyika.

This may prove to be a gigantic form of *L. ovum*.

11. LANISTES LETOURNEUXI, Bourguignat.

Meladomus letourneuxi, Bourg., Moll. Abyss. Égypte, 1879, p. 41.

Lanistes letourneuxi, Smith, Proc. Zool. Soc., 1881, p. 276.

Hab.—South Egypt.

12. LANISTES LYBICUS, Morelet.

Ampullaria lybica, Morelet, Rev. Zool., 1848, p. 354.

A. lybica, Philippi, Mon. Amp., 1850, p. 25, pl. vi, fig. 8.

A. bernardiana, Morelet, Journ. de Conch., vol. viii, 1860, p. 190.

Meladomus vignoni, Bourg., Moll. Afr. Équat., 1889, p. 177.

M. pfeifferi, Bourg., ib., p. 173.

M. alexandri, Bourg., ib., p. 178. Evidently an immature shell.

Var. *nsendweensis*, Dupuis & Pützeys, Ann. Roy. Soc. Malac. Belg., vol. xxxvi, 1901, p. 54.

Hab.—Gaboon, Assinia, Congo, Guinea, etc.

This species, though subject to much variation, is easily separable from all others. The forms which authors have named as species are scarcely varieties, but denote differences in age and development.

13. LANISTES SCHWEINFURTHI, Ancey.

Mém. Soc. Zool. France, vol. vii, 1894, p. 223.

Hab.—Victoria Nyanza.

14. LANISTES MAGNUS, Furtado.

Journ. de Conch., vol. xxxiv, 1886, p. 147, pl. vi, fig. 3.

Hab.—Luapula River.

15. LANISTES NEAVEI, Melvill & Standen.

Mem. and Proc. Manchester Lit. and Sci. Soc., vol. xli, 1907, p. 6.

Hab.—Mtesize River, Loangua, and Zambezi River.

16. LANISTES NILOTICUS, Sowerby.

In Swainson's Zool. Illust., ser. II, 1831, pl. xxxviii, fig. 3.

Hab.—River Nile.

17. LANISTES NYASSANUS, Dohrn.

Proc. Zool. Soc., 1877, p. 715, pl. lxxiv, fig. 8.

Hab.—Lake Nyassa.

18. LANISTES OVUM, Peters.

Ampullaria ovum, Peters, Arch. Natur., 1835, p. 215; Philippi, Mon. Amp., 1851, p. 22, pl. vi, fig. 2.

Lanistes ellipticus, Pfeiffer, Novit. Conch., 1866, p. 294, pl. lxx, figs. 9, 10.

L. ovum, var. *elatio*r, Pfeiffer, Novit. Conch., vol. ii [1870], p. 291, pl. lxx, figs. 7, 8.

L. affinis, Smith, Proc. Zool. Soc., 1877, p. 716, pl. lxxiv, fig. 7. After comparing a large number of specimens, I am compelled to unite this with *L. ovum*.

L. ellipticus, var. *trapeziformis*, Furtado, Journ. de Conch., vol. xxxiii, 1885, p. 150.

L. ellipticus, var. *luapulensis*, Furtado, Journ. de Conch., vol. xxxiii, 1885, p. 151.

L. zambeziensis, Furtado, Journ. de Conch., vol. xxxiv, 1886, p. 148, pl. viii, fig. 1.

Meladomus ambiguus, Bourg., Moll. Équat. Afr., 1889, p. 172.

M. deguerryanus, Bourg., Moll. Équat. Afr., 1889, p. 175. Evidently a young shell.

Lanistes affinis, var. *manayarana*, Sturany, in Baumann, Durch Massailand, 1894, p. 310, taf. xxiv, fig. 32.

Hab.—Mozambique, Angola, Lake Nyassa, etc.

19. LANISTES PALUSTRIS, Morelet.

Ampullaria palustris, Morelet, Journ. de Conch., vol. xii, 1864, p. 158.

Hab.—Senegal.

20. LANISTES OLIVACEUS, Sowerby.

Paludina olivacea, Sowerby, Gen. of Shells [No. 41, 1834, *Paludina*, fig. 3].

Ampullaria purpurea, Jonas, Arch. Naturg., 1839, p. 242, pl. x, fig. 1.

Bulimus tristis, Jay, Cat. of Shells, 1839, p. 121, pl. vii, fig. 1.

Meladomus bulimoides, Swainson, Treat. on Malacology, 1840, p. 340.

M. olivaceus, Sow. (selected as the type of the genus), Gray, Proc. Zool. Soc., 1847, p. 148.

M. olivaceus (Sow.), H. & A. Adams, Gen. of Shells, i, 1858, p. 349, pl. xxxvi, fig. 6.

M. pyramidalis, Letourneux, in Bourg. Moll. Égypte, Abyssinia, etc., 1879, p. 36.

Ampullaria procera, Martens, Novit. Conch., vol. ii [1870], p. 292, pl. lxxi, figs. 1, 2.

Meladomus nitidissimus, Bourg., Moll. Équat. Afr., 1889, p. 171.

M. bloyeti, Bourg., ib., 1889, p. 171.

Hab.—Mozambique, Zanzibar, Ousaghara, Congo, etc.

A very variable and widely distributed species. The shells are generally pyramidal in form, but they sometimes partake of a more oblong-oval shape. Some are distinctly umbilicated, others almost or quite imperforate.

21. LANISTES SINISTRORSUS, Lea.

Paludina sinistrorsa, Lea, Trans. Amer. Phil. Soc., vol. vi, 1839, p. 98, pl. xxiii, fig. 78.

Ampullaria sinistrorsa, Philippi, Mon. Amp., 1850, p. 64, pl. xxi, fig. 3.

Hab.—Usagara, and Lake Tanganyika.

22. LANISTES SOLIDUS, Smith.

Proc. Zool. Soc., 1877, p. 716, pl. lxxiv, figs. 10, 11.

Hab.—Lake Nyassa.

23. LANISTES SUBCARINATUS, Sowerby.

Ampullaria subcarinata, Sowerby, Gen. of Shells, [No. 4, 1822].

Hab.—Congo.

24. LANISTES STUHLMANNI, Martens.

Besch. Weichth. Ost. Afr. (Deutsch-Ost-Afrika, vol. iv), 1898, p. 171, pl. vi, fig. 37.

Hab.—Congo (Dupuis & Putzeys).

Sub-genus LEROYA, Grandidier.

Bull. Soc. Malac. France, vol. iv, 1887, p. 185.

25. LANISTES (LEROYA) CHARMETANTI, Grandidier.

Leroya charmetanti, Grandidier, Bull. Soc. Malac. France, vol. iv, 1887, p. 193.

Hab.—Lake Tanganyika.

26. LANISTES (LEROYA) BOURGUIGNATI, Grandidier.

Leroya bourguignati, Grandidier, Bull. Soc. Malac. France, vol. iv, 1887, p. 182.

Hab.—Lake Tanganyika.

27. LANISTES (LEROYA) CILIATUS, Martens.

Lanistes ciliatus, Martens, Monatsber. K. Acad. Wiss. Berlin, 1875, p. 296, pl. ii, figs. 8–10.

Hab.—Zanzibar.

28. LANISTES (LEROYA) FARLERI, Craven.

Lanistes farleri, Craven, Proc. Zool. Soc., 1880, p. 218.

L. sculptus, Martens, Sitz. Ber. Naturf. Freunde Berlin, 1887, p. 96.

Hab.—Magela, Usambasa.

AMPULLARIA.

The following names have been omitted:—

154. AMPULLARIA (PILA) POLITA, Deshayes.

Encyc. Méth. Vers., vol. ii, 1830, p. 31; Reeve, Conch. Icon., sp. 35.

Ampullaria virescens, Deshayes, Dict. Class. Hist. Nat., tom. xvii, 1831, pl. lxxxvii, fig. 2.

A. pagoda, Morelet, Journ. de Conch., vol. xiii, 1865, p. 227.

A. polita, var. *compressa*, Nevill, Moll. Ind. Mus., Pt. ii, 1884, p. 7.

A. polita, var. *major*, Dautz. & Fisch., Journ. de Conch., vol. liii, 1906, p. 426.

A. brohardi, Granger, Le Naturalist, 1892, p. 79.

The last is a remarkable abnormal form (E. A. Smith, Proc. Malac. Soc., vol. iv, 1900, p. 40).

Hab.—Cambodia.

155. AMPULLARIA (PILA) RUFILINEATA, Reeve.

Conch. Icon. Amp., sp. 7.

Hab.—Pegu.

156. AMPULLARIA IMPERFORATA, Swainson.

Philos. Mag., 1823, p. 401.

I am quite unable to identify this, as the description is very vague and the habitat unknown. Swainson takes it for a western form, but not knowing the operculum he says "operculum corneum?"

ADDITIONAL SYNONYMIC NAMES.

Ampullaria conica, Swainson = VIRENS, Lamarck (see Proc. Malac. Soc., vol. ix, p. 61).

A. borealis, Valenciennes = NATICA HEROS, Say.

A. caliginosa, Reeve = PALUDOSA, Say, Proc. Malac. Soc., vol. viii, p. 358; vol. ix, p. 64.

A. rugosa, Valenciennes = URCEUS, Müller, Proc. Malac. Soc., vol. viii, p. 358.

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rotundata, Say, viii, 357.
rufilineata, Reeve, viii, 357; xii, 69.
rugosa, Lam., viii, 358.
rugosa, Sow., ix, 58; xii, 68.
rugosa, Val., xii, 70.
saxea, Reeve, ix, 61.
scalaris, Orb., viii, 357.
schrammi, Crosse, viii, 357.
schweinfurthi, Ancy, xii, 67.
sculptus, Marts., xii, 69.
scutata, Mouss., ix, 58.
semitecta, Mouss., viii, 357.
simplex, Reeve, viii, 357.
sinamarina, Bourg., viii, 357.
sinistrorsa, Nev., ix, 59.
sinistrorsus, Lea, xii, 68.
solidus, Smith, xii, 68.
sordida, Swains., viii, 357.
speciosa, Phil., ix, 61.
sphaerica, Hanley & T., ix, 59.
spixi, Orb., viii, 348.
sprucei, Reeve, viii, 347.
stoliczkana, Nev., ix, 58.
storeria, Jay, viii, 358.
strebeli, Marts., viii, 358.
stuhlmanni, Marts., xii, 69.

- subampullacea*, Nev., ix, 61.
subcarinatus, Sow., xii, 69.
subglobosa, Nev., ix, 61.
subscutata, Mouss., ix, 61.
sumatrensis, Phil., ix, 56.
swainsoni, Phil., viii, 354, 358.
swainsoni, Reeve, viii, 354.
tamsiana, Phil., viii, 358, 364.
tenuissima, Jonas, viii, 358.
testudinea, Reeve, viii, 358.
theobaldi, Hanley, ix, 61.
trapeziformis, Furt., xii, 68.
tristis, Jay, xii, 68.
trochulus, Reeve, viii, 358.
turbinis, Lea, ix, 56, 61.
turbinoides, Reeve, ix, 58.
urceus, Müll., viii, 358; xii, 70.
venetus, Reeve, viii, 352.
- vermiformis*, Reeve, viii, 353, 363.
vexillum, Reeve, viii, 356.
vignoni, Bourg., xii, 67.
villata, Marts., viii, 350.
violacea, Val., viii, 358.
virens, Lam., ix, 61; xii, 70.
virescens, Desh., xii, 69.
vitrea, Born., ix, 62.
vittata, Reeve, ix, 62.
wellesleyana, De Morg., ix, 56.
wellesleyensis, De Morg., ix, 62.
wernei, Phil., ix, 62.
winkleyi, Pilsb., ix, 62.
woodwardi, Dohrn, ix, 62.
yatesi, Reeve, viii, 358.
yucatanensis, Cr. & F., viii, 353.
zambeziannus, Furt., xii, 68.
zonata, Spix, viii, 359.
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DESCRIPTIONS OF SEVEN NEW SPECIES OF MOLLUSCA
BELONGING TO THE GENERA *DRILLIA*, *CLAVATULA*,
EPITONIUM, *CANTHARIDUS*, *BITTIUM*, *FISSURELLA*, AND
CARDIUM.

By G. B. SOWERBY, F.L.S.

Read 12th May, 1916.

PLATE III, FIGS. 1-8.

1. *DRILLIA CARMEN*, n.sp. Pl. III, Fig. 2.

Testa fusiformis, fulvo-albida, fusco pauci-maculata; antice breviter rostrata, postice elato-turrita; spira elongata, acuta; anfractus $8\frac{1}{2}$, primi 2 leves, nitentes, leviter oblique contorti, cæteri convexi, spiraliter regulariter filo-lirati, longitudinaliter crassi-plicati, plicis rotundatis, obtuse angulatis, interstitiis pallide fusco maculatis; sutura leviter impressa; anfractus ultimus $\frac{1}{2}$ longitudinis testæ æquans, supra obtuse angulatus, deinde leviter convexus, infra medium contractus et attenuatus; apertura oblonga, canalis productus, latiusculus; columella rectiuscula, antice producta; labrum acutum, sinu postico latiusculo. Long. 18, maj. diam. 8 mm.

Hab.—Goto, Hizen, Japan (Hirase).

A typical *Drillia*, with somewhat angular whorls, and numerous rounded longitudinal plicæ; finely spirally lirate throughout. The plicæ are rendered conspicuous by the light-brown colouring of the interstices. Perhaps the nearest species is *D. griffithi*, from which it may be readily distinguished by its much more delicate sculpture.

2. *CLAVATULA DECORATA*, n.sp. Pl. III, Fig. 1.

Testa fusiformis, tenuis, fulvo-fusca; spira acute turrita, elata; anfractus 10, concavi, leves, inferne carina conspicua albo anguste zonata multi-tuberculata et fusco interruptim unilineata ornata; sutura sulcata, infra carina levis angusta marginata; anfractus ultimus $\frac{1}{2}$ longitudinis testa æquans, supra valde concavus, ad peripheriam carina tuberculata per-prominens instructus (tuberculis albis oblique verticalis) infra angulum anguste spiraliter grano-liratus, deinde contractus et rostratus; apertura medioeriter lata, canalis longus; labrum tenue, postice late et profunde sinuatum. Long. 21, diam. 8 mm.

I have only seen a single individual of this species. It was found in the collection of the late Admiral Keppel without any indication of its habitat, but comes very likely from Sierra Leone, where the Admiral collected largely.

The shell is one of striking character, the whorls being unusually concave, with a stout prominent keel, crossed by numerous oblong somewhat oblique white tubercles or short plicæ, which are rendered more conspicuous by a brown intersecting spiral line.

3. *EPITONIUM REYNOLDSI*, n.sp. Pl. III, Fig. 4.

Testa imperforata, angusta pyramidata, solidiuscula, fusco-grisea, albo-balteata; spira turrita, acuta; anfractus 10, rotundati, obscurissime

cancellati, varicibus inæqualibus subdistantibus plerumque tenuibus, hic illic plusminusve crassis muniti; sutura angusta; anfractus ultimus $\frac{1}{3}$ longitudinis testæ æquans, fusco bizonatus, albo late balteatus; apertura fere circularis; peristoma crassum, album. Long. 18, maj. diam. 7 mm.

Hab.—Florida (Reynolds).

This species, of which I have only seen a single specimen, was sent by Mr. Reynolds, of Florida. It differs considerably from any of its congeners. Its surface is rendered slightly rugose by very faint cancellating striæ, and its varices are for the most part thin, and very slightly raised; but at distant intervals there are a few much stouter ones.

I have been at variance with several eminent conchologists concerning the substitution of the name *Scala* for *Scaloria* (see Ann. Mag. Nat. Hist., November, 1903). I am now glad that the question is settled by discarding both these names in favour of *Epitonium*, Bolton (1798), which has priority.

4. CANTHARIDUS RARIGUTTATUS, n.sp. Pl. III, Fig. 8,

Testa conica, profunde umbilicata, fusca, hic illic sparsim albo maculata et flammulata; spira elata, lateribus leviter convexis; anfractus 5, convexiusculi, liris numerosis confertis leviter elevatis spiralliter cingulati, oblique tenuissime striati; sutura anguste canaliculata; anfractus ultimus $\frac{2}{3}$ longitudinis testæ æquans, ad peripheriam obtuse angulatus, ad basim convexus, umbilicus excavatus, intus rotundus, profundus; apertura subquadrata, intus iridescens; columella crassa, albida rectiuscula; peristoma simplex, tenue. Long. 12, diam. 10 mm.

Hab.—New Caledonia.

A shell having the prevailing form of a *Cantharidus*. It is dark brown in colour, with here and there a few whitish spots and streaks, spirally closely lirated, iridescent within. I have seen ten specimens varying very little in form, but some of them are almost, or quite, destitute of the whitish markings mentioned.

5. BITTIUM PERSPICUUM, n.sp. Pl. III, Fig. 3.

Testa elongata, angusta, tenuis, imperforata, fusca, varicibus perconspicuis albis distantibus munita; spira elongata ad apicem angustissima; anfractus 12, leviter convexi, spiralliter dense et rugose lirati, sutura valde impressa sejuncti; anfractus ultimus brevis, brevissime rostratus; apertura subquadrata, brevis; peristoma simplex, tenue. Long. 6, diam. 2 mm.

Hab.—Trincomalee, Ceylon.

This species is chiefly distinguished by its prominent, irregularly distant, short, white varices.

6. FISSURELLA (GLYPHUS) SAGAX, n.sp. Pl. III, Figs. 5, 6.

Testa ovalis, mediocriter lata, elata, luteola, costis radiantibus creberrimis leviter nodulosis, et liris concentricis irregularibus decussata; antice turgida, postice breviter declivis, ad apicem

mucronata; foramen parvum, oblongum, leviter constrictum, multo antemedium situm; pagina interna alba, supra callo denticulata induta, ad marginem crenulata. Long. 8, lat. 7, alt. 5 mm.

Hab.—New Caledonia.

Of this curious little species I have only seen four specimens, two quite young and two apparently adult. The adult are peculiarly swollen on the back, and in both young and old the border of the foramen is curiously mucronate.

7. *CARDIUM FULTONI*, n.sp. Pl. III, Fig. 7.

Testa oblique subovalis, crassiuscula, leviter inflata, alba, maculis numerosis vivide rufo-fuscis pulcherrime ornata, radiatim costata; costis circiter 27 prominentibus, valde nodosis; interstitiis profundis, transversim sulcatis; umbones mediocriter elevati, latiusculi. Umbono-marg. 37, antero-post. 33 mm.

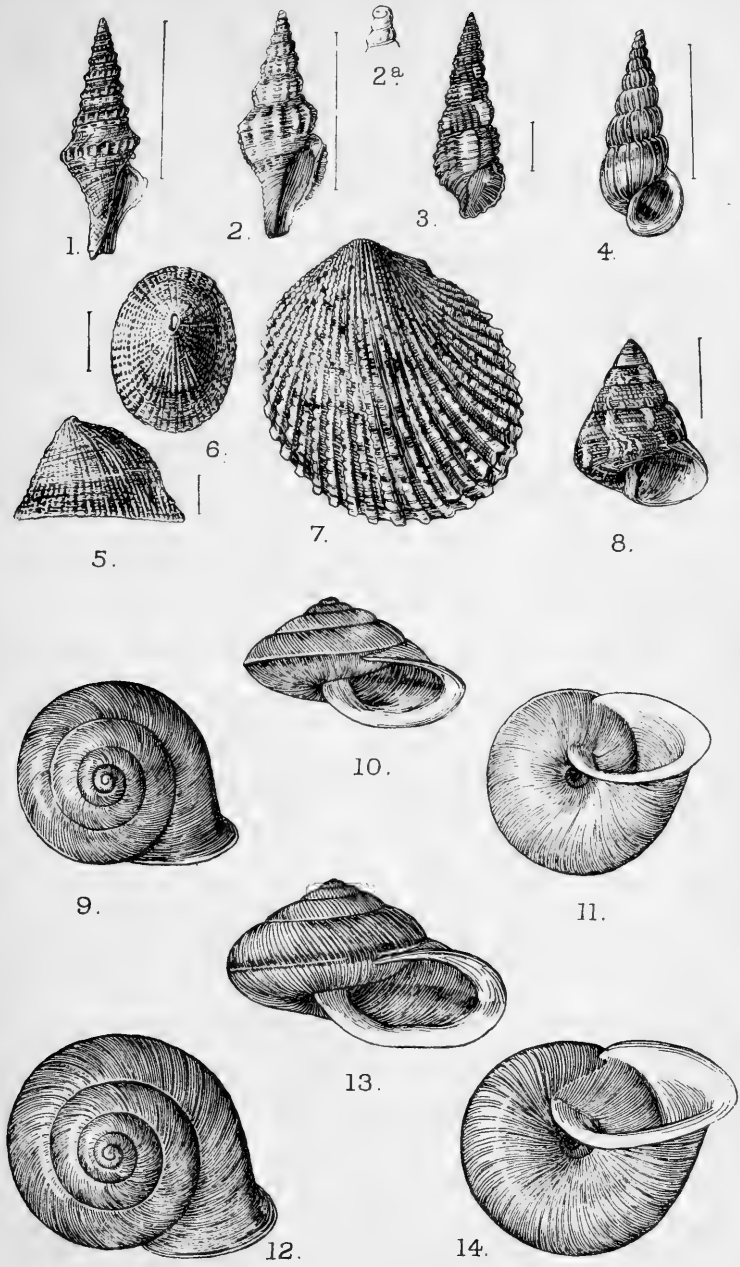
Hab.—Philippines.

A pretty shell, ornamented with red-brown spots on a white ground. The ribs are rather peculiarly knotted, especially on the anterior side. The form and general aspect of the shell are somewhat similar to that of a recent *Trigonia*. I have only seen a single example of this species.

EXPLANATION OF FIGURES ON PLATE III.

FIGS.

1. *Clavatula decorata*, n.sp.
 2. *Drillia carmen*, n.sp.
 3. *Bittium perspicuum*, n.sp.
 4. *Epitonium reynoldsi*, n.sp.
 5. *Fissurella sagax*, n.sp., lateral view.
 6. " " " apical view.
 7. *Cardium fultoni*, n.sp.
 8. *Cantharidus variguttatus*, n.sp.
-



G.M. Woodward del

Huth photo-lith

SEVEN NEW SPECIES OF MARINE MOLLUSCA.
TWO NEW SPECIES OF PAPUINA.

NOTES ON A SMALL COLLECTION OF HELICOID LAND SHELLS
FROM THE SHOUTEN ISLANDS, DUTCH NEW GUINEA, WITH
DESCRIPTIONS OF TWO NEW SPECIES OF *PAPUINA*.

By HUGH C. FULTON.

Read 14th April, 1916.

PLATE III, FIGS. 9-14.

THE shells here noted were collected by Mr. Pratt on the Island of Wiak and a smaller unnamed island to the south-east of it.

1. *XESTA AULICA*, Pfr. Wiak I.

A number of examples of this species were obtained, most of them being the usual colour varieties, but two are new to me; one has the apical whorls white, whilst the lower whorls are covered with a very light uniform greenish-yellow periostracum; the other shows various shades of brown from reddish to a dark smoky brown; both varieties have the usual darker-coloured spiral band and are not polished, but exhibit a duller surface than is usual in this protean species.

2. *XESTA FRAUDULENTA*, Smith. Wiak I.

In addition to the typical form one or two specimens were collected that have a narrow spiral band of darker colour situate just above the periphery of the last whorl and continued upwards towards the spire.

3. *XESTA PORCELLANICA*, Sarasin. S.E. of Wiak I.

Some specimens are of a uniform whitish coloration; others have a narrow reddish-brown band at the suture, which is continued to about the first half of the last whorl.

4. *CHLORITIS CIRCUMDATA*, Fér. Wiak I.

5. *CHLORITIS (ALBERSIA) ZONULATA*, Fér. Wiak I.

6. *PAPUINA HERO*, Smith. S.E. of Wiak I.

Very large examples of this handsome species; the type is smaller, but not so small as some specimens that were collected on a former expedition by Mr. Pratt at Muswar I., Geelvink Bay; the species evidently varies greatly in size.

7. *PAPUINA TROCHIFORMIS*, Preston. Wiak I.

Two specimens, both of which have a somewhat higher spire than the type, but agree well with it in other respects.

8. *PAPUINA SUBCOSTATA*, n.sp. Pl. III, Figs. 12-14.

Shell depressed trochoid, moderately solid, openly umbilicated to a width of about 4 mm., light brown with a rather broad band of darker brown encircling the last whorl, situated just above the middle and continued upwards for a short distance at the suture of the

penultimate whorl, the last two whorls have a whitish thread-like line at the suture, upper part of shell finely obliquely striated, on the lower two whorls the striæ gradually become stronger until the last half-whorl has the appearance of being broadly but obtusely costate, the whole surface of the lower whorls is covered with a microscopic granulation; whorls $5\frac{1}{2}$, slightly convex, the last rounded but showing some indications of a keel; aperture transversely oval, whitish within, the outer band showing through; peristome white, very oblique, broadly expanded and somewhat reflexed, margins joined by a thin transparent callus.

Maj. diam. 36, alt. 22 mm.

Hab.—Wiak I.

Allied to the *Papuina labium-lituus-multizona-wallaceana-aurora* group (all of which may prove to be but varying forms of one species), but our new species can be easily distinguished from all by its open umbilicus and the coarse oblique sculpture of the last whorl. The specimen selected for the type is of a light yellowish-brown with a rather broad dark-brown band at the periphery of the last whorl; but there are also specimens of a uniform dark brown without any band, and other examples have the last whorl dark brown, whilst the upper whorls exhibit a lighter-brown coloration. All have the characteristic open umbilicus and coarse sculpture.

9. PAPUINA LEPIDA, n.sp. Pl. III, Figs. 9–11.

Shell depressed trochiform, rather thin and transparent, openly umbilicated to width of about 3 mm., of a very light yellowish-brown colour; whorls 5, distinctly convex, with very fine oblique striæ or lines of growth, lower whorls covered with microscopic waved granules, last half-whorl is bluntly whilst the first half is sharply carinate, there is a spiral white thread at the suture of the penultimate which is continued half-way round last whorl, where it is covered by a narrow reddish-brown band which extends to the peristome; aperture transversely oval, whitish within; peristome expanded and slightly reflexed, flesh-coloured.

Maj. diam. 29, alt. 17 mm.

Hab.—Wiak I.

Approaching but quite distinct from *P. pseudolanceolata*, Dtz., and *P. callosa*, Sykes, from both of which it is easily distinguished by its open umbilicus and much less angular peristome.

EXPLANATION OF FIGURES ON PLATE III.

FIGS.

9–11. *Papuina lepida*, n.sp.

12–14. *P. subcostata*, n.sp.

ON TWO EDITIONS OF DUMÉRIL'S ZOOLOGIE ANALYTIQUE.

By TOM IREDALE.

Read 14th April, 1916.

I HAVE only seen one reference to this work, namely that in the *Nautilus*, vol. xv, p. 127, March, 1902, where Dr. W. H. Dall wrote as follows: "I have frequently called attention to the ill-effects of the absurd European proposition that names such as *Cyprinus* and *Cyprina* should not be allowed to exist in nomenclature simultaneously . . . Finding the name *Nassaria* challenged on this ground, I hunted up the earlier use (1806) in Duméril's *Zoologie Analytique*, and took the occasion to make a full list of Duméril's names, which all end in *-arius* and are all synonyms. Some appear in the text, and others in the Latin index only, with references to the pages where the French equivalent is to be found. Among the latter I discovered *Pleurotomarius*, Duméril's name for *Pleurotoma*. If the idiotic rule above-mentioned was put in force this superfluous synonym would deprive us of the right to use *Pleurotomaria*, J. Sowerby, which dates only from 1821, and perhaps also *Pleurotomarium*, Blainville, another rendering of DeFrance's French name which dates from 1825. I may add that any rule admitting anonymous names, taken into consideration with the above-mentioned one, would upset about half of the best-known names in molluscan zoology, including such as *Oliva*, *Cypræa*, etc."

The last sentence seems to have been written in a hurry, as *Cypræa* is a Linnean 1758 name, and as far as I can judge absolutely unassailable, while I have no record of any danger to *Oliva* from either of the causes Dr. Dall has quoted.

In the above-mentioned quotation Dall does not discuss the validity of Duméril's names, but apparently accepts them as valid. Many of them were quoted in synonymy by the Adams Bros. in their *Genera of Recent Mollusca*. Scudder also records most, if not all, of the names. Consequently they have been available to workers for many years, and there is no new discovery here. It seems necessary to make this statement in view of the results hereafter given. Dall afterwards reconsidered the matter of rejecting Duméril's nomenclature as not acceptable, for in the U.S. Geol. Survey Prof. Paper No. 59, 1909, p. 46, in the synonymy of *Thais*, Bolten, he wrote: "*Purpurarius*, Duméril, Zool. Anal., p. 166, 1806: nomenclature not Linnean: Froriep's German transl., p. 167 (*P. persica* cited), 1806."

I cannot accept the dictum that Duméril's "nomenclature" is "not Linnean". This would certainly have been an easy solution to the problem, but unfortunately it is not maintained in other branches of Zoology. Thus, in Ornithology, the names proposed, when available, by Duméril are in use. I believe also that Ichthyologists utilize Duméril's novelties without question. My own method of dealing with Duméril's names would be to advise rejection whenever there is the slightest technical cause and to urge the strict letter of the law

against them, but where no cause can be shown for rejection to at once make use of them, and so rid ourselves of an annoying shadow in our nomenclature.

The title of Duméril's book is "Zoologie Analytique, | ou | Méthode Naturelle | de | Classification des Animaux, | rendue plus facile | a l'aide de tableaux synoptiques; | Par A. M. Constant Duméril, | Docteur en médecine, . . . | *Parva sed apta.* | Paris, | Allais, Libraire, Quai des Augustins, No. 39, | M,DCCC,VI".

The dedication to "Monsieur de La Cépède" is dated "Ecija, le 20 septembre, 1805", the preface "Cordoue, le 17 septembre, 1805".

In this preface Duméril, p. xxiii, wrote: "La classe des mollusques offrira des ordres tout-à-fait nouveaux; mais ils ont été faits ou indiqués, déjà par M. Cuvier lui-même, qui a le premier séparé ces êtres de la classe nombreuse des vers de Linné. Tous les savans ont adopté maintenant cette classification; et comme notre objet étoit de faire connoître les animaux et non les coquilles qui les revêtent, nous n'avons profité que dans très-peu de circonstances des travaux de MM. Poli et Lamarck, cette partie de la science laissant encore beaucoup à desirer aux naturalistes."

The Cuvierian work referred to is designated on the previous page as the "Tableau élémentaire de l'Histoire naturelle des Animaux". I therefore conclude that the above can be considered as a direct bibliographical reference, basing my conclusion on the opinion (No. 39) given by the International Commission on Zoological Nomenclature, when dealing with a very similar case. This decision is not in accord with that given by Dr. Dall, already quoted, but in view of the complication hereafter exposed I suggest reconsideration, and moreover confidently anticipate agreement with the results advocated in this note.

The complication consists of the German translation, which was quoted by Dall without comment, but which necessitates a reconsideration of the whole matter. The title-page reads: "C. Duméril's, | Doctors und Professors an der Medicinischen Schule | zu Paris, | Analytische Zoologie. | Aus dem Französischen, | Mit Zusätzen | von | L. F. Froriep, | Professor zu Halle. | *Parva sed apta.* | Weimar | Im Verlage des Landes-Industrie-Comptoirs | 1806."

Froriep's "Vorrede" is dated "Halle am 18 Sept. 1806", and in it he explains that as no examples are given in the original *he has added to each genus-name a species* cited from Gmelin's edition of Linné's *Systema Naturæ*.

Let us now consider the original edition and its effect on the accepted nomenclature of Mollusca. The names collated by me as new are as follows:—

| | |
|---|-------------------------|
| p. 156. <i>Argonautarius</i> , new name for <i>Argonauta</i> , Cuv. | |
| <i>Nautarius</i> | <i>Nautilus</i> , Cuv. |
| p. 157. <i>Spirularius</i> | <i>Spirula</i> , Lam. |
| p. 162. <i>Patellarius</i> | <i>Patella</i> , Cuv. |
| p. 164. <i>Sigaretarius</i> | <i>Sigaretus</i> , Lam. |
| <i>Bullearius</i> | <i>Bullea</i> , Lam. |
| <i>Trochiarus</i> | <i>Trochus</i> , Cuv. |

| | | |
|---------|-----------------------------------|--------------------------|
| p. 164. | <i>Turbinarius</i> , new name for | <i>Turbo</i> , Cuv. |
| | <i>Planorbarius</i> | <i>Planorbis</i> , Cuv. |
| | <i>Naticarius</i> | <i>Natica</i> , Lam. |
| | <i>Neritarius</i> | <i>Nerita</i> , Cuv. |
| | <i>Monodontarius</i> | <i>Monodonta</i> , Lam. |
| | <i>Valvearius</i> | <i>Valvata</i> , Müller. |
| | <i>Scalatarius</i> | <i>Scalaria</i> , Lam. |
| p. 166. | <i>Conarius</i> | <i>Comus</i> , Cuv. |
| | <i>Cypriarius</i> | <i>Cypræa</i> , Cuv. |
| | <i>Olivarius</i> | <i>Oliva</i> , Cuv. |
| | <i>Volutarius</i> | <i>Voluta</i> , Cuv. |
| | <i>Nassarius</i> | <i>Nassa</i> , Lam. |
| | <i>Purpurarius</i> | <i>Purpura</i> , Brug. |
| | <i>Buccinarius</i> | <i>Buccinum</i> , Cuv. |
| | <i>Terebrarius</i> | <i>Terebra</i> , Lam. |
| | <i>Muriciarius</i> | <i>Murex</i> , Cuv. |
| | <i>Turbinellarius</i> | <i>Turbinella</i> , Lam. |
| p. 168. | <i>Venusarius</i> | <i>Venus</i> , Cuv. |
| | <i>Solenarius</i> | <i>Solen</i> , Cuv. |
| | <i>Myarius</i> | <i>Mya</i> , Cuv. |
| | <i>Ostracarius</i> | <i>Ostrea</i> , Cuv. |

In the Latin Index I find several which do not appear in the text save in the vernacular form, and these can only be linked up by the pagination; such are:

| | | |
|---------|--------------------------------------|--------------------------|
| p. 334. | <i>Colombellarius</i> , new name for | <i>Columbella</i> , Lam. |
| p. 338. | <i>Marginellarius</i> | <i>Marginella</i> , Lam. |
| p. 340. | <i>Pleurotomarius</i> | <i>Pleurotoma</i> , Lam. |
| p. 340. | <i>Pholadiarius</i> | <i>Pholas</i> , Cuv. |
| p. 335. | <i>Donaciarius</i> | <i>Donax</i> , Lam. |
| p. 343. | <i>Tellinarius</i> | <i>Tellina</i> , Cuv. |
| | <i>Teredarius</i> | <i>Teredo</i> , Cuv. |
| p. 333. | <i>Cardiarius</i> | <i>Cardium</i> , Cuv. |
| p. 336. | <i>Haliotidarius</i> | <i>Halyotis</i> , Cuv. |
| p. 340. | <i>Pinnarius</i> | <i>Pinna</i> , Cuv. |

It will be just as well to cite an example of Duméril's method, since it is not a common book. I quote part of Table No. 105 (p. 167). This covers his "III^e Famille. Siphonobranches", and the diagnosis reads "Mollusques gastéropodes testacés à deux tentacules, à coquille échancrée ou prolongée en un canal pour recevoir un siphon propre à la respiration". Thirteen genera are admitted with vernacular names only, differential diagnoses being prepared. Thus the two main sections are "Opereule distincte" and "Opereule nulle"; the former is then subdivided thus: "à yeux à la base des tentacules" and "à yeux non à la base des tentacules", and so on.

On the opposite page (166) "Notes sur le No. 105" are given, and equivalent to most of the vernacular names Latin ones are allotted in brackets, thus: "Les *nassiers* (*nassarius*).". A few read as follows (p. 166): "Les *turbinelliers* (*turbinellarius*) et les *pleurotomiers* . . ." No equivalent is given to the last-named, but in the Index (p. 340)

the word '*pleurotomarius*' appears and p. 166 is added. From Duméril's usage it can be deduced that these are connected, but strictly speaking I would have regarded the index names as *nomina nuda*, and objected to their active incorporation into molluscan nomenclature. Three bibliographical references are given by Duméril—first to Cuvier's *Tableau Élém.*, second to Poli, and third to Lamarck. Consequently Duméril's names all depend on these works. I therefore allot all I can first to Cuvier's work, then to Poli's, and lastly to Lamarck's as synonyms. Cuvier's names are simply those of Linné, so that Duméril's names follow the Linnean ones and are absolute synonyms of those. None are referable as new to Poli, so that the only names that interest us are the emendations of the Lamarckian names. Most interest centres around

NASSARIUS.

This can only be determined as a new name for *Nassa*, Lamarck, 1799, non Bolten, 1798. The type of *Nassa*, Lam., is *Buccinum mutabile*, Linn. Recently Lamarck's familiar name has been rejected, as it was antedated by Bolten's usage in another connexion. As substitutes *Arcularia*, Link, 1807, and *Alectrion*, Montfort, 1810, have been utilized. I have argued for the adoption of both as distinct genera, but this proposal was due to a misconception of the types of the two genera, and I now withdraw that view, and would accept *Nassarius* as a substitute for Lamarck's *Nassa*, and use it in place of either *Arcularia* or *Alectrion*.¹ The family name would be Nassariidæ, and this would recall the defunct Nassidæ. With regard to Link's *Nassaria* I unhesitatingly reject it on account of the previous *Nassarius* of Duméril, and think the change should be welcomed since the name to be used is

HINDSIA, H. & A. Adams, 1850.

and the conchologist thus honoured stands in such repute that his dedicatory genus must please his successors in the study. Further, Link's name seems to have simply been an amendment of *Nassa*, and in the case of Link's *Nuculana* this was urged as a valid cause for rejection by Dr. Dall himself. I do not accept this view, but even the constituents of Link's genus are varied, and it should never have been utilized to dispossess *Hindsia*. Again, Rafinesque later proposed *Nassaria* as a new name for *Nassa*, Lam., which suggests the same idea ran through all these workers' minds

The rejection of *Pleurotomaria* in view of Duméril's *Pleurotomarius* does not seem to be a cause for much sentiment. It is somewhat obvious that the name as commonly used would become restricted until it was almost lost. The recent species have already been subdivided from a study of anatomical characters, so that the "genus *Pleurotomaria*" may be considered to represent a family. That "*Pleurotomaria*" now is the distinctive term for a (heterogeneous)

¹ With the proviso that later investigation of the animals of the types of these two genera may cause separation.

family of fossil molluscs is in itself a good argument for reconsideration, and its total rejection should not cause much inconvenience. As already indicated, I would have adjudged *Pleurotomarius* to be a *nomen nudum*, and in this way have avoided the rejection of *Pleurotomaria*. The Froriep translation negatives this and must be next dealt with. If Duméril's names were to be rejected *in toto* as not acceptable under the present Laws of Nomenclature the names proposed in Froriep's edition would need to be discussed *de novo*.

I have collated these and here give them, since the book is at present only known to me by a single copy, although I do not consider it a rare work but rather as an overlooked one.

The names I have collected are as follows:—

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|------------------------------|-------------------------------------|
| p. 157. <i>Nautarius.</i> | z.B. <i>Nautilus pompileus</i> , L. |
| <i>Spirularius.</i> | <i>Nautilus spirula</i> , L. |
| p. 163. <i>Patellarius.</i> | <i>Patella vulgata</i> , L. |
| p. 165. <i>Sigaretarius.</i> | [No example.] |
| <i>Bullearius.</i> | <i>Bulla aperta</i> , L. |
| <i>Trochiarius.</i> | <i>Trochus magus</i> , L. |
| <i>Turbinarius.</i> | <i>Turbo littcreus</i> , L. |
| <i>Planorbarius.</i> | <i>Helix cornea.</i> |
| <i>Naticarius.</i> | <i>Nerita canrena</i> , L. |
| <i>Monodontarius.</i> | <i>Trochus pharaonius.</i> |
| <i>Valvearius.</i> | <i>Valvata cristata</i> , Müller. |
| <i>Scalatarius.</i> | <i>Turbo clathrus</i> , L. |
| p. 167. <i>Conarius.</i> | <i>Conus marmoreus</i> , L. |
| <i>Cypræarius.</i> | <i>Cypræa argus</i> , L. |
| <i>Olivarius.</i> | <i>Voluta oliva.</i> |
| <i>Volutarius.</i> | <i>Voluta musica</i> , L. |
| <i>Nassarius.</i> | <i>Buccinum ancularia</i> , L. |
| <i>Purpurarius.</i> | <i>Buccinum persicum</i> , L. |
| <i>Buccinarius.</i> | <i>Buccinum undatum.</i> |
| <i>Terebrarius.</i> | <i>Buccinum maculatum.</i> |
| <i>Muricarius.</i> | <i>Murex brandaris.</i> |
| <i>Turbinellarius.</i> | <i>Voluta pyrum</i> , L. |
| <i>Pleurotomarius.</i> | <i>Murex babylonius</i> , L. |
| p. 169. <i>Venusarius.</i> | <i>Venus verrucosa.</i> |
| <i>Solenarius.</i> | <i>Solen vagina.</i> |
| <i>Myarius.</i> | <i>Mya truncata.</i> |
| <i>Pinnarius.</i> | <i>Pinna rudis.</i> |
| <i>Mytilarius.</i> | <i>Mytilus edulis</i> , L. |
| <i>Ostracarius.</i> | [No example.] |

When this is contrasted with the preceding list we note that *Argonautarius* and *Neritarius* are missing, while *Pleurotomarius*, *Pinnarius*, and *Mytilarius* have been added. *Argonautus* is Froriep's spelling of the first named, while only the vernacular appears in the second case, but the Latin name is given in the Index, p. 339. The other names, quoted as in the original index of Duméril's work, all appear in Froriep's Index, while the entirely new name *Mytilarius* is not indexed. Further, Froriep gives in the text, p. 167, the correct

Latin names *Columbella* and *Marginella*, and on p. 169, *Pholas*, *Teredo*, *Donax*, *Tellina*, and *Cardium* as examples, citing respectively *Voluta mercatoria*, L., *V. glabella*, L., *Pholas dactyla*, L., *Teredo navalis*, L., *Donax rugosa*, L., *Tellina radiata*, and *Cardium edule*.

The most casual glance will compel the necessity of accepting the Duméril names in preference to these of Froriep, as otherwise confusion would be rampant.

| | | |
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| <i>Trochiaris</i> | might displace | <i>Gibbula</i> , Risso, 1826. |
| <i>Turbinarius</i> | „ „ | <i>Littorina</i> , Férussac, 1821. |
| <i>Monodontarius</i> | „ „ | <i>Clanculus</i> , Montfort, 1810. |
| <i>Scalataris</i> | „ „ | <i>Clathrus</i> , Oken, 1815. |

The above seem apparent at first sight, but then we might get further complications regarding the usage of such names as *Conarius*, *Cypræarius*, *Purpurarius*, *Terebrarius*, *Venusarius*, where the type species are not yet definitely fixed.

Further, the connexion between *Neritarius* in the Index and the vernacular in the text, a parallel case to *Pleurotomarius* of the original edition, would make that name fall on to the group now called *Theodoxis*, Montfort, 1810 (= *Neritina*, Lamarck, 1822).

SOLANDER AS A CONCHOLOGIST.

By TOM IREDALE.

Read 12th May, 1916.

To most conchologists of the present generation the name of Solander does not convey much. For instance, in the *Hist. Coll. Nat. Hist. Brit. Mus.*, vol. ii, 1906, p. 702, E. A. Smith wrote: "It is probable that Dr. D. C. Solander, who was appointed an assistant in the Museum in 1765, may at some time have had charge of the collection, as it is known from his MSS. in the Banksian Library that he had a knowledge of conchology." In the *Ibis*, 1913, pp. 127-35, under the title "Solander as an Ornithologist", I gave a short account of the career of Solander, who must have been far ahead of any other worker of his time in his grasp of systematic ornithology, and I believe also in conchology, but this cannot be so readily established.

Daniel Carl Solander was born in Norrland, Sweden, on 28th February, 1736, and studied at Upsala, where he was a personal pupil of Linné, and where he took the degree of M.D. Upon Linné's advice he came to England in 1760, and recommended to the British Museum, through Ellis, the famous English botanist, he was engaged to classify and catalogue, but was not placed on the permanent staff. Linné, in 1762, therefore procured for him the offer of the Chair of Botany at St. Petersburg, but on the advice of his English friends Solander refused this offer, and in 1763 was appointed assistant in the British Museum, becoming Under Librarian (as the Assistant Keepers were then termed) in 1765, under Maty. In 1764 he was elected a Fellow of the Royal Society. In 1767 Joseph Banks met and persuaded Solander to accompany him on a voyage to observe the transit of Venus in the South Pacific. Captain Cook was to take the expedition, which, as a bye-issue, was to seek the theoretical Antarctic Continent. This voyage lasted from 1768 to 1771, and though primarily Banks and Solander were botanists, zoology was well looked after and a multitude of new shells was procured. Before Solander left England he had been promised that his official post would remain open, and after his return, when Maty was appointed Principal Librarian, Solander was promoted to the Keepership of the Natural History Department, whilst in his non-official time he acted as secretary and librarian to Banks.

The joy of travel had, however, upset both Banks and Solander, and preparations were soon being made, to the detriment of the first collection, by them to accompany Cook on his second voyage. This project fell through, but Banks and Solander consoled themselves with a trip to Iceland instead.

Solander was probably working slowly at the collections he had brought back when he was suddenly cut off on the 16th May, 1782, at the early age of 46.

As an all-round naturalist he was a worthy pupil of Linné, and his knowledge of every branch of natural science must have been profound. His ornithological work showed accuracy and detail far ahead of Linné, and it is definitely stated that while preparing this work he still considered himself primarily a botanist.

In the British Museum (Natural History) is kept a cabinet containing Solander's manuscripts, received with Sir Joseph Banks' collections, and from a glance over these it may be suggested that he hoped to publish a Survey of Natural History, comparable to that of Linné's *Systema Naturæ*, but on an even more extensive and accurate scale than Gmelin's edition as well as more replete with personal knowledge. A very large quantity of manuscript deals with molluscs, which appear to have been a favourite study of his since Solander collected them on his voyages.

Donovan in the *Naturalist's Repository*, vol. i, pl. viii, 1st June, 1822, observed: "It may not be very generally known, excepting only among naturalists, that the late Dr. Solander had devoted much attention to this intricate science; his arrangement of shells was designed as an amendment upon that of Linnæus. This arrangement was never made public, it remained in manuscript in the library of the late Sir Joseph Banks." Donovan proceeds to comment on what may be learnt from a perusal of these MSS., thus showing that they were available to workers, whilst in another place he upbraids Dillwyn for not making better use of them when quoting from them. Again, Pulteney continually quotes them and gives notes upon them.

I have been unable to trace any worker since the time of Donovan who has consulted them, and the reputation of Solander as a conchologist stands upon the published account of British fossils in Brander's *Fossilia Hantoniensia*. This book, small as it is, I am told by my friend Mr. Bullen Newton, is a standard work quite remarkable for its accuracy as the initial attempt to deal with British fossils.

A source of publication which has been neglected forms the basis of the present note. A reference by Dr. Dall to the Portland Museum Catalogue compelled me to refer to this publication. I carefully studied it and was unable to see any cause for the non-acceptance of the names I noted in it. I found there were less than a hundred validly proposed names, and this seemed a small number to cause an exception to our commonly accepted nomenclatural laws. I at once looked up that all-in-all to the systematist, the *Index Animalium*, by C. Davies Sherborn, and on p. xlv of the Bibliography I read "Portland. Catal. of the Portland Museum. 4to. Lond. 1786. [Many *nomina nuda* of Testacea by Solander, which it seems inadvisable to introduce into literature]", and I therefore consulted Mr. Sherborn, who pointed out to me on p. 458 the entry "'hians Argonauta, Solander' [*Portland Catalogue*]. This seems to have been a MS. name and *nomen nudum* until 1817, when Dillwyn described it in his *Descr. Catal. Recent Shells*, vol. i, 1817, p. 334".

Much as I would have delighted to acquiesce in this disposition the facts seemed to negative such a proceeding, and therefore I put these before the late Mr. Edgar A. Smith, I.S.O., of the British Museum. Mr. Smith at once turned up a note made by himself some thirty years ago wherein he had investigated the matter and had rejected the book as "anonymous and with no descriptions". Under the present laws anonymity is no bar to acceptance, and the fact that, though there are no descriptions, a definite reference to the figure of the shell is given cannot be disputed. Mr. Smith then concluded that under the present laws the names accompanied by the citation of a published figure are perfectly valid and must be recognized, and Mr. Sherborn has agreed. I have therefore considered it advisable, since it is a rare book, to give details of the contents so far as regards conchological science. The title-page of the *Portland Catalogue* reads: "A | Catalogue | of the | Portland Museum, | lately the property of | The Duchess Dowager of Portland, | Deceased: | which will be Sold by Auction, | by | Mr. Skinner and Co. | On Monday the 24th of April, 1786, | and the | Thirty-seven following Days | At Twelve O'Clock, | Sundays, and the 5th of June, (the Day his Majesty's Birth-Day | is kept) excepted; | At her late Dwelling-House, | In Privy-Garden, Whitehall; | By Order of the Acting Executrix. | To be viewed Ten Days preceding the Sale. | Catalogues may now be had on the Premises, and of Mr. Skinner | and Co., Aldersgate-Street, Price Five Shillings, which will admit | the Bearer during the Time of Exhibition and Sale." The Preface begins: "It may be proper to inform the Purchasers of the Catalogue, and the Public in general, That there is no one Article contained in it but was a Part of the Genuine *Collection* of the late Noble Possessor, *Margaret Cavendish*, Duchess Dowager of Portland . . . in *Natural History* every Subject is inserted she had with so much Pains and Treasure accumulated. And here it will appear, that all the Three Kingdoms of Nature, the *Animal*, *Vegetable*, and *Fossil*, were comprehended in her Researches. In all of these she took infinite Pleasure and Delight; but in none of them is her Cabinet more richly stored than in that durable and beautiful Part of the *First*, named *Conchology*. In this Branch of Nature's Works, no Collection in *Europe* can equal that of her Grace's in Number and Variety. To give some Idea of its great Extent, it may be remarked, that the celebrated *Linnaeus*, who had studied the Subject, and methodized the Materials of it, has not described One Fourth Part of the Objects contained in the Museum now offered to the Public. It was indeed in the Intention of the enlightened Possessor to have had *every unknown* Species described and published to the World; but it pleased God to cut short the Design. not only by the Death of the ingenious Naturalist employed by her for that Purpose * (**Dr. Solander*); but, in a short Time afterwards, to the great and irreparable Loss of Science, by her *own* also . . . It is hoped, however, that the *Man of Science* will not be altogether disappointed in the present Arrangement of the Catalogue; for as much Pains and Care have been taken to affix the proper classical, or generally received Names,

to as many Articles as the *Time* and *Abilities* of the Compiler would allow; it will be no great Trouble for him to cast his Eye over each Day's Sale, as it occurs, and he will hardly fail to meet in one or more of them, with the Subjects he desires. In Order therefore to his more ready Understanding the various Articles recorded in the following Catalogue, it remains only to subjoin an Explanation of the References and Abbreviations made Use of in it."

Then follows a bibliography with the abbreviations used, which stamps the Catalogue as available as a reference work.

In the British Museum (Natural History) a specimen of this Catalogue is kept which is priced throughout. I have observed that Dall refers to the Portland Catalogue as available to him, and have noted that Mr. E. R. Sykes exhibited a copy before this Society. Mr. Alex. Reynell showed me a copy in his library, and later obtained the copy, which I have before me, which he generously presented to me.

As examples of the manner in which the references in this work are given may be cited:—

- "Page 1. Lot 8. A fine pair of *Voluta Vespertilio*, L., or Wild Music.
 ,, 1. ,, 10. A pair of *Buccinum Barbiton*, S., or Smooth-ridged Harp.
 ,, 18. ,, 400. A large and fine *Helix plicata*, *undescribed*, Favanne, pl. 61, D. 10.—rare."

The first is a Linnean name; the second is a *nomen nudum*; while the third is a new name founded on Favanne's pl. lxi, D. 10, and under the present nomenclatural laws is certainly an acceptable name. I only deal with those of the last class.

I might note that it is probably from this published source and the acquisition of named specimens at the sale that so many of Solander's names crept into literature. Dillwyn constantly synonymizes the *nomina nuda* observed in this Catalogue, and this could only be done through named specimens. With access to the Solander Manuscript in the British Museum I note that against the description of many species appears the letters "M.P." and "M.C.P.", which I correlate with this collection.

Contrary to my general usage I cite the names from this Catalogue as of Solander, though it is obvious from the above extract that really "the Compiler" is responsible. I think that as Solander drew up the descriptions and named the specimens in the Portland Museum and "the Compiler" simply saw that there was no discrepancy the credit must belong to Solander. Who "the Compiler" was is not accurately known, but Dillwyn has recorded "Humphreys" as the compiler.

A word of warning must be here inserted. *Nomina nuda* which at first sight appear valid commonly occur as "p. 44, Lot 1043. Two fine specimens of *Buccinum ligatum* S. a curious and new species, from New South Wales, very rare, Martyn, vol. ii, fig. ". No reference is given, since Martyn's second volume had not been published at this date.*

* No such species in either volume of Martyn.

In this connexion may be noted that the Catalogue was published between the 8th and the 24th of April, 1786, and we do not know the exact date of publication of Martyn's vol. ii, save 1786. This suggests that if the Portland Catalogue's valid names clashed with Martyn's the former should have priority. I know of one case, *Patella umbraculum*, and I will use this name in preference to Martyn's (*Lepas*) *umbella*, until such time as an exact date is known for the latter, when the matter may be reconsidered.

The valid names are as follows:—

- Arca fusca*, S., p. 42, based on Gualt., 87 G.
labiata, S., p. 185 D'Avila, vol. i, pl. 18.
nodulosa, S., p. 98 Gualt., 87 E.
Argonauta hians, S., p. 44 Rum., 18 B.
navicula, p. 44 Rum., 18, 4.
nodosa, S., p. 96 Rum., 18, 1.
Buccinum calcaratum, S., p. 133 Gualt., 31 F.
iris, S., p. 14 Martyn, vol. i, fig. 2b.
monodon, S., p. 17 Martyn, vol. i, fig. 10a.
muricatum, p. 104 Favanne, 33, x. 3.
pustulosum, S., p. 88 Rum., 49 B.
taurinum, S., p. 142 Lister, 841, 69.
testudo, S., p. 98 Seba, iii, 70, figs. 2, 3, and 4 of the
Bucc. harpa, L.
Bulla vesicaria, S., p. 136 Seba, iii, tab. xxxviii, figs. 46, 48.
zonata, S., p. 164 Born, Mus. cæs., tab. ix, fig. 1.
Cardium hystrix, S., p. 116 Gualt., 72 B.
impressum, S., p. 155 Born, mus., tab. ii, figs. 15, 16.
protrusum, S., p. 178 Lister, 319, 156.
robustum, S., p. 58 Lister, 328, 165.
spinosum, S., p. 105 Favanne, 52, A 2.
Chama lazarus, var. *pannosus*,
 S., p. 96 Rum., 48, 3.
Conus araneosus, S., p. 76 ¹Martyn, vol. ii, 676.
architalassus, S., p. 189 Argenv. Suppl., tab. i, fig. M.N., 18.
augur, S., p. 44 Knorr, vi, tab. xiii, fig. 6.
fuscatus, S., p. 160 Martyn, vol. ii, fig. 693.
leoninus, p. 72 Knorr, iii, 12, 5.
mappa, S., p. 116 Knorr, i, tab. viii, 4.
nocturnus, S., p. 156 Martyn, vol. ii, 687, 688.
pulcher, p. 179 Lister, 772.
quercinus, S., p. 67 Martyn, vol. ii, 657.
undulatus, S., p. 180 Gualt., 25 I.
Cypræa pantherina, S., p. 50 Lister, 681, 28.
pustulata, p. 106 Lister, 710, 62.
Helix alba, p. 186 Lister, tab. xxxiii, xxxii, and xlvi,
 Favanne, 63 E.
erubescens, p. 187 Lister, 24, 22.

¹ It will be noted that *Martini* is commonly written *Martyn*.

- Helix insignita*, p. 176, based on Lister, 67, 68.
otis, p. 38 Favanne, tab. lxxiii, fig. 11.
ovipara, p. 87 Lister, 23, 21.
picta, p. 182 Rum., 22, 1.
undata, p. 177 Lister, 76, Favanne, tab. lxxiii, fig. G3.
vitellus, p. 26 Rum., 22, 1.
- Isognoma lignea*, S., p. 9 New name for *Ostrea isognomon*, L.
rigida, S., p. 115 Lister, 227, 62.
- Lepas cornucopiæ*, S., p. 101 D'Argenville, 26 D.
- Murex elongatus*, p. 65 Favanne, pl. lxxix H.
fimbriatus, p. 106 Martyn, vol. i, fig. 6c.
plicatus, p. 104 Favanne, tab. lxxix, I.
tribulus, var. *pecten*, p. 188 Rum., 26, 3.
- Mya complanata*, p. 100 Lister, 150, 5.
gigas, S., p. 27 Lister, conch. 414 ; 414, 258.
ovalis, p. 134 Lister, 146, 1.
- Mytilus castaneus*, S., p. 69 Lister, 1055, 9.
lingua, S., p. 77 New name for *Patella unguis*, L. =
Humph. Conch., pl. ii, fig. 2.
pictus, p. 158 Knorr, iv, tab. xv, fig. 5.
- Nautilus scrobiculatus*, S.,
p. 182 Lister, 552, 4 ; Knorr, iv, 22, 1.
- Ostrea purpurea*, p. 139 Born, Mus. cæs., tab. vi, figs. 11, 12.
- Patella auricularia*, p. 154 Rumph., 40 N.
fungoides, p. 55 Humph. Conch., pl. iv, fig. 16.
gorgonica, p. 105 Humph. Conch., 3, 8.
macrochisma, p. 71 Humph. Conch., pl. vii, fig. 3, 3.
mytiliformis, p. 42 Humph. Conch., pl. iii, fig. 9.
oculus-hirci, p. 105 Humph. Conch., pl. ii, 6.
pulchra, p. 105 Humph. Conch., pl. ii, 8.
umbraculum, p. 178 Humph. Conch., pl. v, fig. 5.
Pinna rigida, S., p. 136 Knorr, ii, 26, 1.
- Serpula attrahens*, p. 106 Humph. Conch., pl. vii, fig. 15.
gigantea, p. 186 Seba, iii, 94 ; the largest figure.
tortuosa, p. 184 Humph. Conch., pl. ii, fig. 4.
- Solen antiquatus*, p. 101 Pennant, 46, 25.
pallidus, p. 42 Lister, Conch., t. 412 inferior.
plebeius, p. 42 Lister, 421, fig. 265.
- rostratus*, S., p. 160 Valentyn, Bivalves, No. 5.
- Strombus fusus*, var. *persicus*,
p. 3 Lister, 854, 12.
sinuatus, p. 189 Seba, iii, pl. lxxii, fig. 3 ; Favanne, 22,
A. 2.
- tricornis*, p. 5 Martin, 843, 45 ; Lister, 873.
truncatus, p. 150 D'Avila, vol. i, tab. xii.
Tellina cruentæ, S., p. 10 Knorr, vi, 12, 1.
marginalis, S., p. 137 Lister, 387.
Trochus alveolatus, p. 52 Lister, 62, 60.
onustus, p. 4 Favanne, tab. xii, C. 1, 2.
solaris, p. 86 Martyn, vol. i, fig. 30, 9.

- Trochus sulcatus*, p. 113, based on Naturforscher, vol. ix, tabs. iii, figs. 5, 6; Martyn, vol. i, fig. 33r.
tectus, p. 187 Lister, 628, 14.
Turbo cornutus, p. 147 D'Avila, vol. i, pl. v, fig. 1.
Venus arctica, S., p. 138 Lister, 426, 267.
nimbosa, p. 175 Favanne, pl. xlix, fig. I, 1.
Voluta amphora, S., p. 30 Martyn, 780.
ancilla, S., p. 84 D'Avila's Cat., vol. i, pl. viii, fig. 5.
angulata, S., p. 76 Martyn, vol. iv, 1325.
anguria, S., p. 64 Martyn, vol. iii, 767.
arasiaca, S., p. 26 Rumph., 37, 2.
cithara, S., p. 96 Seba, Mus., vol. iii, t. lxx, figs. 1, 2.
elongata, p. 30 Martyn, vol. i, fig. 25n.
filosa, S., p. 76 Martyn, vol. i, fig. 22l.
gravis, S., p. 103 Martyn, vol. iii, 917.
haustum, S., p. 137 Martyn, vol. iii, 781.
imperialis, S., p. 183 Martyn, vol. iii, 934, 935.
incompta, S., p. 96 Martyn, vol. i, fig. 19l.
incrassata, S., p. 13 Martyn, 499, 500.
melo, S., p. 41 Martyn, vol. iii, 772, 773.
muricata, S., p. 142 Lister, 810, 19.
nobilis, S., p. 6 Lister, 799, 6; p. 183, adds Martyn, vol. iii, 774.
pepo, S., p. 87 Martyn, vol. iii, figs. 768-70.
ponderosa, S., p. 25 Martyn, 916.
scafa, S., p. 41 Adans., Seneg., 3, 2.
virescens, S., p. 26 Martyn, 932, 933.

I had hoped to have given the exact status of each of the above names, but my ignorance of general conchology has compelled me to forego that idea. I believe, however, that the preceding list will prove useful, and here add a few notes whereby the work of my critics may be lessened.

Page 186, lot 3964, reads: "A very fine specimen of the Concho-Lepas, or Cockle Limpet. Humph. Conch. page 12, No. 7, plate 5, fig. 9, which was taken from the shell. See also Favanne, pl. 4, fig. H. 2, from the Straits of Magellan."

I note that the following Solander names are invalid through earlier usage of the same combination, mayhap in some cases in the same connexion. The necessary data can be easily recovered in each instance from the same source as I have consulted, viz. Sherborn's *Index Animalium*. Such are *Serpula gigantea*, *Buccinum monodon*, *Trochus solaris*, *Arca nodulosa*, *Voluta muricata*, *Mytilus pictus*, *Helix picta*, and *H. plicata*.

A second series of invalid names are those proposed for the shells figured by Martyn in the first volume of the *Universal Conchologist*. These are *Buccinum iris*, *Voluta elongata*, *V. filosa*, *Trochus solaris*, *V. incompta*, *Murex fimbriatus*, and *T. sulcatus*. I have compiled from Sherborn's *Index* a third list of names, these being generally referred to a later worker. The latter need investigation, though in some instances probably they refer to the same species, viz.: *Arca*

fusca, Brug., 1789; *Conus araneosus*, Brug., 1792; *C. augur*, Brug., 1792; *C. leoninus*, Gmelin, 1791; *C. nocturnus*, Brug., 1792; *C. quercinus*, Brug., 1792; *C. sulcatus*, Brug., 1792; *Cymbium melo*, Bolten, 1798; *Cypræa nebulosa*, Gmelin, 1791; *Helix undata*, Gmelin, 1791; *Murex plicatus*, Gmelin, 1791; *Mya ovalis*, Pulteney, 1799; *Patella mytiliformis*, Gmelin, 1791; *Solen antiquatus*, Pulteney, 1799; *Trochus tectus*, Gmelin, 1791; *Turbo cornutus*, Gmelin, 1791; *Voluta arausiaca*, Shaw, 1790; and *V. scapha*, Gmelin, 1791.

Most, if not all, of these Solander names are quoted by Dillwyn in his synonymy, but I have refrained from citing Dillwyn's equivalents as it is commonly known that these may not be exact, and I might only cause confusion. Thus *Arca fusca* of Solander is cited as a synonym of *Arca imbricata*, Bruguière, over which it has priority, while it invalidates the later *Arca fusca*, Bruguière. The exact determination of the correct names of the two species concerned would need special knowledge, for E. A. Smith has shown that Lamy's synonymy of these complex bivalves is open to correction.

STROMBUS LIVIDUS, Linné.

Hedley, in the Proc. Linn. Soc. N.S.W., 1909, vol. xxxiv, p. 453, used *Drillia livida* ex Gmelin, explaining: "In the absence of a figure and a type, the Linnean *Strombus lividus* is, according to Hanley, unrecognizable. Under these circumstances it is better to adopt the name of Gmelin, securely based on the figure of Chemnitz (Conch. Cab., ix, 1786, pl. 136, f. 1269-70), than to use Lamarek's *auriculifera*."

I have made it a rule never to accept second-hand determinations, so that to me Linné's species being indeterminable Gmelin's interpretation did not systematically concern me, save as a synonym. For the shell figured by Chemnitz, Bolten (prior to Lamarek) had proposed two names, viz., (Mus. Boltenianum, p. 100) *S[trombus] canalicularis*, and (p. 124) *T[urris] St. Stephani*. I should therefore have preferred the safe method of nomination and called the shell "*Drillia*" *canalicularis* (Bolten). The sequel appears in the present publication, as on p. 91 we read, "A pair of large and fine *Strombus lividus*, L., from Guinea, Lister, 121, 17, rare." Here we have a definite and earlier attempt to fix the Linnean species, and, moreover, one more valuable than Gmelin's, as Solander was a personal pupil of Linné and more likely to know the Linnean shell. I cite this as of interest in confirming my proposed usage of the Boltenian species-name, and *not* as an incentive to use Solander's acceptance of the Linnean name.

I have cited "*Drillia*" as I do not consider this genus-name in any way satisfactory. It is restricted to the species *D. umbilicata*, Gray, fixed as type in 1847, and I cannot trace any knowledge of the animal of this apparently aberrant species. It belongs to the west coast of Africa, where also *Clavatula* typical is found, and the shell characters of this genus, as commonly utilized, approach so closely that it is difficult to separate these genera. I do not believe the Pacific "*Drillia*", especially the smaller species, are closely related.

CYPRÆA UMBILICATA, Solander.

On p. 65 "Lot 1471, *Cypræa umbilicata*, S., Coromandel" occurs. Here it is a *nomen nudum*.

Dillwyn, in his Index Hist. Conch. List., 1823, p. 32, gives a note identifying List., 667, fig. 12, thus: "This shell has been arranged as a variety of *Cypræa Pyrum*, and as a separate species in Solander's MS. with the name of *Cypræa umbilicata*; it has the teeth of a saffron colour, and in *Cypræa Pyrum* they are whitish." This quotation validates *Cypræa umbilicata* as of Dillwyn, 1823, and invalidates *Cypræa umbilicata* of Sowerby, 1825. Recently Verco has given a good history of the latter species, and now his varietal name *armeniaca* will become the species-name, while the typical form will need renomination. In order to draw attention to this matter I propose to rename *C. umbilicata*, Sowerby, and to call it

CYPRÆA HESITATA.

[P.S.—*Murex fimbriatus* of Solander (*ante*, p. 90) unfortunately invalidates *Murex fimbriatus* of Lamarck, 1822, which has just recently been rehabilitated, after ninety years, by C. Hedley (Proc. Linn. Soc. New S. Wales, vol. xxxviii, 1913, p. 328).]

MISNAMED TASMANIAN CHITONS.

By TOM IREDALE and W. L. MAY.

Read 12th May, 1916.

PLATES IV AND V.

SUMMARY.

Status of *Chiton inquinatus*, Reeve.*Eudoxoplax*, gen. nov. for *Chiton inornatus*, Ten.-Woods.*Plaxiphora*, spp.*Acanthochiton*, spp.*Cryptoplax*, spp.*Ischnochiton*, spp.Recognition of *Chiton longieymba*, Blainville.*Heterozona subviridis*, n.sp.*Chiton contractus*, Reeve, is *Ischnochiton decussatus*, auctt.Recognition of *Chiton lineolatus*, Blainville, as *contractus*, auct.*Ischnochiton* (*Anisoradsia*, n.subg.) *mawlei*, n.sp.*Chiton divergens*, Reeve, is a synonym of *I. fruticosus* (Gould).*Chiton proteus*, Reeve, is the correct name for *I. divergens*, auct.*Ischnochiton milligani*, n.sp.*Ischnochiton atkinsoni*, n.sp.*Chiton ustulatus*, Reeve, is not *Ischnochiton ustulatus*, auct.*Ischnochiton torri*, n.sp. = *I. ustulatus*, auct.*Ischnoradsia evanida* (Sowerby) is not a synonym of *I. australis*, but is the name for East Tasmanian form.*Chiton cimolius*, Reeve, is distinct from *Chiton volvox*, Reeve, and is probably equal to *Lorica duniana*, Hull.*Callistochiton mawlei*, n.sp.*Sypharochiton maugeanus*, n.sp.*Rhyssoplax diaphora*, n.sp.

I. HISTORICAL NOTES.

It seems meet to anticipate the systematic correction of some misnamed Tasmanian Chitons with a few notes which may appear outside the scope of our title, but which nevertheless are the direct results of research conducted with the above sole aim.

The earliest collectors of Tasmanian Chitons appear to have been the famous French naturalists Péron and Lesueur. In 1802 the *Géographe* called at southern Tasmania, and Péron records that he met with wonderful shells on Maria Island. Our friend Mr. Chas. Hedley has sympathetically related (Proc. Linn. Soc. N.S. Wales, vol. xxxix, 1915, p. 727) how a comrade, Mauge, perhaps even keener than the two above-named naturalists, passed away through an effort to participate in the spoils, and was buried on the island. We have no record of any Chitons preserved from this particular locality, but it may be that Mauge's eyes feasted upon the species with which we associate his name. The following year the *Géographe* returned from Port Jackson and stayed at King Island, Bass' Straits, where a large collection of shells was made.

Péron was now the conchologist of the trip, but unfortunately, though he survived to reach Paris with his treasures, science was deprived of his personal experiences and knowledge by his early decease. Lesueur was primarily the artist, and though he edited his friend's journal he did not attempt to deal with this collection, which was deposited in the Paris Museum. Blainville, however, in the preparation of the pioneer monograph of this group published in the *Dict. Sci. Nat.*, vol. xxxvi, 1824, made good use of the material, and many species were described as collected by Péron and Lesueur from various Australian localities. The only definite citations are from King Island and King George's Sound, but unfortunately, through accidents, Péron's collections had suffered so that incorrect data were frequently ascribed to the specimens, and the correction of such errors has been made with great difficulty, as hereafter shown.

Quoy and Gaimard, twenty years after Péron and Lesueur, collected in southern Tasmania, and their great interest in this group is manifested in their beautiful plates and lucid descriptions.

The earliest British visitor who was a collector of Chitons appears to have been Dr. Sinclair, R.N., but his discoveries are peculiarly perplexing, since his shells also appear to have been mixed and we have had a great deal of trouble in clearing these up. Thus, in Dieffenbach's *Travels in New Zealand*, vol. ii, 1843, Gray described some New Zealand forms and enumerated the New Zealand molluscs. On p. 245 he recorded:—

Acanthopleura undulatus; *Chiton undulatus*, Q. & G., New Zealand, Van Diemen's Land, Dr. Sinclair, R.N.,

and p. 262:—

Acanthochætes hookeri, n.sp., New Zealand, Van Diemen's Land, Dr. Sinclair, R.N.

A few years later Reeve in the *Conch. Icon.*, section *Chiton*, included the following species as collected by Dr. Sinclair in Van Diemen's Land, viz.: *Chiton sinclairi*, Mus. Cuming, *C. inquinatus*, Mus. Brit., and *C. carinulatus*, Mus. Brit.

None of these records is reliable. The first three are undoubtedly Neozelanic, the fourth is probably so, and the last may be West American.

Reeve at the same time described *Chitonellus gunnii* from specimens forwarded by Roland Gunn, which appears to be the only contribution made to our study by that famous Tasmanian naturalist.

Joseph Milligan's name is known in this connexion through the record of some species from Flinders Island by E. A. Smith in 1884. The true facts have never been published, but it would seem that we must consider Milligan to be the first native Chiton enthusiast, for reference to the British Museum Registers and collections shows the following items: In the year 1850 Joseph Milligan presented to that institution a series of Tasmanian shells, including Chitons collected on Flinders Island, Bass' Straits. The Chitons were forty-seven in number, separated by Milligan into nineteen lots. This series has been traced in the British Museum, and we find it covers the

majority of the forms recently collected by one of us on the Furneaux Group. Thus, we note "*Ischnochiton crispus, ustulatus, contractus, decussatus, cariosus, mayii, australis, noræhollandiæ, Cryptoplax gunnii, Notoplax speciosa, Acanthochiton asbestoides, and Loricæ volvox*". We have quoted these names as being in use, but we show many to be incorrect hereafter. The collection was simply placed in the drawers in the British Museum without study, but thirty-four years afterwards E. A. Smith recorded a couple of species and described one new one from Milligan's gift. One of us recorded only three years ago, and sixty-three years after Milligan's discoveries, three of the above-named species as new to Tasmania. This tardy recognition of Milligan's success in Chiton-collecting is noteworthy, since we can now accept this worker as our earliest local predecessor.

The earliest list we recollect is that of Tenison-Woods in 1877, when eleven species were included, but Woods conservatively estimated this as far too many. We wonder how he would greet our fifty to sixty species and suggestions of many more. We have not with certainty determined the modern equivalents of his eleven names.

Tate and May in 1901, mainly from collections made by the latter, were enabled to recognize twenty-four species, but these included some doubtful forms.

Torr, the most diligent Chiton collector in Australasia, explored the north-west coast, and as a result a new list was drawn up. This was published in the "Papers and Proc. Roy. Soc. Tasm." for 1912, pp. 25-40, by May and Torr, as follows:—

| | |
|---|---|
| <i>Lepidopleurus inquinatus</i> (Reeve). | Dredged 15 f. and 9 f., South-east Coast. |
| <i>mattheesianus</i> , Bednall. | One specimen, North-west Coast. |
| <i>columnarius</i> , Hedley & May. | One specimen, 100 f., South Coast. |
| <i>Callochiton platessa</i> (Gould). | North Coast. |
| <i>mayi</i> , Torr. | North Coast. |
| <i>inornatus</i> (Ten.-Woods). | North Coast. |
| <i>Ischnochiton crispus</i> (Reeve). | Universal. |
| <i>divergens</i> (Reeve). | North Coast. |
| <i>contractus</i> (Reeve). | North Coast. |
| <i>cariosus</i> , Pilsbry. | North Coast. |
| <i>smaragdinus</i> (Angas). | North and East Coast. |
| <i>mayii</i> , Pilsbry. | South Coast. |
| <i>australis</i> (Sowerby). | East Coast. |
| <i>noræhollandiæ</i> (Reeve). | North-west Coast. |
| <i>Callistochiton antiquus</i> (Reeve). | North Coast. |
| <i>Placiphora costata</i> (Blainville). | Universal. |
| <i>albida</i> (Blainville). | Universal. |
| <i>mattheusi</i> , Iredale. | North-west and East Coasts. |
| <i>Acanthochites asbestoides</i> (Smith). | Universal. |
| <i>variabilis</i> (Adams & Angas). | North-west Coast. |
| <i>bednalli</i> , Pilsbry. | Universal. |
| sp. | Five valves, 100 f. off Cape Pillar. |

- Acanthochites speciosus* (H. Adams). Dredged 9 f., South-east Coast.
lachrymosus, May & Torr. South-east Coast.
Cryptoplax striatus, var. *gunnii*, Reeve. East and North-west Coasts.
Chiton jugosus, Gould. North-west, South, and East Coasts.
pellis-serpentis, Quoy & Gaimard. Universal.
tricostalis, Pilsbry. North Coast.
quoyi, Deshayes. South-east Coast.
calliozona, Pilsbry. One valve only.
Loricella angasi (Adams & Angas). North-west Coast.
Liolophura gaimardi, Blainville. Recorded but doubtful.

The following species admitted in the Revised Census in 1901 were rejected, as not rediscovered or authenticated:—

- Ischnochiton fruticosus* (Gould). New South Wales.
carinulatus (Reeve). Described from "Tasmania".
tateanus, Bednall. South Australia.
Acanthochites granostriatus, Pilsbry. = *A. bednall*, Pilsbry.
costatus, Adams & Angas.

An investigation of the Furneaux Group enabled one of us to add some more species, whilst also other shells found there incited a redetermination of some species, and these specimens were forwarded to England for comparison with the British Museum types, hence the present paper. The species added were (*Victorian Naturalist*, vol. xxx, 1913, p. 59) *Ischnochiton sulcatus* (Quoy and Gaimard) = *deussatus* (Reeve), *I. ustulatus* (Reeve), and *Lorica volvox* (Reeve); and the doubtful species were *Ischnochiton cariosus*, Pilsbry, and *I. contractus* (Reeve).

Continued interest through the publication of these accounts resulted in further discoveries, and in the "Papers and Proceedings Royal Society of Tasmania", 1915, pp. 78-9 and 81-2, May added *Chiton oruktus*, Maughan, *C. aureomaculatus*, Bednall & Matthews, *Acanthochiton kimberi*, Torr, and *A. rubrostratus*, Torr, all from the south-east coast, and extended the range to the south-east coasts of *Lorica volvox* (Reeve), *Callochiton inornatus* (Ten.-Woods), *C. mayi*, Torr, *Acanthochites variabilis*, Adams & Angas, and *Callistochiton antiquus* (Reeve).

This made up a total of thirty-nine species, but the collections now studied by us show at least sixty species.

We here record our thanks to a recent and most energetic field naturalist, our friend Mr. Ernest Mawle, of Port Arthur, who has submitted and presented to us splendid specimens of many species which are worthy of special note for their perfect preservation and large size. We have attached his name to two magnificent new species as a mark of our appreciation of his good work, and note that we have other new discoveries made by him now before us and anticipate many more.

It is rather difficult to fully express our thanks to our friend Dr. W. G. Torr for his generosity in presenting us with so many Tasmanian forms, the results of much labour in collection, and,

further, Iredale desires to place on record at this, the earliest, opportunity, his gratitude to Dr. Torr for the gift of an unequalled and complete series of South Australian shells, whereby definiteness has been gained in connexion with typical Adelaidean forms. We have continually referred to Torr's papers, and, though the nomenclature needs revision, these mark an epoch in the study of Australian Chitons, being based on personal experience, whilst his field notes are very valuable.

The types of the new species will be presented to the Tasmanian Museum, Hobart. These are undissected shells which have been figured as such; detail figures will be later given from dissected paratypes.

II. SYSTEMATIC NOTES.

We preface our corrections and descriptions of new species with a few words of explanation and warning. The list given above needs extensive revision, and we have to point out one general reason. Many species were described by Reeve from the Cuming Collection and British Museum. Reeve only described and figured one specimen of each species, and very fortunately his artist painted the shell carefully. We are thus able to trace the individual which must be regarded as the type. When Pilsbry prepared his monograph he was dependent upon Carpenter's MS. notes on these shells, and Carpenter did not differentiate this figured shell. The only worker who has since determined Australian shells by direct comparison with the British Museum material also overlooked this item, which now proves important. One of us has endeavoured to fix these figured shells, and hereafter we record some results, but we would note that complications may yet occur.

The word of warning is in connexion with the description of new species from unique examples of which we do not as yet know the variation and evolution through their growth stages. Hence, while geographically species can be easily named and thus variation gauged, it is impossible to apply the knowledge so gained from one species to another case even in the same genus. The growth of sculpture and development of girdle-scales need careful investigation, for we find that the young of some species of *Ischnochiton* differ in both these items from the adult and senile phases. We have now before us almost twenty different species represented by a few specimens; most of these are very distinct, but we withhold descriptions until possessed of more material that will illustrate the growth stages. It is also necessary to use the microscope in connexion with each specimen, though we have found it an infallible law that the strange appearance of a shell is the first attraction, and that in no case are species so alike that no superficial difference is apparent at first sight.

1. CHITON INQUINATUS, Reeve.

This species was described from "Van Dieman's Land; Dr. Sinclair". In 1896 Sykes dissected one of the type-specimens and found it to be a *Lepidopleurus*, and recorded the species from Victoria, while

simultaneously Pilsbry and Suter added New Zealand as an additional locality, and Bednall extended the range to South Australia. In 1910 May recorded it as dredged in 9 fathoms off Pilot Station, River Derwent, and in 1912 May and Torr added "large specimens dredged, fifteen fathoms in Geographe Strait, East Coast", observing "No specimen, to our knowledge, has been taken near the shore".

Re-examination of these dredged specimens in conjunction with the type series necessitated a consideration of Neozelanic and South Australian shells. Unfortunately we have not been able to criticize Victorian examples, but we have the following facts to record. The type set are obviously "shore shells" and agree better with New Zealand specimens than with any other, but here again no certainty is possible, since they do not exactly agree, and, moreover, we have two species collected on the New Zealand littoral; we have not seen the dredged New Zealand specimens attributed to this species. We particularly note this because we have two series from Tasmania, both dredged, and these represent two species, both different from the types of *inquinatus*. Torr has also sent us two different species from South Australia, which seem to agree with the Tasmanian forms or to differ very slightly from them, we have not sufficient material to determine which. However, all those we have yet examined seem to fall into *Parachiton*, since the girdle appears to be covered with slender glassy spikes, whilst *inquinatus* and the Neozelanic shore shells have the girdle covered with small scales.

There may be a rare shore shell in Tasmania which will bear the name *inquinatus*, and there may be a shore shell in South Australia which may bear the name *liratus*, as the description given refers to a shore shell which seems to be a *Lepidopleurus*, but we have not yet traced the type.

2. EUDOXOPLAX, gen. nov.

This name is proposed for *Chiton inornatus*, Tenison-Woods. Pilsbry, in his Monograph, took up a manuscript description, made by Carpenter of a shell in the British Museum, under the name *Callochiton lobatus*, placing it in the subgenus *Stereochiton* from Carpenter's note, "Girdle leathery, smooth, under a lens seen to bear short minute sparsely placed hairlets." Later Pilsbry recognized this species was Tenison-Wood's species above-named, and still later sinking *Stereochiton* as a synonym of *Trachyradsia*, noted the species as *Callochiton (Trachyradsia) inornatus*, Ten.-Woods.

Recent acquisitions of many specimens show the Tasmanian shell to reach a large size, and to differ appreciably from *Callochiton* and approach very closely to *Eudoxochiton*. It differs from the latter in the very wide leathery girdle with very short thin curved few and minute little hairs, and may later be regarded as a subgenus of *Eudoxochiton*.

3. PLAXIPHORA IN AUSTRALIA.

Under this heading one of us gave (Proc. Malac. Soc. Lond., vol. ix, June, 1910, pp. 96-100) the results of the examination of a number of specimens, concluding as follows:—

Plaxiphora costata (Blainville). Specimens from Queensland, Tasmania, and South Australia.

Plaxiphora albida (Blainville). New South Wales, Victoria, South Australia, and Tasmania.

Plaxiphora pateliana, Thiele. New South Wales.

Plaxiphora matthewsi, Iredale. South Australia.

It was obvious from that paper that no definite result had been achieved, and other workers found great difficulty in accepting these conclusions. The writer was just as dissatisfied, and later recorded that he was still working on the matter. Herein is presented a reason for reconsidering the whole subject, but material is demanded.

It has been abundantly proved by the large collections now available that all Chitons are very local in their distribution, and this suggests the criticism of series from definite localities. With such series field notes should be considered and the variation established. Thus "Tasmania" is of little use as a locality when we know the northern shells may differ from the southern, and from the south alone we seem to have three distinct species, not counting *matthewsi*, Iredale, which is not a *Plaxiphora*, strictly speaking, at all.

Tasmanian shells have been twice named, thus: *P. albida* (Blainville), King Island; *P. tasmanica*, Thiele, new name for *Chiton glaucus*, Quoy & Gaimard, from southern Tasmania.

We have not yet examined actual topotypes, but Thiele has given figures of the type of the first-named, and good figures were given by Quoy & Gaimard as well as by Thiele of the other. As previously stated, it is hoped to settle this matter in detail later, but we call attention to it in the hopes of obtaining further co-operation, many more specimens being necessary. Thus Torr has sent us shells from St. Francis Island which he has called *costata*, publishing a note, "Mr. Gatcliffe, of Victoria, identifies this shell with *P. bednalli*, Thiele." We are inclined to agree with Gatcliffe, and the shells are certainly *not costata* (Blainville). Torr also sent us a topotype of the latter, and it seems distinct from the South Australian shell we had so identified. Further, South Australian shells do not seem to agree with Tasmanian shells determined as *albida* (Blainville), so that probably the former will bear the name of *conspersa*, Adams & Angas. A further complication exists in *Plaxiphora pateliana*, Thiele. This was described as from "Tasmania", and Iredale, probably wrongly so determined a New South Wales species.

The items calling for urgent solution are: Does *P. albida* (Blainville) exist in South Australia, and, if so, is *P. conspersa*, Adams & Angas, synonymous? Does *P. costata* (Blainville) range into South Australia and Tasmania, or is it represented by different forms? Does *P. bednalli*, Thiele, range into West Australia, and, if so, is not *P. hedleyi*, Torr, the immature shell, and also is not this the form recorded as *P. albida* (Blainville) by Thiele? Again, does *P. bednalli*, Thiele, range into Tasmania or is it there represented by a closely allied form? These questions can only be answered by the study of systematically made collections of numbers with field notes. This is necessary, as it is quite impossible to gauge the merits of the cases by

means of a few shells only. *P. matthewsi*, Iredale, is not involved in the above medley, and we think one of the other species would quickly be eliminated were collections available. We have taken the opportunity of figuring *P. matthewsi*, Iredale, from a Tasmanian specimen so determined (Pl. V, Fig. 4). When it was described the peculiar formation of the tail-valve which suggested *Frembleya* was remarked upon. Receipt of well-preserved specimens from Tasmania show that the species has no close relationship with *Frembleya*, the animal being obviously different. This is now being investigated, but in the meanwhile a nearer ally from a superficial examination might be *Loricella*. This statement should prove how extremely interesting this species is, and we hope that its exact status will be soon fixed. The valve slitting recalls that of *Callistochiton*, and we note hereafter that Thiele associated *Lorica*, *Loricella*, *Squamophora*, and *Callistochiton* together. We discuss the association later, but believe most of the resemblances of this species are simply due to convergence in development, and are not of phylogenetic import.

4. ACANTHOCHITONS.

Torr, in his essay on South Australian Polyplacophora, observed, "A splendid opportunity awaits the student who will make this field a special study," and recorded sixteen species. We confirm Torr's statement, and as an aid give the following notes. First, it is now necessary for the student to collect in quantity, as we find the species difficult to delimit without long series. It will be necessary to continually use the microscope, and very many specimens must be dissected.

The difficulty of distinguishing these Chitons may be lessened by the usage of narrow generic groupings. Thus one of us advocated the usage of six generic names, viz.: *Acanthochitona*, *Cryptoconchus*, *Cryptoplax*, *Notoplax*, *Macandrellus*, and *Craspedochiton*. This was after consideration of Thiele's classification, which was based on examination of the radula as well as microscopic shell-characters, and which reads:—

"Genus *Craspedochiton* and subgenus *Thaumastochiton*.

Genus *Aristochiton*.

Genus *Cryptoconchus* with subgenus *Spongiochiton* and sections *Leptoplax* and *Notoplax*.

Genus *Acanthochites*."

If this be accepted the following alterations are necessary on nomenclatural grounds alone. Firstly, regarding the genus *Cryptoconchus* with subgenus *Notoplax* and sections *Leptoplax* and *Macandrellus*. *Notoplax* is older than *Macandrellus*, which equals *Spongiochiton* and *Loboplax*. We, however, would prefer Iredale's arrangement with the amendment that *Macandrellus* may fall as an absolute synonym of *Notoplax*. We have Tasmanian species which completely combine any superficial differences apparent in the types of the two generic groups. We would note, however, that Thiele referred the Neozelanic species "*rubiginosus*, Hutton" to *Loboplax* =

Macandrellus, whereas, superficially, it seemed typically a *Craspedochiton*. Again, Thiele placed the Australian *variabilis* in *Loboplax*, but we have no hesitation in disagreeing with this point. This species (there may, however, be more than one confused under the name) is of the greatest interest because it cannot be closely correlated with any other Australian shell. More study than we have yet given to it is necessary to determine the correct location of the shell, and the animal must be carefully examined. Again, it must be admitted that probably more than one generic form is confused under the name *Acanthochiton*, even as restricted above, since the "*bednalli*" group seems somewhat different to the "*asbestoides*" group. These may, however, prove to stand in the same relationship to each other as typical *Notoplax* does to typical *Loboplax*. As one of us admitted before, this is the most difficult group in the order to satisfactorily determine, and we want much more material to work upon.

5. CRYPTOPLAX.

Reeve described *Chitonellus gunnii* from Bass' Straits, Tasmania, but Pilsbry, in his Monograph, considered it a variety of *striatus*, Lamarck, even as E. A. Smith had concluded some years previously. Consequently Bednall so recorded the South Australian shells. Torr recently reverted to the name *striatus*, remarking: "*Chitonellus striatus* of Lamarck describes our South Australian species admirably . . . The breadth of the valves varies so much in *striatus* that there seems no room for var. *gunnii*." Previously, May and Torr had catalogued the Tasmanian shells as *Cryptoplax striatus* (Lamk.), var. *gunnii*. Probably Torr had overlooked an article by Pilsbry in the Proc. Malac. Soc., vol. iv, pp. 151 et seqq., March, 1901, entitled "Morphological and descriptive notes on the genus *Cryptoplax*", wherein Pilsbry clearly differentiated specifically *Cryptoplax gunnii*, Reeve, from *Cryptoplax striatus*, Lamarck. In this paper Pilsbry used spirit specimens sent by Bednall from St. Vincent's Gulf, South Australia, giving a description on p. 156 and figures on pl. xv, figs. 17-19, 24-6, to be contrasted with figs. 20-3 drawn from Port Jackson specimens of *C. striatus*, Lamarck. British Museum specimens confirmed Pilsbry's conclusion, and North Tasmanian shells generally agreed. The first Port Arthur (South Tasmania) specimen attracted attention as differing from the typical *gunnii* in being even more elongate. Mr. E. Mawle has since collected more Port Arthur specimens, and these indicate the solution of Torr's perplexity, since two very distinct species are living together in that locality. We had observed some differences in other collections, but were not certain of the exact source of the shells. Mawle's collection has placed us upon sure ground, and the additional material we are now obtaining will enable us to deal with this matter later in more detail.

In the meanwhile we can state that the two Port Arthur species are quite different superficially and in detail, and that we suggest one is the southern representative of "*striatus*", while the other

represents *gunnii*. This conclusion necessitates the redetermination of South Australian shells and also West Australian ones. Torr has sent a few South Australian shells, and here again two very distinct species are confused, and it may even prove that more may be recognized. The exact application of the name *striatus* is not yet certain, for we have not ascertained the existence of the type, and the description is very inadequate and no exact locality is given, though Péron and Lesueur are cited as the collectors; this fact suggests King Island.

6. ISCHNOCHITONS.

Tasmania appears to be very rich in species referred to *Ischnochiton*, s.l., but the south has developed a most wonderful fauna of large species, while the north has many Adelaidean forms. Torr recorded twenty species of *Ischnochiton* from South Australia, and the majority of these may yet be found in northern Tasmania. Pilsbry, when dealing with Port Jackson Chitons, admitted five subgenera, viz. *Ischnochiton*, s.s., *Heterozona*, *Stenochiton*, *Haploplax*, and *Ischnoradsia*. Thiele was more conservative still, for, dismissing *Haploplax* altogether, he only regarded *Stenochiton*, *Heterozona*, and *Ischnoradsia* as sections of the subgenus *Ischnochiton*. *Stenochiton* and *Ischnoradsia* are superficially so different that generic segregation is demanded. The general form of *Haploplax* differentiates this group, and the girdle-scales being very different from those of *Ischnochiton* we consider the name should have generic rank. However, we would record that neither *mayii* nor *virgatus* have any place in the group. Adult *Heterozona* is a very characteristic shell in the peculiar girdle-scaling, and we propose to use this name generically for somewhat novel reasons. Firstly, the immature *Heterozona cariosa* has the girdle-scaling normal, the scales being regular but smaller on the outer half of the girdle. This is the regular girdle-scale formation in such a species as *fruticosus*, Gould, and to some extent in the species known as "*contractus*" (recte *lineolatus*, Blainville). In the species known as "*divergens*" (recte *proteus*, Reeve) and *crispus*, Reeve, the scales are practically uniform in size to the edge of the girdle. Therefore, if *Heterozona* were to be enlarged, it might reasonably include such shells as *fruticosus*, Gould. While we do not take this step at this time we use *Heterozona* generically, as we describe a new species from southern Tasmania which is the most highly developed of the group yet known. In this the peculiar girdle covering is developed at an early age, and is most noticeable at the first glance. We would thus make use of Pilsbry's five subgenera as genera, and if these are utilized closer examination of shells becomes necessary and fewer mistakes will be made. Again, we must note that long series are necessary, as the very immature of many *Ischnochitons* are quite alike in form, lack of sculpture, and girdle-scaling. Further, the girdle-scales of juvenile specimens appreciably differ from those of the adult, even when the latter are not referable to *Heterozona*.

Since the preceding was written we have been surprised by the dissections of the new species *I. mawlei*. A peculiar and beautiful

Ischnochiton with extraordinary lateral sculpture was all it impressed us as. The girdle-scales were certainly slightly abnormal, in that they were more regular than those of "*contractus*" auctt., with little or no leaning to the *fruticosus* style. We found, however, that all the median valves had two, three, or four slits, instead of the single one anticipated by us. Consequently it fell into Pilsbry's subgenus *Ischnoradsia*, which in no other item did it resemble. While this proved the inadvisability of accepting Pilsbry's differential features it did not relieve us from our dilemma. We purpose having the animal investigated and will then decide as to its exact status. In the meanwhile, to fix the peculiar systematic position of the species we provide for it the new subgeneric term ANISORADSA.

When Hull described *Ischnochiton falcatus* he recorded that he had received the same species from one of us under the name *I. tateanus*, concluding that an error had been made by Tate & May in 1901 when they included the latter species in the Revised Census. Confusion occurred through this note, and consequently *neither* species appeared in May & Torr's List, whereas the fact is that *both* species or their representatives *do* occur, and were dredged together. Further, either *I. falcatus* or a nearly allied shell also occurs in South Australian waters. The Tasmanian and South Australian shells known as *I. crispus* (Reeve) differ appreciably from New South Wales shells, which are typical, as shown by the types in the British Museum. The Victorian shell received as a varietal name *decorata* by Sykes, and at the present time this may be used specifically for the Victorian, Tasmanian, and South Australian form.

7. CHITON LONGICYMBA, Blainville.

Blainville described this species in 1825. Quoy & Gaimard utilized this name for a common *Ischnochiton* found in Australia and New Zealand. This usage persisted until 1892, when Pilsbry separated the Australian species from the Neozelanic, retaining the above name as of Quoy & Gaimard for the latter, definitely stating that this was not Blainville's species. This disposition was accepted until one of us indicated the falsity of this procedure and definitely distinguished the Neozelanic shell with a new name. This, however, did not finish the matter, for Blainville's species still remained unrecognized. The same writer has continually endeavoured to fix this name and so effectually rid our nomenclature of an irritating item. The constant examination of the present collections has enabled us to record a favourable, though quite unanticipated, result. Blainville's description not being commonly accessible, we here transcribe it:—

"*C[hiton] longicymba*, Dufr. (Blainville, Dict. Sci. Nat. (Levrault), vol. xxxvi, 1825, p. 542).

"Corps très-allongé, très-étroit; limbe couvert de très-petites écailles comme farineuses; coquille très-longue, composée de huit valves grandes, croissant de la première à la dernière, convexes et parfaitement lisses; les intermédiaires avec des aires latérales larges, distinctes par une saillie anguleuse; couleur générale d'un vert brunâtre, varié ou panaché de petites taches blanches, plus larges sur

la ligne dorsale. Cette jolie espèce existe dans la collection du Muséum; elle provient des rivages de l'île King."

The recognition of this species is very easy when the keynote is touched. Hitherto we have always been searching in the wrong place, looking at *Ischnochitons* with sculpture, whereas Blainville wrote "valves . . . parfaitement lisses".

Rochebrune described a large number of Chitons in the Paris Museum, generally hiding every clue to their identity under a peculiarly false generic location. Thus he described *Schizochiton nymphe* (Bull. Soc. Philom. Paris, ser. VII, vol. VIII, p. 36, 1884) from King Island, collected by Péron & Lesueur. No one could possibly be expected to guess that so far from being a *Schizochiton*, this species was exactly the opposite in every generic feature, being a *Stenochiton*. Yet Thiele, from an examination of Rochebrune's type, has showed this and given figures to support his conclusions. In a similar case one of us showed that Rochebrune had redescribed the type of a species named by Quoy & Gaimard, and this enabled us to reconcile the loss of the type of *C. longicymba*, Blainville, with the presence of *Schizochiton nymphe*, Rochebrune.

From Thiele's description and figures there is certainty that Rochebrune renamed the Blainvillean species, and that *Chiton longicymba*, Blainville, is a *Stenochiton*. Thiele does not definitely make this a synonym of *Stenochiton juloides*, H. Adams & Angas, and until King Island specimens are again collected we prefer to allow *Stenochiton longicymba* (Blainville) as a separate species. Blainville definitely named four species as coming from King Island, viz. *C. lineolatus*, *C. longicymba*, *C. hirtosus*, and *C. albidus*. Thiele disposed of the last two, and we now recognize the two first-named. Thus *C. lineolatus* is later shown to be the species known as "*I. contractus*, Reeve", but which is not Reeve's species. The status of *C. longicymba* has just been discussed, while *C. albidus* from examination of the type-specimen still existing must be used for one of the common species of *Plaxiphora*.

Though Thiele recorded that *C. hirtosus* was based on the shell later described by Quoy & Gaimard as *C. georgianus*, from King George's Sound, and therefore the locality "King Island" was erroneous, he did not use it. We had referred the species to the genus *Sclerochiton*, though Thiele selected *Liolophura*, but here we simply note that *Sclerochiton* is untenable, the name being preoccupied, and for the Chitons so named, *Squamopleura*, Nierstrasz, seems available: of which more at a later opportunity.

8. HETEROZONA SUBVIRIDIS, n.sp. Pl. IV, Fig. 2.

Shell of full size for the genus, elliptical, valves low, semi-carinate, keel often obsolete, side slopes arched, valves not beaked. Colour varied, generally of shades of blue-green with lighter stripes and mottling; many specimens show a dark dorsal stripe succeeded on each side by whitish stripes; some specimens combine with the bluish shell a beautiful red-brown girdle, others even a golden girdle, though usually the girdle is darker blue-green. The characteristic

coloration has suggested the specific name, but some colour-aberrations occur in which the green is lacking, being pale cream splashed with white and orange, though green even here sometimes recurs. The following description of the sculpture is drawn up from a perfectly normal specimen of small size selected as the type.

Anterior valve regularly radially ribbed with about fifty flattened ribs. Median valves have six to eight similar ribs on the lateral areas; the pleural areas have a few longitudinal wrinkled threads near outer edge of the pleura, the rest of the pleura and jugum covered with fine zigzag wrinkled lines. Posterior valve regular and normal; mucro elevated about anterior third; sculpture of posterior half like that of the anterior valve; anterior portion sculptured like the pleura. Variation in the sculpture occurs according to age in that the ribbing on the anterior valve and lateral areas of median valves increases through divarication and also tends to degenerate into nodules through the intersection of the concentric growth-lines. The posterior area of the tail-valve shows this more strongly, appearing in some cases coarsely nodulose. Further with age, the pleural sculpture becomes finer and the zigzags predominate. Girdle-scales distinctive; near the shell small pointed or tending to mucronate scales bearing striæ, and comparatively regular for about half the width of the rather broad girdle; the outer half covered with minute scales, irregular and somewhat varying in size.

Length of type 30 mm., breadth 16 mm. Dried shell. Length of largest specimen (dried) 49 mm., breadth 24 mm.

The series examined shows two phases, a lower broader shell and a higher narrower shell; they are certainly conspecific as far as can be determined at the present time, and the only suggestion we can make is that the differences may be sexual. This suggestion is being investigated as it may explain the discrepancies observed in other cases. The internal structure is quite normal, the coloration varying slightly as the outer coloration varies.

Type from Port Arthur, southern Tasmania, collected by E. Mawle. Range, east and south coasts of Tasmania. Swansea, Kelvedon (W. L. May); Port Arthur (W. Torr, W. L. May, E. Mawle).

9. CHITON CONTRACTUS, Reeve.

The locality given when this species was described was "New Zealand". When Pilsbry dealt with it (*Man. Conch.*, vol. xiv, 1892, p. 93) he did not comment upon this, but simply gave "Tasmania (*Mus. Cuming.*)". This was taken from Carpenter's Manuscript, the quotation reading, "There are 3 specimens in the Cuming collection, from Tasmania, and two on the same tablet which are really an intermediate variety of *I. castus.*" As synonyms, also following Carpenter, Pilsbry added *Chiton decussatus*, Reeve, *Chiton castus*, Reeve, and *Lepidopleurus speciosus*, H. Ad. & Angas. Later, in the *Nautilus*, vol. viii, p. 129, March, 1895, Pilsbry recorded, "By the study of many specimens received from Messrs. Bednall & Cox, I find that two species were 'lumped' under the name *Ischnochiton contractus*. (1) *I. decussatus*, Reeve, of which *castus*, Reeve, and

speciosus, Ad. & Ang., are synonyms, and (2) *contractus*, Reeve, of which Mr. Sykes considers *pallidus*, Reeve, a synonym." This conclusion was accepted by Bednall, though he observed he was not satisfied. Confusion of more than one species under the name *contractus* in Tasmania urged reconsideration from first principles, when it was found that the description of *contractus* was only applicable to the shell known as *decussatus*, specimens being available that agreed absolutely with Reeve's figure and description. Reeve wrote, "terminal valves and lateral areas of the rest concentrically granulated, granules solitary." This is quite definite and sufficient to fix the species, and when this is accepted the exact shape and coloration are seen to agree. Search in the British Museum showed that the description and figure had been taken from a specimen of *decussatus* on the same tablet as specimens of "*contractus* auctt.", and this had apparently been selected as being the most perfect. Consequently the name *contractus* undoubtedly refers to the species known as *decussatus*, and the synonymy given in the Man. Conch. by Pilsbry is exact. We had drawn up a description of "*contractus* auctt." when we recognized that the description of *lineolatus* given by Blainville was absolutely applicable. We reproduce the latter: "*C*[*hiton*] *lineolatus* (Blainville), Dict. Sci. Nat. (Levrault), vol. xxxvi, 1825, p. 541). Coll. du Mus.

"Corps ovale, assez allongé; les aires laterales des valves intermédiaires moins distinctes que dans les espèces précédentes, et offrant des stries nombreuses sur les bords; les écailles du limbe très-petites; les dents des lames d'insertion non pectinées; couleur variée de petites taches longitudinales brunes sur un fond jaunâtre. Cette espèce, assez rapprochée de l'oscabrion allongé, a été rapportée de l'île King par M. Péron et Lesueur."

Sykes has recorded *C. pallidus*, Reeve, as a synonym, but the description is of a smooth shell of unknown locality. The tablet bearing the name has specimens of "*contractus*" upon it, as Sykes recognized, but the particular shell figured and described by Reeve is there also; it is a smooth shell, due to extraordinary wear, and differs in shape and is quite indeterminate, but *textilis* is suggested, and it very probably is not Australian. We give the synonymy of the two species as we now make it.

Ischnochiton contractus (Reeve).

Chiton contractus, Reeve, 1847 = *C. sulcatus*, Quoy & Gaimard, 1834, not of Wood, 1815 = *C. decussatus*, Reeve, 1847 = *C. castus*, Reeve, 1847 = *Lepidopleurus speciosus*, H. Adams & Angas, 1864 = *Gymnoplax urvillei*, Rochebrune, 1881.

Range: Adelaidean Region from Flinders Island, Bass' Straits, to Rottneest Island, West Australia (W. Torr).

Note.—One of us observed that specimens in the British Museum from West Australia appeared separable. We have not seen any more shells from that locality, but Torr has again recorded it. We here note that should the West Australian form be distinguished it

will bear the name *urvillei*, Rochebrune, given to the shell collected by Quoy & Gaimard in King George's Sound, West Australia.

Ischnochiton lineolatus (Blainville). Pl. IV, Fig. 1.

Ischnochiton contractus, Pilsbry, 1895 (not of Reeve, 1847), and of all recent writers. A good description was published by Pilsbry in the Manual, extracted from Carpenter's MS., but no figure has yet appeared. We remedy this latter point, but do not give any further description, since the shell we figure is well known, and complications occur in specimens from southern Tasmania which we have not yet completely cleared up.

The typical form is very common in South Australian waters, where little variation exists. One of us collected it in the Flinders Group, and odd specimens with the same distinctive coloration have been taken in southern Tasmania.

"*I. contractus*" must now be entirely omitted from the New Zealand fauna.

10. ISCHNOCHITON (ANISORADZIA, n.subg.) MAWLEI, n.sp. Pl. IV, Fig. 4.

Shell of full size for the genus, elongate elliptical, valves round-backed, low, not keeled nor beaked. Colour uniform pale yellow. The following description of the sculpture is drawn up from a small normal specimen selected as type.

Anterior valve sculptured, with fifty to sixty low radials, which are curved, straggling, convergent, and more or less undefined, so that scarcely any one can be traced from apex to edge. Median valves show the same sculpture on the lateral areas, but more irregular development still is here noticeable. The pleural areas are sculptured at the sides with irregular longitudinal threads, more or less wavy, which become obsolete towards the jugum, the dorsal area being covered with fine zigzag scratches. Tail-valve large with mucro elevated at about the anterior third, posterior slope straight. Posterior area sculptured like the anterior valve, but more roughly, separated lozenges commonly occurring; anterior sculpture like that of pleura of median valves. Variation in sculpture is slight, age developing more radials on anterior valve and lateral areas of median valves, while concentric growth-lines become more prominent and tend to form lozenges on these areas, the posterior area of tail-valve generally showing this lozenge formation more boldly. Interior coloration pure white. In young shells both the tegmentum and articulamentum are brittle. The sutural laminae and teeth are typically Ischnoid, but the latter are very short. In the anterior valve twenty slits were counted in a senile shell, twenty-five in a young one, the teeth irregular in shape. In the posterior valve eighteen irregular slits were noted in the senile shell, eighteen regular ones in the young one. In the median valves the sinus is broad, about one-third the breadth of the valve, the sutural laminae are long and evenly shaped; the lateral teeth are very short, exceeded by the tegmentum, and two, three, or four slits occur. The external appearance of the shell is distinctive, but detail figures of the valves will be given later. Girdle

broad, covered with regular imbricating small scales; in the young shell these are oval, sub-erect, with ten to twelve deep grooves, the apex smooth. Adjacent to the shell these are longer, narrower, and more erect. Small squarish granules adorn the edge. In a senile shell the scales are all more erect and more deeply grooved, while they are more irregular in shape. Length of type (dried shell) 34 mm., breadth 18 mm. Collected by E. Mawle at Port Arthur, South Tasmania.

Range: south coast of Tasmania.

This distinctive species cannot be confused with any other Australian shell, differing as it does in shape, colour, sculpture, and internal features. It is a very fine discovery, as it grows to 51 mm. \times 24 mm. in the dried specimen. We have already indicated that its relationships are obscure and its range is very restricted so far as at present known, for such a conspicuous shell could not escape notice by collectors as keen as those of Victoria and South Australia.

11. CHITON DIVERGENS, Reeve.

Reeve's description and figure were not carefully considered by Pilsbry when he separated *divergens*, from *fruticosus*, Gould, and made *Chiton proteus*, Reeve, synonymous with the former. Pilsbry wrote "Girdle covered with large scales", and remarked, "*I. divergens* has been erroneously united to *fruticosus* by Angas and by Haddon." Angas and Haddon were, however, quite right, as the figure shows, and the description "ligament horny, very finely granulously coriaceous" is very definite. Reeve's diagnosis of *Chiton proteus* is a perfect description of the shell Pilsbry considered "*divergens*". Tasmanian shells recorded under the latter name do not agree with specimens of *proteus* and are here distinguished. We may note that in the British Museum the shell apparently figured by Reeve as *C. divergens* is on a tablet now labelled *fruticosus* (quite correctly), while the type of *proteus* appears to be on a tablet labelled "*divergens*".

12. ISCHNOCHITON MILLIGANI, n.sp. Pl. V, Fig. 2.

Shell of full size for the genus, narrowly elongate, not appreciably tapering at the ends, elevated, gothic arched, valves not beaked nor keeled. Colour varied: greenish of dull shades longitudinally streaked with darker. Anterior valve small radially, closely ribbed, with numerous low riblets, often divaricating, forty to sixty or more according to size. Median valves deep; lateral areas radially ribbed as anterior valve, eight to twelve ribs being counted; ribs low and close together. Pleura finely ridged at sides, ridges straight, succeeded on jugum by finer sculpture which is sometimes zigzag in character. Tail-valve large, mucro elevated at anterior third, posterior slope slightly concave; sculpture of posterior area as of anterior valve and anterior portion sculptured as pleural areas. Girdle-scales large, oval, and very regular, deeply grooved with eight to ten grooves. Interior with red markings, a red horseshoe clearly seen in tail-valve; slitting regularly Ischnoid in character, head-valve in young shell

having 13 slits, old shell 9 slits, median valve 1 slit, tail-valve in young shell 13 slits, in old shell 11 slits.

Type from Port Arthur, southern Tasmania, collected by E. Mawle. Length 41, breadth 19 mm. Largest shell: length 59, breadth 27 mm.

Range: coasts of Tasmania.

This species differs from *I. proteus*, Reeve, in the finer sculpture of the terminal valves and lateral areas of the median valves, while the pleura shows much coarser sculpture. It grows to a much larger size, and the scales of the girdle are comparatively smaller. Compared with a typical specimen of *proteus* of the same size, the anterior valves show 40 ribs, the laterals 6-8, the posterior 40 ribs, as against anterior 35, the laterals 4-7, the posterior 28-30 for *proteus* (Pl. V, Fig. 2a'''). The figures will show the differences, which become emphasized as larger specimens are examined.

13. ISCHNOCHITON ATKINSONI, n.sp. Pl. IV, Fig. 3.

Shell small, elongate oval, elevated, round-backed, valves not beaked. Colour uniform buff. Anterior valve coarsely quincuncially punctate, though obscure radials can be distinguished; the type-specimen figured is half-grown only, since the valves become eroded and brittle at a very early stage. In the senile shell obscure radials predominate on the anterior valve. Median valves have the pleural areas coarsely quincuncially pustulose, the pustules round, flat-topped, and finer on the jugum, which is always much eroded in senile shells. The lateral areas are well elevated, pustulose only in the adult, coarse, nodulous radials being developed with age, that are, however, dominated by the concentric growth-lines so that they appear as if concentrically granulose. The posterior valve is pustulose in the immature stage, which first shows the development of stronger sculpture. In the senile shell the mucro is elevated and central, the posterior slope slightly convex, sculptured with apparently elongate nodules, caused by the intersection of the radials with the growth-lines. Girdle-scales regular, very small, and finely striate. Internal coloration white; slits normally Ischnoid, nine in anterior valve, one in median valves on each side, eleven in posterior valve.

Type collected by Mr. E. D. Atkinson, J.P., at Sulphur Creek, northern Tasmania.

Length 8, breadth 4.5 mm. Senile shell: length 13, breadth 7 mm. Dried shells.

Range: northern Tasmania. Also collected by Dr. Torr.

The minute striated scales of the girdle at once distinguished this small species from the immature of *I. decoratus* (Sykes), and there is at present no other species with which it can be confused. It suggested "*gryei*" recorded by Dr. Torr from South Australia, but we find it quite distinct, as will later be shown.

14. CHITON USULATUS, Reeve.

Angas, in 1867, recorded *Lepidopleurus ustulatus* (Reeve) from Port Jackson. Pilsbry (Proc. Acad. Nat. Sci., 1894, p. 70, footnote) commented "*Ischnochiton ustulatus*, Reeve, occurs abundantly in South Australia, but nothing I have seen from Port Jackson

corresponds to this species". Bednall (Proc. Malac. Soc., vol. ii, April, 1897, p. 144) then recorded a species under this name, giving a very fine word-picture of the shell, and observing, "Recorded by him [Angas] from New South Wales, where it does not appear to occur. I have received specimens of *I. divergens* (= *proteus*) under this name." Bednall's species does not agree with the type of Reeve's species, but is a very distinct unnamed shell. We would note that Sykes (Proc. Malac. Soc., vol. ii, July, 1896, p. 88) also recorded *Ischnochiton ustulatus* (Reeve) from Port Phillip. We have not seen the shells so named, but they may have been the true *ustulatus*, since there are shells in the British Museum dredged in Port Phillip which agree very closely with the type lot of *ustulatus*, Reeve.

15. *ISCHNOCHITON TORRI*, n.sp. Pl. V, Fig. 3.

Ischnochiton ustulatus, Pilsbry, Proc. Acad. Nat. Sci. Philad., 1894, p. 70, footnote, and of Bednall, Torr, May, and Thiele, but not *Chiton ustulatus*, Reeve.

Shell of full size, for the genus narrowly elongate, girdle broad, elevated, round-backed, valves not beaked. Colour red brown, longitudinally striped with cream, stripes more prominent on the dorsal area, lacking on head-valve. Anterior valve very finely radially ribbed, about fifty being counted on normal specimen. Median valves, with lateral areas strongly elevated, similarly sculptured, but sculpture commonly tending to elongate lozenge shapes through growth-lines. Pleural areas very finely quincuncially punctate, somewhat linear towards edges, even fine on the jugum. Tail-valve with mucro elevate, ante-central, posterior slope a little concave; the posterior sculpture like that of anterior valve, but much more cut into lozenges by the concentric growth-lines. Internal features normal. Girdle very broad, covered with microscopic scales, not distinguishable with an ordinary lens. This is diagnostic. Under the microscope the scales are seen to be elongate ovals, a little variable in size, flattened, and closely imbricating; they average about a tenth of a millimetre long, and are finely striated with about twelve striæ.

Type from Barren Island, Flinders Group, collected by W. L. May. Length 29, breadth 14 mm.

Range: Adelaidean region from Flinders Group to West Australia, recorded by Torr and Thiele.

This very distinct species stands quite alone, not only in shape, coloration, and sculpture, but in its microscopic girdle-scales. We have given a section of the girdle of one of the type series of *Chiton ustulatus*, Reeve, for comparison, drawn from the specimens in the British Museum (Pl. V, Fig. 3a"). We have not yet recognized Reeve's species, though it certainly seems Australian.

16. *ISCHNORADSLIA EVANIDA* (Sowerby).

In the "Mag. Nat. Hist. (Charlesworth)", vol. iv, June, 1840, Sowerby described (p. 290) *Chiton australis* (Conch. Illus., fig. 46), Australia, and (p. 291) *Chiton evanidus* (Conch. Illus., fig. 139), New Holland.

The descriptions and figures are good.

When Reeve wrote his Monograph he doubtfully made the latter synonymous with the former, introducing as new species pl. xvii, sp. 104, *Chiton metallicus*, Australia, Mus. Cuming, and pl. xxi, sp. 142, *Chiton novæhollandiæ*, New Holland, Mus. Brit. Pilsbry made *evanidus* and *metallicus* synonymous with *australis*, writing: "The synonymy . . . is unquestionable," and giving as habitat "Port Jackson, Australia". *I. novæhollandiæ* was admitted as distinct from "Adelaide, S. Australia". Shells from the two localities named (New South Wales and South Australia) are very distinct. Recognition of two forms in Tasmania necessitated re-investigation, which revealed that the form recorded as "*australis*" from that locality had little to do with the typical Sydney shell. The description of *evanidus* gives as the salient features "central areas smooth in the middle, faintly striated at the sides; lateral areas rather elevated, with radiating granular *striæ*". This disagrees with *australis*, but describes the eastern Tasmanian shell very exactly.

The north-west Tasmanian form differs in the absolute smoothness of its pleural areas and seems identical with the South Australian shells known as *I. novæhollandiæ* (Reeve). It is easy to separate these when series are compared, but individuals are not so clearly differentiated, and we are not certain about immature shells, the north-west form being apparently more elevated. However, the species of *Ischnoradsia* seem to have exceedingly narrow limits, so that for the present we may recognize two species in Tasmania. We make this observation because we have an undescribed species from Caloundra, Queensland, which is exceedingly like *evanida*, though the very different *australis* intervenes geographically.

17. LORICA CIMOLIA (Reeve).

In the Conch. Icon. Chiton, pl. vi, sp. 31, fig. 31, February, 1847, Reeve figured and described *Chiton volvox* from specimens in the Mus. Cuming, collected at Sydney, New Holland, by Jukes. Later in the same work (pl. xxi, sp. 141, fig. 141, May, 1847) Reeve added *Chiton cimolius* from the same collection, the only locality given being Australia: he observed, "Allied in form, but not in sculpture, to the *C. volvox*; at a loss for a name, I have distinguished its resemblance in colour to the common fuller's clay." The differences are not clearly defined in the descriptions, but we note with regard to the former "ridges narrow, slightly waved, interstices peculiarly crenulately latticed", and to the latter "central areas smooth in the middle, ridged on each side, ridges thin, scarcely granulated, interstices hollowed".

In 1871 Angas, recording *Lorica angasi* from Port Jackson, commented (Proc. Zool. Soc. London, 1871, p. 97), "A species quite distinct from *L. cimolia*, Reeve, of which *L. volvox*, Reeve, is a synonym."

In the Man. Conch., vol. xiv, p. 237, 1893, Pilsbry accepted this synonymy, probably following Haddon (Rep. Zool. Res. Challenger, vol. xv, Polyp., p. 31, 1886), writing, "The differences

between *L. volvox* and *L. cimolia* are easily effaced when a good series is examined." He also suggested *Chiton rudis*, Hutton, as a synonym. Hutton's species was based on a specimen in the Colonial Museum, Wellington, New Zealand, supposed to have been collected in that country. This determination has been accepted by all workers since, Bednall, Suter, Torr, Thiele, and ourselves all passing this synonymy without question.

The consideration of the present collection necessitated a review, and with the types of Reeve's species, topotypes of the first-named species, South Australian specimens, and shells purporting to have been collected in New Zealand we find that *Lorica cimolia*, Reeve, is the name for the Tasmanian species, which differs at sight from the New South Wales shell in lacking the very distinct laticing between the longitudinal ribs of the central areas. The ribs are more distant and not so definite; the girdle-scales differ in size, and there are other minor differences. Basset Hull (Proc. Linn. Soc. N. S. Wales, vol. xxxv, 1910, pl. xvii, figs. 1, 2) gave illustrations of half-valves of the fossil *Lorica duniana*, n.sp., and the recent *L. volvox*, Reeve. Relying on the excellent illustrations, we cannot separate the recent Tasmanian and South Australian species from the fossil *L. duniana*, which would thus become a synonym of *L. cimolia*, Reeve. It may be possible later on to differentiate southern Tasmanian from South Australian shells, but typical *L. volvox* cannot be confused with either. The juveniles of the two species also show striking differences in many respects.

Lorica was reduced by Thiele to subgeneric rank under *Callistochiton*, *Loricella* and *Squamophora* being given similar rank. Thiele overlooked the fact that *Lorica* had priority, and that *Callistochiton* would be the name to suffer. We cannot see, however, that there is such a close relationship, and maintain all the groups with generic value and suggest later that they will not be closely associated. *Squamophora* seems very near to *Loricella*, but when the juveniles of *Lorica*, *Loricella*, and *Callistochiton* are compared little resemblance is found. With regard to the genus *Callistochiton*, we would note it has been badly handled in Australia. The generic (or family) characters have been taken as specific, and hence Torr recorded that he had traced *C. antiquus* from Queensland to West Australia. The northern Queensland shell differs from the Sydney one, which is easily separable from the South Australian form, which, however, may be the one inhabiting Bass' Straits, and may range to south-west Australia. The southern Tasmanian shell is, however, so very different that we are dubious of every record we have not personally investigated; and we note variation among unlocalized South Australian examples.

18. CALLISTOCHITON MAWLEI, n.sp. Pl. IV, Fig. 5.

Shell small, elliptic oblong, elevated, keeled, side slopes curved, valves not beaked. Colour orange-brown with distant dark-brown spots; girdle orange-brown tessellated with dark-brown stripes. Anterior valve with twelve distinct rounded radial ribs with deep

intervals, apparently smooth but under a good lens showing transverse scratches. Median valves with two similar ribs forming the lateral area; the ribs obsoletely scaled, probably due to growth, and sometimes appearing nodulose. Pleura longitudinally ridged, the ridges continuing over the jugum, about twenty to the half-valve, closer together as they reach the jugum, the interstices closely latticed. Tail-valve with mucro median, depressed, posterior slope convex. Anterior area sculptured as the pleura, posterior area as the anterior valve with nine ribs, scaly nodulose. Girdle covered with minute rounded scales, deeply grooved. The internal coloration white; teeth and slitting normal, but sutural laminae low and continuous, the sinus only showing as a slight curve.

Type from Port Arthur, southern Tasmania, collected by E. Mawle.

Length 17, breadth 9.5 mm. A larger specimen measures 24 × 12 mm.

Range: southern Tasmania, collected by W. L. May, Dr. Torr, and E. Mawle.

Separable at sight from *C. antiquus* (Reeve) by the presence of the longitudinal ribs on the jugal area; a honeycomb structure occurs on the jugum of *C. antiquus* (Reeve), as here figured (Pl. IV, Fig. 5a') for comparison. Other differences exist in the keeling, size and shape of girdle-scale, elevation of mucro of posterior valve, and conclusively in the formation of the sutural laminae. These are continuous, whereas they are widely separated in the species *C. antiquus* (Reeve), and even more so in the South Australian species.

19. SYPHAROCHITON MAUGEANUS, n.sp. Pl. V, Fig. 5.

Shell large, elongate oval, elevated, valves round-backed, beaked. Colour: blackish brown, with a black stripe down the jugum, succeeded on each side by a pale buff stripe, blotches of the latter colour also occurring on some of the sides of the valves. Anterior valve sculptured, with about sixteen ribs at the apex, divaricating so that over thirty can be counted at the edge; the ribs are cut by growth-lines into irregular nodules. Median valves with the lateral areas similarly sculptured, four primary ribs becoming six to eight at the edges; pleural areas sculptured with fine slanting longitudinal threads, becoming obsolete on the jugum; these are crossed by distinct growth-lines, which do not, however, cause nodules. Tail-valve with the mucro elevated at about the anterior third, posterior slope straight; sculpture on anterior portion like that on pleura of median valves; posterior portion sculptured like the anterior valve, twelve primary ribs being noted, and as many secondary ones. Internal features normal. Girdle covered with large round oval scales, finely striated.

Type from Port Arthur, southern Tasmania.

Length 52, breadth 31 mm. A large specimen measures 61 × 40 mm.

Range: southern Tasmania.

The history of the genus *Sypharochiton* in Australia is complex. *Chiton pellisserpentis* was described in 1834 by Quoy & Gaimard from New Zealand. Gray in 1843 added another species, *Chiton*

sinclairi, also from New Zealand. In 1847 Reeve figured the latter species with the locality "Van Dieman's Land. Dr. Sinclair". In 1877 Tenison-Woods included this species in the Tasmanian census, but noted "Locality doubtful. N.Z. species". In 1893 Pilsbry included in the Manual *C. pellisserpentis* and *C. sinclairi*, but only gave for each the locality New Zealand. The next year Cox added Sydney as a locality for the former species, and later observed that he had specimens from Port Jackson which he took to be *C. sinclairi*. The same year Pilsbry stated he could not separate the Sydney shells sent him by Cox from Neozelanic specimens. In 1901 Tate and May replaced *C. sinclairi* by *C. pellisserpentis* on the Tasmanian list. In 1912 May and Torr write of *C. pellisserpentis* as "the commonest of all Tasmanian Chitons", while a similar shell is common in Port Jackson. The southern Tasmanian shells differ appreciably from Neozelanic shells in shape, elevation, sculpture, etc. In order to gauge the value of these differences we have studied Neozelanic shells from many localities from Auckland to Otago, and though we have observed variation we have not been able to confuse Australian with Neozelanic shells. Robin Kemp collected for one of us a long series of this genus in Sydney Harbour, and these are obviously separable from the Tasmanian shell and many of them suggest *C. sinclairi*. It is possible that there are two species of the genus also represented in Sydney Harbour, just as there appear to be two in South Tasmania. Certain shells have been found in the latter locality having the lateral areas as well as the pleural areas smooth. We have not yet fixed the status of this smooth shell. If it be an aberration of the present species it is unparalleled in the Neozelanic species, unless *C. torri*, Suter, be its equivalent. The question at once arises, should these be classed as sub-species or species? We have carefully considered this matter in connexion with southern Tasmanian shells, of which we have the following representatives: *Sypharochiton maugeanus*, Tas., and *S. pellisserpentis*, N.Z.; *Ischnochiton milligani*, Tas., and *I. proteus*, N.S.W.; *Ischnochiton decoratus*, Tas., and *I. crispus*, N.S.W.; *Callistochiton mawlei*, Tas., and *C. antiquus*, N.S.W.; *Lorica cimolia*, Tas., and *L. volvox*, N.S.W.; *Rhysoplax diaphora*, Tas., and *R. rugosa*, N.S.W., and others.

It is obvious that the last three could not be treated as subspecies, and in the case of *I. decoratus*, Sykes, we have three closely allied species living together, scarcely any more difference being observed than between the Tasmanian *I. decoratus*, Sykes, and the New South Wales *I. crispus* (Reeve). In the present case we have *S. pellisserpentis* (Q. & G.) and *S. sinclairi* (Gray) living together, and it is possible two pairs also occur together in Australia and Tasmania. Thus, while not dogmatizing, it seems best, until we know these faunas better, to treat each on its merits as specifically distinct, for to accurately settle the matter long series must be collected in many localities.

20. RHYSSOPLAX DIAPHORA, n.sp. Pl. V, Fig. 1.

Shell of full size for the genus, elongate oblong, narrow, slightly tapering at the posterior end, strongly elevated and keeled, side-slopes

straight, median valves beaked. Colour generally green, end-valves and lateral areas of median valves concentrically lined with white or pale greenish, dorsal area with dark-brown triangular patch, apex of triangle posterior, sides orange marbled; pleura green, with furrows in some cases blue-lined. In some specimens the orange marbling overruns the dark dorsal patch, and also extends on the pleura, the ribs becoming orange-brown. The general appearance is, however, more or less uniform. On the tail-valve there is a very narrow white patch, more or less triangular from the mucro to the girdle, where a broader and more extensive white patch is observed. Anterior valve very perpendicular, smooth. In senile shells an obsolete radial ribbing may be distinguished under a strong lens. Median valves have the lateral areas well raised and smooth, but in senile shells concentric growth-lines are prominent and obsolete radial ribbing is rarely present. The pleural areas are cut by longitudinal furrows which are distant and reach across the valve for half its height, fading away as the jugum is approached. In other words the pleura are sculptured with shallow ribs, a broad smooth triangle being observed on the jugum. In the type figured ten grooves can be counted on the half-valve, four of which extend across the valve; in the largest specimen sixteen grooves appear, seven extending across the valve. Tail-valve with the mucro elevated at the posterior third, the posterior slope slightly concave and smooth, the anterior area sculptured like pleural areas. Girdle-scales shining, obsoletely striate, and of varied colours. Rounded in shape, they are much smaller near the girdle-margin, and are largest in the centre of the girdle. Internal features typical of *Rhyssoplax*. Sinus very narrow. Colour inside pale blue-green with the sutural laminae white.

Type from Norfolk Bay, southern Tasmania.

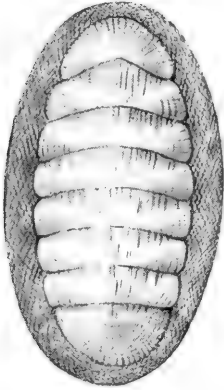
Length 31, breadth 17 mm.

Range: southern Tasmania.

This shell has been known as *Chiton jugosus*, but it differs at sight from the typical Sydney shell in the pleural sculpture. It seems more nearly allied to *C. torri* = *torrianus*, Hedley & Hull, but it cannot be regarded as a subspecies thereof, nor can it be so classed in connexion with *R. jugosa*. We give diagrams of sections through the pleural areas of each species, taken at right angles to the girdle (Pl. V, Fig. 1a and a''). In South Australia there lives another species, classed as *C. jugosus*, which is nearer to that form, but it lives with *R. torriana*, and so complicates the matter. Moreover, the West Australian shell called *R. torriana* differs at sight from the South Australian species. Additional material is needed to accurately fix the status of these forms, but there is little doubt this shell is specifically distinct.

III. GEOGRAPHICAL NOTES.

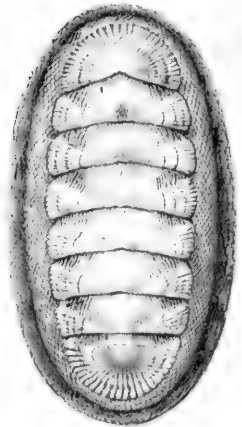
We have previously noted the importance of the *Chiton* fauna of Australia in connexion with zoogeographical problems, and have cited them in support of Hedley's theory of the Bassian Isthmus. The results of the present study are striking and such as we had not



1.



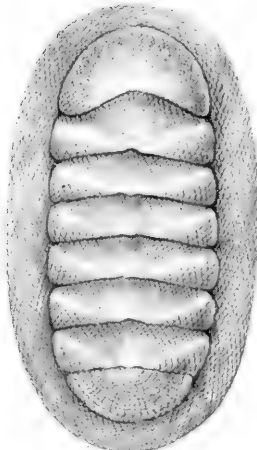
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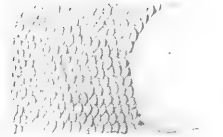
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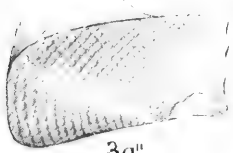
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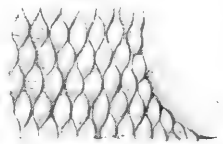
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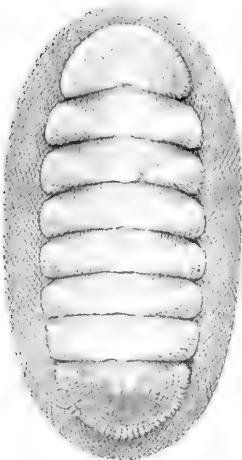
3a.



3a'.



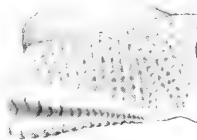
3a''.



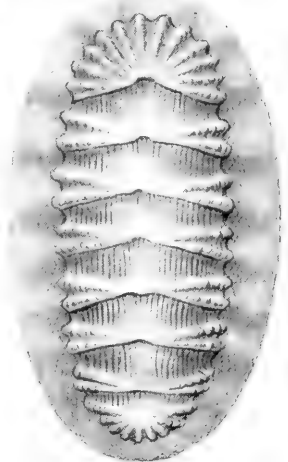
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4a.



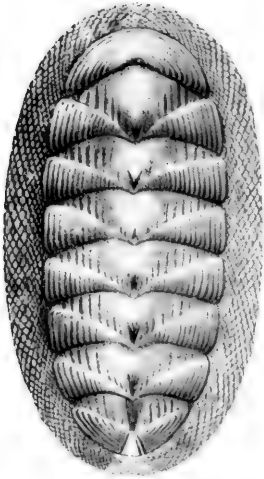
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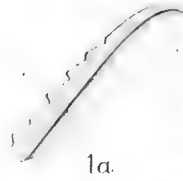
5.

H. Gronvold, del.

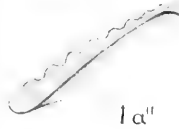
TASMANIAN CHITONS.



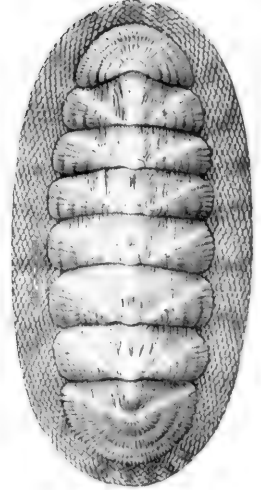
1.



1a.



1a''



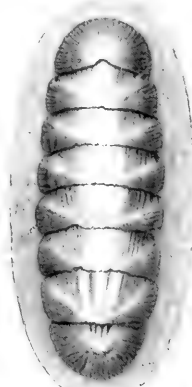
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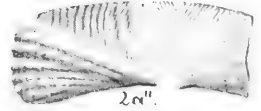
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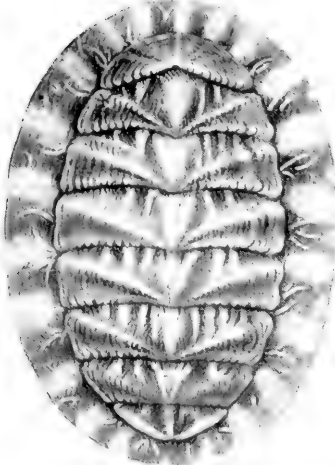
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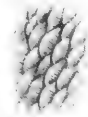
2a''



2a'''



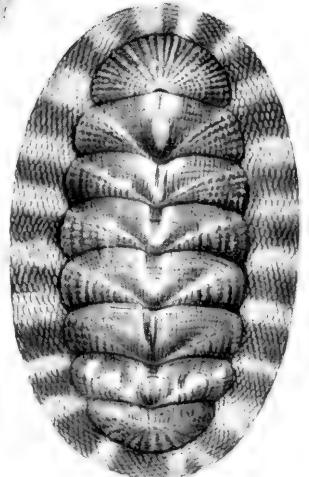
4.



3a.



3a'.



5.

H Gronovold, del.

TASMANIAN CHITONS.

ventured to anticipate. We find that not only are the Peronian Chitons quite distinct from the Adelaidean ones, but that no Peronian species occurs in Tasmania without local variation. Further, that a different *Chiton* fauna is developed in the south and south-east bays from that of the north coast. The latter is practically pure Adelaidean, but there is a slight Tasmanian element. This Tasmanian element is strongly emphasized in the south-east, and shows such peculiarities that we propose to designate the east coast of Tasmania the MAUGEAN REGION, and separate it from the Peronian Region, which we restrict to the east coast of Australia from Bass' Straits to Caloundra, Queensland. This nomination will attract zoogeographers, and we anticipate confirmation from study in other divisions of molluscs, and also other branches of natural science. As distinctive of the Maugean Region we would cite the species *Ischnochiton mayi*, Pilsbry, *I. (Anisoradsia) mawlei*, *Heterozona subviridis*, and *Callistochiton mawlei*, described in this paper. The genus *Eudoxoplax* has worked into the Adelaidean Region, but not into the Peronian, while other genera such as *Sypharochiton* range into the Adelaidean only as far as Tasmania is concerned, though otherwise represented in the Peronian region. Larger and more extensive collections may add further novelties and make the subject more interesting still.

EXPLANATION OF PLATES.

PLATE IV.

FIG.

1. Shell of *Chiton lineolatus*, Blainville = *contractus*, auct., × 2, p. 108.
- 1a. Half valve of id., × 5, showing sculpture.
2. Shell of *Heterozona subviridis*, n.sp., × 2, p. 105.
- 2a. Section of girdle of id., × 7.
3. Shell of *Ischnochiton atkinsoni*, n.sp., × 8, p. 110.
- 3a. Half valve of id., × 12, showing sculpture.
- 3a''. Section of girdle of id., × 24.
- 3a'''. Section of girdle of *I. decoratus*, Sykes, × 24.
4. Shell of *I. (Anisoradsia) mawlei*, n.sp., × 2, p. 108.
5. Shell of *Callistochiton mawlei*, n.sp., × 4, p. 113.
- 5a. Half valve of id., to show sculpture and sutural plate, × 8.
- 5a'. Half valve of *C. antiquus*, Reeve, from Caloundra, Queensland, × 10, for comparison.

PLATE V.

1. Shell of *Rhysoplax diaphora*, n.sp., × 2, p. 115.
- 1a. Section through pleural area of half valve of id., × 4.
- 1a''. Section through pleural area of half valve of *R. jugosa*, × 4.
2. Shell of *Ischnochiton milligani*, n.sp., × 2, p. 109.
- 2a''. Half valve of id., × 5.
- 2a'''. Half valve of *I. proteus*, for comparison, × 5.
3. Shell of *I. torri*, n.sp., × 2, p. 111.
- 3a. Section of girdle of id., × 50.
- 3a''. Section of girdle of *Chiton ustulatus*, Reeve, × 50.
4. Shell of Tasmanian specimen of *Plaxiphora matthewsi*, Iredale, × 2½, p. 101.
- 4a. Tail-valve of id., side view.
- 4a'. Tail-valve of id., front view.
5. Shell of *Sypharochiton maugeanus*, n.sp., × ½, p. 114.

* * * The enlargements are only approximate.

ON *AMMONITOCERAS TOVILENSE* FROM THE LOWER
GREENSAND (APTIAN) OF KENT.¹

By G. C. CRICK, F.G.S., etc.

Read 9th June, 1916.

PLATE VI.

THE specimen which forms the subject of the present note belongs to the British Museum collection [B.M., No. C. 14671] and came from the Hythe Beds of the Lower Greensand (Aptian) at Tovil, near Maidstone, Kent. When obtained only a portion of the outer whorl of the specimen was visible, the rest being covered by extremely hard matrix; the greater part of this, however, has been successfully removed by Mr. Richard Hall, one of the formateurs at the Museum, and to him therefore we are indebted in no small degree for the admirable specimen described below.²

The fossil is fairly complete; the body-chamber occupies about three-fourths of the last whorl, but the aperture is not preserved. The shell is evolute, the whorls being just in contact. Unfortunately the youngest part of the shell is not exposed and may not be preserved; the shell begins where the coil has a diameter of about 55 mm., and three whorls are preserved. The diameter of the whole specimen is about 510 mm. (about 20 inches), the width of the umbilicus (measured from suture to suture) 225 mm., and the height of the outer whorl about 164 mm. The whorls are subcircular in cross-section, wider than high, and increase rapidly. At a point about 100 mm. (measured along the median line of the periphery) from the anterior end of the specimen the thickness of the whorl including the rib is 186 mm., and excluding the rib 170 mm., whilst the height of the whorl including the rib is 160 mm. The earliest part of the surface of the specimen is much damaged, and the precise nature of the ornaments cannot be seen until the shell has attained a diameter of 132 mm. Here the test is ornamented with coarse rounded ribs separated by intervals rather wider than the ribs; the ribs are somewhat reclined over the greater part of the lateral area, and at the umbilical margin of the whorl curve a little more forward as far as the suture of the shell. From the point where the shell has a diameter of 132 mm. the whorl exhibits at intervals a double row of tubercles, a fairly sharp one on the umbilical margin and a larger, more obtuse one on about the middle of the lateral area. Between the umbilical tubercle and the suture of the shell there are sometimes two ribs, at other times only one, rather stouter than the rest. Each pair of tubercles is connected mostly by three prominent ribs, and from the outer tubercle there are usually three ribs passing over the periphery of the whorl, without interruption, though sometimes with

¹ Published by permission of the Trustees of the British Museum (Nat. Hist.).

² In its present condition, after development, the fossil weighs almost exactly 100 lb.

a slight flattening or even a slight depression on the central part of the peripheral area. The rib connecting each pair of tubercles becomes gradually stronger until, where the diameter is 350 mm., most of the fine ribs of the test have disappeared, the outer tubercle becomes more compressed and gradually approaches the periphery; the three ribs connecting it with its fellow on the opposite side are relatively coarser and have an orad convex curve. Later the finer ornaments disappear except on the inner area of the whorl, and the shell is ornamented with strong compressed ribs, which encircle the whorl, have a strong projection both at the umbilical margin and at the margin of the periphery, and a slight depression at the middle of the periphery. The body-chamber began at a point where the shell had a diameter of 295 mm. and occupied fully three-fourths of the last whorl. At the base of the body-chamber the thickness (or width) and height of the whorl are about 135 mm. and 115 mm. respectively. The aperture is not preserved. The details of the septal-suture are unknown. On the earliest part of the outer whorl and immediately in front of the aperture the periphery is broken and exposes the siphuncle in the median line just beneath the surface in two places (see fig. 2); in one place for a length of about 78 mm., and in the other for a length of about 23 mm.; here the diameter of the siphuncle is about 4.5 mm.

In a work by Emilien Dumas,¹ published (1875-6) after the author's death, an ammonoid from the Lower Aptian of the department of Gard (France) is quoted (but not described) and figured as *Ammonitoceras ucetie*,² other cephalopods occurring at the same horizon being very large examples of *Ancylloceras matheronianum*, *A. gigas*, *Nautilus radiatus*, *N. plicatus*, *Ammonites stobieckii*, and *Am. crassicostratus*.

The genus *Ammonitoceras* was not described, but the following extract from the notes of Emilien Dumas was given in a footnote by the editor of the work (Lombard-Dumas): "Ce nouveau genre doit être placé entre les Ammonites et les Scaphites. Il se rapproche des Ammonites par sa coquille enroulée en spirale régulière dans un même plan et à tours en contact pendant la période embryonnaire et la période d'accroissement; mais à l'âge adulte, le dernier tour se détache peu à peu des tours réguliers et sa projecte en avant en conservant toujours une forme arquée au lieu de se prolonger en ligne droite comme dans les Scaphites."

In a note communicated to the Geological Society of France on the 19th December, 1910, Professor W. Kilian³ noticed the occurrence of a group of loosely-coiled ammonoids in the Aptian of France, of the Caucasus, and of various other regions, in which the ornaments differ both from those of *Crioceras* (sensu stricto) and of *Ancylloceras* (sensu stricto) by the possession of only two rows of lateral tubercles

¹ Emilien Dumas, *Statistique géologique, minéralogique, métallurgique et paléontologique du département du Gard*, 2 parts, 1875-6.

² Op. cit., p. 405, pl. v, figs. 1, 2.

³ W. Kilian, "Sur le genre *Ammonitoceras*": Bull. Soc. géol. France, sér. iv, vol. x, 1912, pp. 798-9.

(instead of three), of which the outer one is situated towards the middle of the lateral area, rather far from the median line of the periphery and by the ribs crossing the peripheral area without interruption.

For these forms, which according to Kilian may be considered as having been derived from *Acanthoplites*, examples of this genus occurring with them in the Aptian, Kilian uses the name *Ammonitoceras* proposed by Dumas, and in it he includes the *Ammonitoceras uctiæ* of Dumas from the Lower Aptian of Languedoc; *Crioceras transcaspicum* described by Sîntzov¹ from the Lower Gault of the Mangischlak Peninsula on the eastern shore of the Caspian Sea, and which Kilian² states that he himself had also found in the Aptian of the Basses Alpes; also the form noticed by Kilian³ (under the name of *Ancyloceras ackermanni*) and figured by Krenkel⁴ (under Kilian's name of *Ancyloceras ackermanni*) from the Aptian of Delagoa Bay, South-East Africa.

The present specimen seems to be clearly referable to this group of forms and may be named *Ammonitoceras tovilense*, the trivial name being suggested by the locality whence it came.

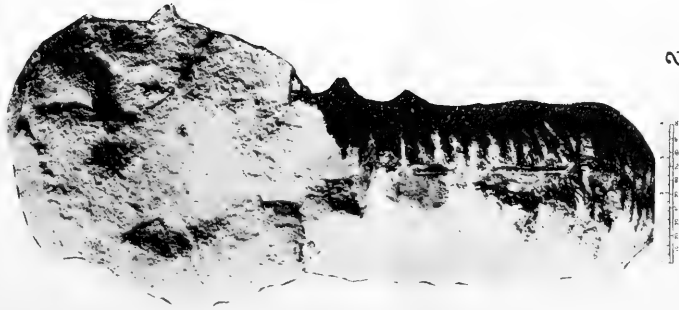
EXPLANATION OF PLATE VI.

Ammonitoceras tovilense, n.sp., from the Lower Greensand (Hythe Beds), Aptian: Tovil, near Maidstone, Kent.

- FIG. 1. Lateral aspect. The body-chamber commences at a point immediately above the figure 2 on the scale.
 ,, 2. Apertural aspect, showing the siphuncle on the early portion of the last whorl.
 ,, 3. Peripheral view.

The specimen is in the British Museum collection [reg. No. C. 14671].

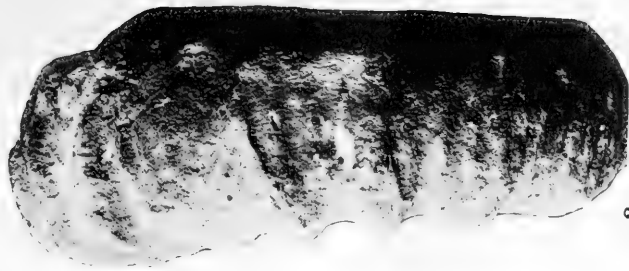
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- ¹ I. Sîntzov, "Untersuchung einiger Ammonitiden aus dem Unterem Gault Mangyschlaks und des Kaukasus": Verhandl. d. russisch-kaiserlichen mineral. Gesellschaft, ser. II, vol. xlv, 1907, pp. 510-11, pl. vi, figs. 9-12.
² W. Kilian, "Sur le genre *Ammonitoceras*": Bull. Soc. géol. France, sér. IV, vol. x, 1912, p. 799.
³ W. Kilian, "Ueber Aptien in Südafrika": Centralbl. f. Mineral., etc., 1902, p. 466.
⁴ E. Krenkel, "Die Aptfossilien der Delagoa-Bai (Südostafrika)": Neues Jahrb., 1910, i, p. 150, pl. xvii, figs. 10, 11.



2



1.



3.

Hfth. coll

AMMONITOCERAS TOVILENSE, G. C. CRICK.
LOWER GREENSAND (HYTHE BEDS), APTIAN. TOVIL, nr MAIDSTONE, KENT.

NOTE ON *HELIX SCYTODES*, PFR.

By G. K. GUDK, F.Z.S., etc.

Read 9th June, 1916.

RECENTLY, while working at some of the land shells in the collection of the British Museum. I noticed two specimens of a helicoid which I had not seen before, viz. *Helix scytodes*, Pfr.,¹ from the Solomon Islands. These were the type-specimens in the Cuming Collection. I was immediately struck with their resemblance to two unnamed shells which were acquired by me some years ago with various other shells at an auction sale, and actual comparison of the specimens confirmed their identity.

The species was referred to *Trochomorpha* by Pfeiffer² and by Pilsbry,³ but a careful examination of the shell convinced me that it would more correctly be assigned to the genus *Plectotropis*, the reflected outer and basal margins of the peristome, especially, being a feature which would at once remove it from *Trochomorpha*. Both the type shells in the Cuming Collection, and those in my own, are devoid of the periostracum and do not, consequently, show the scales which are so characteristic of the genus *Plectotropis*, but traces of them can be seen inside the umbilicus. The shell bears a general resemblance to such species as *P. winteriana*, Pfr., *P. tapeina*, Bens., and *P. squarrosa*, Gld.

No species of the genus *Plectotropis*, it is true, has been recorded from the Solomon Islands, but Cuming is well known to have been unreliable with his localities, and this may well be another instance of a wrong habitat.

The species has been well figured by Reeve,⁴ whose figure has been copied by Tryon.⁵

¹ Proc. Zool. Soc., 1854, p. 56.

² Malak. Blatt., ii, 1855, p. 133.

³ Man. Conch., ser. II, ix, 1894, p. 5.

⁴ Conch. Icon., vol. vii, 1854, pl. 188, fig. 1310.

⁵ Man. Conch., ser. II, vol. iii, 1887, p. 77, pl. xiv, fig. 20.

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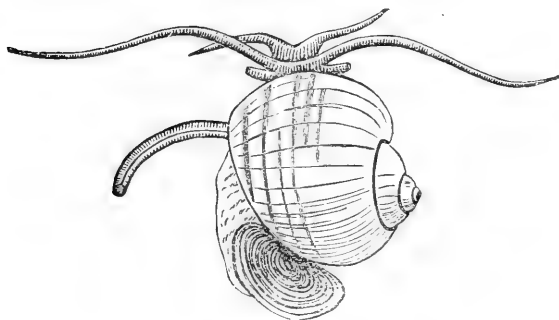
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EDITED BY

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ORDINARY MEETING.

FRIDAY, 10TH NOVEMBER, 1916.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

The Rev. Dr. A. H. Cooke exhibited two sinistral shells of *Helix vermiculata* from Palermo.

Mr. A. S. Kennard exhibited a sale catalogue of shells of Sowerby's, dated 25th May, 1829.

The following communications were read:—

1. "Has *Lymnæa* an Auriculoid ancestry?" By Charles Hedley, F.L.S.

2. "Sexual characters in the shell and radula of *Pomatias elegans*." By Dr. A. E. Boycott, F.R.S.

ORDINARY MEETING.

FRIDAY, 8TH DECEMBER, 1916.

The Rev. Dr. A. H. COOKE, M.A., F.Z.S., Vice-President, in the Chair.

The following communications were read:—

1. "(a) *Anodonta cygnæa*, L., and *A. anatina*, L., (b) *Pseudanodonta rothomagensis*, Locard." By H. H. Bloomer, F.L.S., and H. Overton.

2. "A revision of the species of the family Pleurotomidæ occurring in the Persian Gulf, Gulf of Oman, and the Arabian Sea, as exemplified in the collections formed by Mr. F. W. Townsend, 1893-1914." By Dr. J. Cosmo Melvill, M.A., F.L.S.

3. "On the occurrence in England of *Helicella neglecta* (Drap.);" By A. S. Kennard, F.G.S., and B. B. Woodward, F.L.S.; with notes on the Anatomy by Dr. A. E. Boycott, F.R.S., and on the Radula by the Rev. E. W. Howell, M.A.

4. "On the occurrence of *Eulota fruticum* in a living state in Kent, and of *Paludestrina minuta* in the British Isles." By A. S. Kennard, F.G.S., and B. B. Woodward, F.L.S.

ORDINARY MEETING.

FRIDAY, 12TH JANUARY, 1917.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Messrs. Fulton and Salisbury were appointed Auditors.

The following communications were read:—

1. "*Patella vulgata*, L., and its so-called variety, *Patella depressa*, Penn." By the Rev. Dr. A. H. Cooke, M.A., F.Z.S.

2. "The occurrence of Manganese in Mollusca." By Dr. A. E. Boycott, F.R.S.

3. "Note on the holotype of *Crioceratites bowerbankii*, J. de C. Sowerby." By G. C. Crick, F.G.S., F.Z.S.

NOTES.

ON THE OCCURRENCE OF *EULOTA FRUTICUM* (MÜLL.) IN KENT. (Read 8th December, 1916.)—On 10th November, 1911, an example of this species, collected at Penshurst, W. Kent, by the Rev. E. W. Bowell, was exhibited (by A. S. K.) before this Society (Proc. Malac. Soc., vol. x, 1912, p. 1). It was then considered that the species could not be recognized as a member of the British recent fauna, since only one stray example had been found, but it was suggested that it might occur and be mistaken for *Theba cantiana* (Mont.). Recently F. Hugh Gripper informed us that he possessed some examples of a shell which he could not name, though at the time of collecting he had thought they were the white form of *T. cantiana*. An examination of the shells at once showed that these shells were *Eulota fruticum* (Müll.). They were four in number, three mature and one immature, and were collected in September, 1908, between Dover and Lydden from a roadside hedge. There can now be no question that the species does live in Kent and has been confounded with *Theba cantiana* (Mont.). The attention of collectors having now been called to it, it will probably be found in other localities. The question arises whether this species can be considered a survival from the Pleistocene, or is a reintroduction. In the first place it is only known in a fossil state in England from four localities, Barnwell and Grantchester (Cambridgeshire), Stutton (Suffolk), and Ilford (Essex), and it has not yet been detected in any of the Kentish Pleistocene beds. These four deposits are all of the same age and form a well-marked horizon in the Pleistocene. The species has not been found in any Holocene deposit in Kent. Hence it would appear that the species became extinct in Pleistocene times, and these Kentish examples must be considered a recent introduction.

A. S. KENNARD & B. B. WOODWARD.

ON THE OCCURRENCE IN THE BRITISH ISLES OF *PALUDESTRINA MINUTA* (TOTTEN). (Read 8th December, 1916.)—About two years ago Dr. A. C. Johansen called our attention to the existence of this species in a living state at Blythburgh, Suffolk, examples having been given to him by one of us (A. S. K.). He pointed out that the species differed in its anatomy from *P. ventrosa* (Mont.) and forwarded Danish examples. We had hoped that he would have published the discovery himself, but since he has not done so we think it is quite time the fact should be recorded. Though greatly resembling *P. ventrosa* in its general appearance, *P. minuta* may be distinguished by its smaller size and more regular growth, the last whorl not being so inflated. We have now noted it in a recent state from Blythburgh, Southwold, and Lowestoft (Suffolk), Woolwich (Kent), Strangford Lough and Killough (co. Down), and in the Holocene from Littleport (Cambridgeshire), St. Ives (Huntingdonshire), Deal (Kent), and Waterloo (Surrey). In all probability *P. minuta* is a widely distributed form in these Islands.

Perhaps it may be of interest to add that we have lately received from Mr. F. W. Harmer, through Mr. Alfred Bell, a gathering taken at Kaasjeswater, near Zierikzee, at the mouth of the Scheldt, Baster's locality for his *Turbo stagnalis*. Baster's description is too meagre and his figures too weird to recognize his species, which has been assumed to be a synonym for the *ulvæ* of Pennant. This gathering, however, consists almost exclusively of *Paludestrina minuta*, the shells of which are coated, as Baster describes, with a whitish limy deposit.

A. S. KENNARD & B. B. WOODWARD.

HAS *LYMNÆA* AN AURICULOID ANCESTRY?

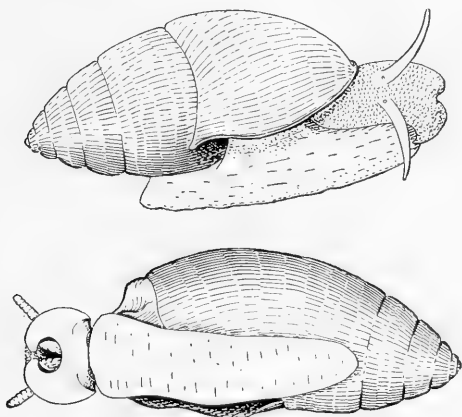
By CHARLES HEDLEY, F.L.S., etc.

Read 10th November, 1916.

CRITICAL study of fluviatile faunas has lately broken up the alliances of former classifications and frequently ascribes to each smaller group an independent origin from marine species.

Thus the Lymnæidæ of Fischer's Manual has been divided since 1883 into Lymnæidæ, Planorbidæ, Ancyloidæ, and Physidæ, while *Chilina* is regarded by Dr. H. A. Pilsbry as having arisen in South America from a marine parent. From what marine type did *Lymnæa* come?

Judging from its radula, Mr. F. C. Baker proposed for *Lymnæa* "a descent from the Tectibranchiate stock of marine mollusks".¹ It is now suggested that the Ellobiidæ may stand closer to *Lymnæa* than any Tectibranch.



Phytia ornata (Férussac). Upper and under view of the animal crawling.

In shell features the remarkable strongly-twisted pillar of *Lymnæa* may answer to the prominent columella folds so radical a character of the Ellobiidæ. The animal of *Lymnæa* is well known, but there are few drawings, or descriptions from life, of the auriculoids. The following notes which prompted the query at the head of this paper are therefore advanced for comparison.

Phytia ornata, Férussac,² is abundant and widespread in South-East Australia and Tasmania. Its habits are to associate with *Rhodostoma*, *Salinator*, and *Assemannia*, in the *Salicornia* zone, that is just below high-water level in sheltered estuarine swamps, either in the open or

¹ Baker: Chicago Acad. Sci., Spec. Publ. No. 3, 1911, p. 9.

² Hedley: Proc. Linn. Soc. New South Wales, xxxviii, 1913, p. 334.

under the shade of the *Avicennia* mangrove. At low tide the *Phytia* crawls over the mud at a fair pace, and if placed in a vessel of sea-water it soon creeps out and always moves steadily away from the light.

The foot is small and narrow for the size of the shell. There is no operculum. The facial area is darker in colour and covered with finer tubercles than the rest of the animal; it is marked off from the foot by a groove on each side. When the animal is extended the tentacles are planted well apart, but seem to spring from contiguous bases when it is contracted. They are subcylindrical, slightly tapering, blunt at the tips, contractile not evaginate. The eyes are sunk within the substance of the tentacle at the inner base. Near the tip of the muzzle are two white oblong marks that may represent the smaller tentacles of the *Helicidæ*.

The muzzle is unusually broad, being as wide as the foot. Sometimes it is emarginate in front and usually recurved at the margins. The mouth is in the centre of a large labial disc. Between this disc and the fore-part of the foot is a shallow pouch.

Here there seems to be a general correspondence to the pattern of *Lymnæa*, the chief distinction being the longer and narrower tentacles of *Phytia*.

Acclimatization from salt water to fresh is easy in warm temperatures, but difficult in cold. So it was perhaps during the warmer periods of the Eocene or Cretaceous that the rich *Lymnæid* fauna of the Northern Hemisphere arose from auriculoid sources.

ON SEXUAL CHARACTERS IN THE SHELL AND RADULA OF
POMATIAS ELEGANS (MÜLLER).

By Dr. A. E. Boycott, F.R.S., etc.

Read 10th November, 1916.

SOME years since¹ I examined the shells of a series of *Pomatias elegans* from Ashtead in Surrey for sexual characters and found that the females were longer and wider than the males, but not more tumid, *i.e.* the ratio of length to breadth was the same in the two sexes. In the present communication I give the results of the examination of some 400 specimens, collected on about a hundred yards length of chalky hedge bank in the parish of St. Stephen, near Aldenham, in Hertfordshire, on 28th June and 1st July, 1916, when they were crawling freely on the surface after rain. All specimens found were taken without selection. The two lots were analysed separately, but no significant difference was found in any respect and they are treated below as forming one series.²

The shells were measured with sliding callipers to 0·1 mm., the length (altitude) being taken parallel to the axis of the shell and the breadth (diameter) at right angles to the length. The fraction $\frac{\text{altitude}}{\text{diameter}} \times 100$ gives a measure of tumidity. These figures do not of course afford a complete description of the shells; with regard to the shape of whorls, depth of suture, size and shape of mouth, and the like, I can only say that by visual inspection I can detect no difference between males and females.

In comparing males and females it is necessary in the first instance to take only mature specimens, and as the criterion of maturity the completion of the peristome has been used.³ There will obviously be a certain number of specimens in which it is a matter of opinion rather than of fact whether the peristome is complete or not; but such specimens are few in number, and, noting also the texture of the edge of the shell and the depth within the mouth where the operculum makes a good fit, there does not seem to be much danger of any substantial inconsistency in the determination of maturity, at any rate within the same series of shells examined at

¹ *Journal of Conchology*, vol. xii, 1909, p. 323.

² *e.g.* in the first lot males formed 54 per cent of 130 mature specimens, in the second 61 per cent of 187, a difference easily compatible with the two lots being random samples of the same series.

³ I do not know whether sexual activity is restricted to individuals which are mature by this standard; anatomically the sexual apparatus seems to be pretty fully developed in the larger immature specimens (*e.g.* in many of the males of 11·5 mm. altitude). In species where the growth of the shell reaches a definitive termination (*e.g.* *Tachea*), completion of the shell seems to precede sexual action. The six pairs taken *in cop.* in the present series were all mature.

one time. Unless otherwise stated, the following refers to specimens judged to be mature in this way.

Of 317 specimens, 184 (58 per cent) were males and 133 (42 per cent) females.

I. ALTITUDE AND DIAMETER.

The altitudes and diameters, distributed in convenient groups of 0.3 mm., are shown in the table, which gives also the relation between altitude and diameter for each group.

| ALTITUDE mm. | DIAMETER mm. | | | | | | | | | | Males. | Females. | Total. |
|--------------|--------------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|--------|----------|--------|
| | 8.6-8.8 | 8.9-9.1 | 9.2-9.4 | 9.5-9.7 | 9.8-10.0 | 10.1-10.3 | 10.4-10.6 | 10.7-10.9 | 11.0-11.2 | 11.3-11.5 | | | |
| 12.0-12.2 | | 3+0 | | | | | | | | | 3 | | 3 |
| 12.3-12.5 | 4+0 | 7+0 | 1+0 | | | | | | | | 12 | | 12 |
| 12.6-12.8 | 8+0 | 11+0 | 11+0 | 4+0 | | | | | | | 34 | | 34 |
| 12.9-13.1 | | 5+0 | 11+0 | 9+0 | 3+0 | | | | | | 28 | | 28 |
| 13.2-13.4 | 1+0 | 3+0 | 19+1 | 17+1 | 5+0 | 1+0 | | | | | 46 | 2 | 48 |
| 13.5-13.7 | | | 4+2 | 20+7 | 13+6 | 2+3 | 0+1 | | | | 39 | 19 | 58 |
| 13.8-14.0 | | | | 7+2 | 7+6 | 5+6 | 0+3 | | | | 19 | 17 | 36 |
| 14.1-14.3 | | | | 0+3 | 2+13 | 0+7 | 0+6 | 0+5 | | | 2 | 34 | 36 |
| 14.4-14.6 | | | | 1+0 | 0+1 | 0+10 | 0+7 | 0+5 | 0+1 | | 1 | 24 | 25 |
| 14.7-14.9 | | | | | 0+2 | 0+6 | 0+3 | 0+4 | 0+2 | | | 17 | 17 |
| 15.0-15.2 | | | | | | 0+1 | 0+6 | 0+3 | 0+1 | | | 11 | 11 |
| 15.3-15.5 | | | | | | | 0+3 | 0+3 | 0+1 | | | 7 | 7 |
| 15.6-15.8 | | | | | | | | | 0+1 | 0+1 | | 2 | 2 |
| Males . . . | 13 | 29 | 46 | 58 | 30 | 8 | | | | | 184 | | |
| Females . . | | | 3 | 13 | 28 | 33 | 29 | 20 | 6 | 1 | | 133 | |
| Total . . . | 13 | 29 | 49 | 71 | 58 | 41 | 29 | 20 | 6 | 1 | | | 317 |

"13 + 6" = 13 males, 6 females.

Further analysis of these figures gives the following summary results:—

| | | ALTITUDE mm. | | Standard deviation. | Coefficient of variation. |
|-------------|------|--------------|-------|---------------------|---------------------------|
| | Max. | Min. | Mean. | | |
| Males . . . | 14.5 | 12.1 | 13.21 | 0.470 | 3.6 |
| Females . . | 15.8 | 13.2 | 14.36 | 0.539 | 3.8 |
| Total . . . | 15.8 | 12.1 | 13.69 | 0.707 | 5.2 |
| | | DIAMETER mm. | | Standard deviation. | Coefficient of variation. |
| | Max. | Min. | Mean. | | |
| Males . . . | 10.3 | 8.6 | 9.44 | 0.376 | 4.0 |
| Females . . | 11.4 | 9.2 | 10.26 | 0.435 | 4.2 |
| Total . . . | 11.4 | 8.6 | 9.78 | 0.571 | 5.8 |

It is clear from these results¹ that *the females are definitely larger than the males*. Of the males 77 of 184 (42 per cent) are smaller (in altitude) than the smallest female, and of the females 47 of 133

¹ For statistical methods and the interpretation of the results I have followed G. U. Yule, *Introduction to the Study of Statistics* (2nd ed., London, 1912), where a plain account of the methods of testing the validity of numerical differences will be found.

(35 per cent) are larger than the largest male, the average female being 1.2 mm. longer and 0.8 mm. wider than the average male. If anyone therefore wants to breed *Pomatias* it is probably safe to assume that the largest shells are females and the smallest males; about two-thirds might from their size be of either sex.

It would be a matter of much interest to determine whether there is any size selection in mating. In the present series only six pairs were taken *in cop.*; in each case the male was smaller than the female:—

| | | | |
|-------|---------|-------|---------|
| Male. | Female. | Male. | Female. |
| 13.5 | 13.7 | 13.2 | 15.2 |
| 12.6 | 13.7 | 13.4 | 14.6 |
| 13.4 | 14.6 | 12.7 | 13.5 |

II. TUMIDITY OF SHELL.

Taking next the question whether the tumidity ($\frac{\text{altitude}}{\text{diameter}}$ index) differs in the two sexes, we have the following figures, the shells being grouped by altitude into half-millimetre groups:—

| MALES. | | | FEMALES. | | TOTAL. | |
|-----------|-----|-------------|----------|-------------|--------|-------------|
| Group. | No. | Mean index. | No. | Mean index. | No. | Mean index. |
| 12.0-12.4 | 6 | (139) | — | — | 6 | (139) |
| 12.5-12.9 | 46 | 139 | — | — | 46 | 139 |
| 13.0-13.4 | 71 | 140 | 2 | (141) | 73 | 140 |
| 13.5-13.9 | 50 | 140 | 26 | 139 | 76 | 140 |
| 14.0-14.4 | 10 | 142 | 52 | 139 | 62 | 140 |
| 14.5-14.9 | 1 | (149) | 33 | 140 | 34 | 140 |
| 15.0-15.4 | — | — | 16 | 142 | 16 | 142 |
| 15.5-15.9 | — | — | 4 | (143) | 4 | (143) |
| Total. | 184 | 140 | 133 | 140 | 317 | 140 |

| $\frac{\text{Altitude}}{\text{diameter}} + 100.$ | Males. | Females. | Total. |
|--|--------|----------|--------|
| 130-132 | 6 | 6 | 12 |
| 133-135 | 13 | 11 | 24 |
| 136-138 | 43 | 31 | 74 |
| 139-141 | 61 | 35 | 96 |
| 142-144 | 44 | 36 | 80 |
| 145-147 | 14 | 13 | 27 |
| 148-150 | 2 | 1 | 3 |
| 151-153 | 1 | 0 | 1 |
| Mean | 139.91 | 139.86 | 139.88 |
| Standard deviation | 3.645 | 3.951 | 3.165 |
| Coefficient of variation | 2.6 | 2.8 | 2.3 |

Taking the results as a whole, or dealing only with the groups (13.5 and 14.0 mm. altitude) which contain a fair number of both males and females not differing very grossly in size, there is no evidence that there is any sexual difference in tumidity. The index has a low variability,¹ and the evidence that it varies with size is indefinite, though there is some suggestion that the larger shells are relatively more slender.

¹ Corresponding with a high correlation (+0.92) between altitude and diameter.

III. WEIGHT OF SHELL.

The average weights of the shells with opercula (dried at 100° C.) showed no difference between males and females except that due to size.¹ In the 13.5 mm. group the sizes and weights are identical: in the 14.0 mm. group the females (14.2 × 10.1) had larger shells than the males (14.0 × 9.9). Hence we may conclude that there is no sexual difference in shell thickness.

| GROUP. mm. alt. | AVERAGE WEIGHT IN MILLIGRAMMES. | |
|--------------------|---------------------------------|----------|
| | Males. | Females. |
| 12.5-12.9 | 154 | — |
| 13.0-13.4 | 169 | — |
| 13.5-13.9 | 186 | 186 |
| 14.0-14.4 | 198 | 205 |
| 14.5-14.9 | — | 230 |
| 15.0-15.4 | — | 244 |
| Total . . . | 171 | 213 |

IV. RADULA.

The bodies were used for various purposes; from 185 (112 males, 73 females) the radulae were extracted by boiling with caustic soda and mounted in Farrant's solution. No sexual difference in the shape or character of the teeth could be made out, and beyond three cases with multicuspid centrals there seemed to be no gross variations; for numerical examination the length of the radula and the number of transverse rows of teeth were determined. The length is given in arbitrary units, 12.8 of which equal 1 mm.

| MALES. | | | | | FEMALES. | | | | |
|--------------------------|-----|------------------------|---------------------------|----------------------|----------|------------------------|---------------------------|----------------------|--|
| Group. Alt. of shell. | No. | Mean size of shell. | Mean length of radula. | Mean No. of rows. | No. | Mean size of shell. | Mean length of radula. | Mean No. of rows. | |
| 12.0-12.9 | 29 | 12.6 × 9.1 | 64.4 | 96.4 | — | — | — | — | |
| 13.0-13.4 | 37 | 13.2 × 9.5 | 69.7 | 99.2 | — | — | — | — | |
| 13.5-13.9 | 36 | 13.7 × 9.8 | 69.5 | 98.5 | 14 | 13.6 × 9.7 | 70.9 | 99.1 | |
| 14.0-14.4 | 10 | 14.0 × 9.9 | 69.9 | 104.8 | 28 | 14.2 × 10.2 | 74.3 | 98.7 | |
| 14.5-14.9 | — | — | — | — | 20 | 14.7 × 10.6 | 76.7 | 98.8 | |
| 15.0-15.4 | — | — | — | — | 11 | 15.3 × 10.7 | 71.1 | 97.0 | |

LENGTH.

| Long. | Males. | Females. | Total. |
|--------------------------|------------------|------------------|------------------|
| 50-55 | 2 | — | 2 |
| 56-61 | 8 | — | 8 |
| 62-67 | 37 | 12 | 49 |
| 68-73 | 50 | 25 | 75 |
| 74-79 | 13 | 22 | 35 |
| 80-85 | 2 | 10 | 12 |
| 86-91 | — | 3 | 3 |
| 92 | — | 1 | 1 |
| Mean . . . | 68.52 (8.35 mm.) | 73.89 (5.77 mm.) | 70.63 (5.52 mm.) |
| Standard deviation . | 5.283 | 6.426 | 6.330 |
| Coefficient of variation | 7.7% | 8.7% | 9.0% |
| Maximum . | 6.4 mm. | 7.2 mm. | 7.2 mm. |
| Minimum . | 4.0 mm. | 4.8 mm. | 4.0 mm. |

¹ The weights are nearly proportional to the calculated shell volumes, the ratio volume to weight varying only from 2.5 to 2.6 on passing from the smallest males to the largest females.

| Rows. | NUMBER OF ROWS. | | |
|------------------------------------|-----------------|----------|--------|
| | Males. | Females. | Total. |
| 78-85 | 12 | 3 | 15 |
| 86-93 | 23 | 21 | 44 |
| 94-101 | 40 | 19 | 59 |
| 102-109 | 23 | 22 | 45 |
| 110-117 | 10 | 5 | 15 |
| 118-125 | 2 | 2 | 4 |
| 126-129 | 2 | 1 | 3 |
| Mean | 98.25 | 98.29 | 98.27 |
| Standard deviation | 10.07 | 9.61 | 9.90 |
| Coefficient of variation | 10.2% | 9.8% | 10.1% |
| Maximum | 129 | 127 | 129 |
| Minimum | 78 | 79 | 78 |

These figures show that the females have a larger radula than the males but about the same number of transverse rows; in the males the number of rows appears to increase as the shell becomes larger, while in the females it remains the same or even becomes less. Whether the difference in length is due to the larger size of the females is uncertain without more ample data for males and females of equal size.¹ Relatively to the volume of the shell and the weight of the body the female radula is obviously short and has few rows, but the same is true of the larger males and females compared with smaller individuals of the same sex. The ratio of the volume of the female shell to that of the male is about 130 : 100.² The average weights of a series of bodies dried at 100° C. are given below, the general ratio being 138 : 100. On the whole, therefore, while the radula of the females is slightly but clearly different from that of the males, it is hardly legitimate to call it a sexual difference without clearer exclusion of the size factor.

| Group. | MALES. | | | FEMALES. | | |
|---------------|--------|------------------------|------------------------------|----------|------------------------|------------------------------|
| | No. | Average size of shell. | Average weight of body : mg. | No. | Average size of shell. | Average weight of body : mg. |
| 12.0-12.9 mm. | 17 | 12.6 × 8.9 | 48 | — | — | — |
| 13.0-13.9 | 46 | 13.3 × 9.5 | 53 | 13 | 13.6 × 9.8 | 62 |
| 14.0-14.9 | 6 | 14.1 × 9.8 | 58 | 35 | 14.4 × 10.2 | 72 |
| 15.0-15.9 | — | — | — | 11 | 15.3 × 10.7 | 87 |

V. SEX OF IMMATURE SPECIMENS.

Those of the *immature specimens* which were 10 mm. or more in altitude were examined for sex and gave 40 per cent males,³ distributed as follows:—

¹ It is obviously illegitimate to bring immature specimens into the comparison, the radula being a feeding organ, and the amount of food required being presumably quite different in growing and adult individuals.

² i.e. assuming the shell is a regular cone with a base equal to the measured diameter and a height equal to the measured altitude.

³ This does not satisfy the statistical test that there are really fewer males in the immature than in the mature specimens (58 per cent).

| Group. | Males. | Females. | Total. |
|---------|--------|----------|--------|
| 10 mm. | 8 | 9 | 17 |
| 11 | 9 | 12 | 21 |
| 12 | 11 | 15 | 26 |
| 13 | 3 | 9 | 12 |
| 14 | 0 | 1 | 1 |
| Total . | 31 | 46 | 77 |

VI. COLOUR VARIATION IN SHELL.

Among the 317 mature specimens were 64 (20 per cent) of the pale form (var. *ochroleuca*) and in the 77 immature 16 (21 per cent); there is no evidence that this variety has any relationship to size or sex:—

| Group. | MALES. | | FEMALES. | | Total No. | TOTAL. | | =per cent. |
|---------|-----------|----------------------------|-----------|----------------------------|-----------|----------------------------|-----|------------|
| | Total No. | No. of <i>ochroleuca</i> . | Total No. | No. of <i>ochroleuca</i> . | | No. of <i>ochroleuca</i> . | | |
| 10 mm. | 8 | 2 | 9 | 0 | 17 | 2 | 12% | |
| 11 | 9 | 1 | 12 | 1 | 21 | 2 | 10 | |
| 12 | 63 | 15 | 15 | 6 | 78 | 21 | 27 | |
| 13 | 124 | 19 | 37 | 10 | 161 | 29 | 18 | |
| 14 | 11 | 2 | 86 | 21 | 97 | 23 | 24 | |
| 15 | — | — | 20 | 3 | 20 | 3 | 15 | |
| Total . | 215 | 39 (18%) | 179 | 41 (22%) | 394 | 80 | 20% | |

VII. SUMMARY.

- (a) Females are larger than males.
 - (b) There is no difference in shape nor, allowing for size, in weight.
 - (c) The female radula is longer, but has not more teeth, than the male radula.
 - (d) The var. *ochroleuca* has no sexual significance.
-

ON THE OCCURRENCE IN ENGLAND OF *HELICELLA NEGLECTA*
(DRAP.).

By A. S. KENNARD, F.G.S., and B. B. WOODWARD, F.L.S., etc.

With notes on the Anatomy by Dr. A. E. BOYCOTT, F.R.S., and on
the Radula by the Rev. E. W. BOWELL, M.A.

Read 8th December, 1916.

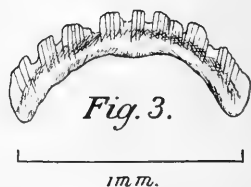
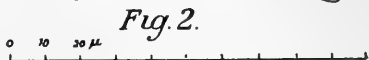
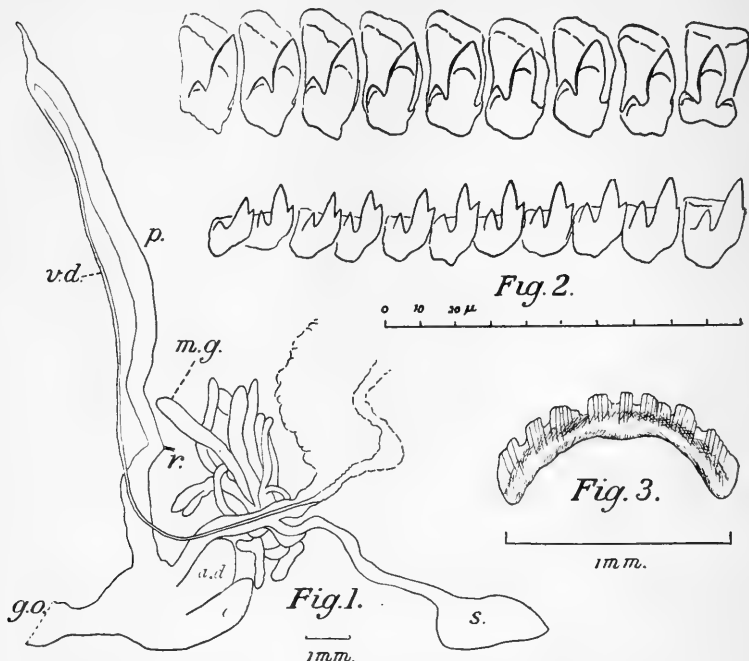
IN September, 1915, several examples were found by one of us (A. S. K.) on a grassy bank near Luddesdown, West Kent, of a *Helicella* which was obviously new to our fauna. In the same month this year two excursions were made to the locality. On the first occasion about six living examples and several dead shells were met with, but on 17th September about thirty examples were collected, whilst a number of immature specimens were left. On comparing our shells with the large series of this genus in the Norman Collection in the British Museum (Natural History) we were able to identify them as *Helicella neglecta* (Drap.), and this has been confirmed by Mr. G. K. Gude. Luddesdown is a small village about one mile south of Cobham, and is situated on the Chalk. The bank where the species occurs is about three-quarters of a mile south-west of Luddesdown church. It is a grassy bank about six feet high, and is really a large gap in the roadside hedge. It is a very remote spot, and we can offer no solution as to how the species came to be established there. Search was made in the neighbourhood to see if it occurred elsewhere, but so far it appears to be restricted to this one locality. We, however, hope next year to make a more extended search in the neighbourhood, for it is extremely probable that this is not an isolated colony. The district is not only a remote one, sparsely populated, but it is also famous for the number of its botanical rarities. *Helicella neglecta* has been well figured by Draparnaud (Hist. Nat. Moll. France, pl. vi, fig. [125] 13), by Moquin-Tandon (Hist. Nat. Moll. France, pl. xviii, figs. 27-9), and by Bourguignat (Moll. Algiers, pl. xxx, figs. 12-18).

According to Westerlund it lives in Southern France, Italy, Spain, Greece, and Algiers, whilst Moquin-Tandon records it from Central and Southern France. The occurrence of this species in West Kent thus affords an interesting analogy with the presence of *Helicella elegans* (Gmel.) near Dover. In its habits it appears to resemble *H. gigaxii*, Pfr., for nearly all the examples were high up on the stems of grasses. In captivity it partakes freely of lettuce and carrot, but is decidedly a shy species, retiring into its shell on slight provocation.

ANATOMY.

The obvious anatomical distinction of Mr. Kennard's specimens from any known British *Helicella* is the presence of a double dart-sac lying on one side of the oviduct with a single dart, *itala* having two sacs one on each side with two darts, *virgata*, *gigaxii*, and *caperata* a single sac. Apart from this the anatomy is similar to that of *itala* in its general features. The dart is of a simple slightly curved

acicular type. The second sac has slighter walls, and recalls the accessory dartless sacs of *Hygromia rufescens*, *fusca*, and (from Moquin-Tandon's account) *Helicella carascalensis*.



Helicella neglecta (Drap.).—FIG. 1. Genitalia of specimen whose shell measured 10.5 mm. in diameter: *a.d.* accessory dart-sac; *d.* dart-sac; *g.o.* genital orifice; *m.g.* mucous glands; *p.* penis; *r.* retractor muscles; *s.* spermatheca; *v.d.* vas deferens. FIG. 2. Unci of Radula. FIG. 3. Maxilla.

RADULA AND MAXILLA.

The radula is 2.47 mm. long and 0.96 mm. wide. There are ninety-four rows of unci. The admedians merge gradually into the externals. Ten typical admedians may be recognized, leaving twenty externals; of the latter, the lateral ten or twelve have a well-marked median cone. This is the condition which I have elsewhere described as "bifid mesocone", but in this case the accessory cone has more the appearance of an appendage median to the mesocone. In my figure of *H. caperata* (Proc. Malac. Soc., viii, p. 384) this feature is more regularly represented than I have since found to be usual; it is quite common to find an irregularly scolloped median margin to the mesocone in that species. The general appearance of the unci is shown in Fig. 2.

The maxilla is narrow, presenting no central increase of length. It is provided with eight or nine ribs. Its width is about 1 mm. (Fig. 3.)

PATELLA VULGATA, LINNÆUS, AND ITS SO-CALLED VARIETY,
PATELLA DEPRESSA, PENNANT.

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 12th January, 1917.

PENNANT, *British Zoology*, vol. iv, 8vo ed., 1777, p. 142, described his *Patella depressa* as a "shell much depressed, the vertex approximating nearly to one edge. More oblong than the former" [*vulgata*].

Forbes & Hanley, *Hist. British Mollusca*, vol. ii, p. 428, under the name *athletica*, Bean, regard *depressa* on conchological grounds as a true species, but, after mentioning that the two forms "inhabit different levels, the *vulgata* being always in the higher zone", add the singular statement, "We have sought in vain for differences between the structure of the tongue in this and the common species."

Jeffreys, *Brit. Conch.*, vol. iii, p. 237, regards *depressa*, Penn., as a var. of *vulgata*, and "cannot find a single permanent character which will serve to distinguish" them or the var. *intermedia*, Knapp.

The authors of the List of British Marine Mollusca published by the Conchological Society (*Journ. Conch.*, vol. x, 1901, p. 16) appear to have been of the same opinion, since they kept *depressa* as one of the vars. of *vulgata*, but in their revised edition (1902) they treat them as separate species.

If the radula of a specimen of *vulgata*, the shell of which measures 2 inches in length, be laid out alongside the radula of a specimen of *depressa*, whose shell is also 2 inches long, it will at once be noticed that the radula of *depressa* is markedly shorter than that of *vulgata*, probably by as much as $\frac{1}{2}$ to $\frac{3}{4}$ inch. Two other points will strike the observer: the radula of *depressa* is much broader than that of *vulgata*, and the nascent portion is relatively much shorter and terminates more abruptly. Thus a radula of *vulgata* measuring 84.2 mm. long is .8 mm. broad, with perhaps 25 nascent and 190 adult rows, while a radula of *depressa* 55.6 mm. long is 1.6 mm. broad, and has 6-7 nascent and 112 adult rows.

If a long series of the two forms be taken, and the radulæ of shells of equal length, from the same locality, examined, this difference becomes more striking. Beginning with shells measuring 58.8 mm. (the largest procurable of both species) and forming a series with shells decreasing each time by an equal amount (1.6 mm.), we find that in every case the radula of *depressa* is markedly shorter than that of *vulgata*. Sometimes the amount of difference is so large as to be startling; thus in the case of shells measuring 55.6 mm. the radula of *vulgata* is 89 mm. long, that of *depressa* 47.8 mm., a difference of 41.2 mm., or more than $1\frac{1}{2}$ inches. In the case of shells measuring 44.6 mm. the radula of *vulgata* (100.2 mm.) is more than double the length of that of *depressa* (44.6 mm.). In the younger specimens the difference is just as marked. And if the length of the radulæ of the whole series is added up, the average length of a *vulgata* radula is found to be 63.6 mm., while that of

a *depressa* radula is 37·4 mm. The sum of the whole of the differences in length in favour of *vulgata* is, in the twenty-nine specimens of the series, 75·96 cm., or about 2½ feet.

| Length of shell. ¹ | Length of radula in | | Difference in |
|-------------------------------|---------------------|-------------------|----------------------------|
| | <i>vulgata</i> . | <i>depressa</i> . | favour of <i>vulgata</i> . |
| 58·8 | 84·2 | 70·0 | 14·2 |
| 57·2 | 87·4 | 65·2 | 22·2 |
| 55·6 | 89·0 | 47·8 | 41·2 |
| 54·0 | 81·0 | 46·2 | 34·8 |
| 52·4 | 76·2 | 57·2 | 19·0 |
| 50·8 | 87·4 | 49·3 | 38·1 |
| 49·3 | 76·2 | 46·2 | 30·0 |
| 47·8 | 74·8 | 50·8 | 24·0 |
| 46·2 | 74·8 | 54·0 | 20·8 |
| 44·6 | 100·2 | 44·6 | 55·6 |
| 43·0 | 87·4 | 38·2 | 49·2 |
| 41·4 | 84·2 | 43·0 | 41·2 |
| 39·8 | 87·4 | 36·6 | 50·8 |
| 38·2 | 87·4 | 36·6 | 50·8 |
| 36·6 | 54·0 | 36·6 | 17·4 |
| 35·0 | 66·8 | 33·4 | 33·4 |
| 33·4 | 60·4 | 35·0 | 25·4 |
| 31·8 | 47·8 | 35·0 | 12·8 |
| 30·2 | 76·2 | 33·4 | 42·8 |
| 28·6 | 46·2 | 28·6 | 17·6 |
| 27·0 | 43·0 | 27·0 | 16·0 |
| 25·4 | 38·2 | 27·0 | 11·2 |
| 23·9 | 41·4 | 27·0 | 14·4 |
| 22·4 | 36·6 | 25·4 | 11·2 |
| 20·8 | 38·2 | 22·2 | 16·0 |
| 19·2 | 38·2 | 19·2 | 19·0 |
| 17·6 | 28·6 | 19·2 | 9·4 |
| 16·0 | 23·9 | 17·6 | 6·3 |
| 14·4 | 27·0 | 14·2 | 14·8 |

It must be remembered that the specimens examined are not specially selected in order to exhibit differences of length in the radula. They are simply, in each case, the first two specimens of equal length which happened to come to hand on a certain beach in South Devon.

In the teeth of the radulae themselves certain small differences appear. In both cases there are four uncini flanked on each side by laterals, the innermost of which is armed, and not in the same plane with the rest. In *depressa* the two interior uncini are much narrower than the two external, the hooks being mounted on narrower bases than in *vulgata*. This fact, which is observable in the nascent rows, becomes more marked as growth proceeds. In *vulgata*, on the other hand, the two interior uncini, although smaller than the other two, are not nearly so unequal to them in breadth. Further, the serrations of the interior lateral appear to be much more deeply cut in *vulgata* than in *depressa*.

The sum of all these observations seems to tend decisively to the conclusion that in *vulgata* and *depressa* we have two quite distinct species of British limpets. It is my impression, which I have not yet had time to verify, that *vulgata* is a northern, *depressa* a southern

¹ Measurements are in millimetres.

form, and that while the northern limit of the distribution of *vulgata* is about the latitude of the Lofoden Islands, that of *depressa* is very much further south.

It should be made clear that the statement of Forbes & Hanley—the two forms “inhabit different levels, the *vulgata* being always in the higher zone”—does not represent the facts accurately. *P. vulgata*, as is well known, lives from near high-water mark to the extreme of low-water. *P. depressa*, on the other hand, is seldom found till near low-water mark, where, so far as my experience goes, *vulgata* and *depressa* occur abundantly on the same masses of rock. This fact further strengthens the case for their specific difference.

* * * Since the foregoing paper was read, our Editor informs me that it is stated in Woodward's *Manual*, 1st ed., p. 451, that “Mr. Wilton has ascertained that *Patella athletica* may be distinguished from the common limpet of our coast by its teeth”. He further tells me that in his uncle's interleaved working copy of the *Manual*, now in his possession, he finds the following manuscript note: “*Patella athletica*: dental canal not much longer than the shell (scarcely half as long as in *P. vulgata*): teeth closer together than in *P. vulgata*; more massive and with shorter cusps; the difference is greater in the imperfectly developed teeth near the further extremity of the canal.”

NOTE ON THE TYPE-SPECIMEN OF *CRIOCERATITES*
BOWERBANKII, J. DE C. SOWERBY.¹

By G. C. CRICK, F.G.S., F.Z.S.

Read 12th January, 1917.

PLATE VII.

THE type-specimen of *Crioceratites bowerbankii*, formerly in the Bowerbank Collection, now forms part of the British Museum collection [Brit. Mus. No. 46474]. The present writer's attention was directed to it recently in connexion with the description² of an ammonoid, *Ammonitoceras tovilense*, from the Lower Greensand (Aptian) of Kent, and two or three features about the specimen that had not hitherto been recorded seem to deserve notice.

Sowerby's³ description of the fossil was communicated to the Geological Society of London in a letter which was read on March 8th, 1837. In his letter Sowerby writes: "The recent discovery in the Isle of Wight, by Mr. Bowerbank, of a fossil shell resembling *Ammonites*, but differing essentially from that genus, and of a magnificent *Scaphites*, appears to me of sufficient importance to be laid before the Geological Society; I have, therefore, drawn up the following descriptions, accompanied by reduced figures of the fossils. pl. xxxiv."

His description of *Crioceratites bowerbankii* is as follows: "The gigantic species from the Isle of Wight I shall name, after its discoverer, *Crioceratites bowerbankii*, pl. xxxvi, fig. 1. Spec. Char.—Whorls about four, slightly flattened on their sides, and nearly close; the inner one ornamented with numerous radiating furrows, which, gradually disappearing upon the outer whorl, are replaced by eight or ten thick, arched costæ, extending completely across the whorl, and largest and most elevated towards the thinly edged, transversely oblong aperture.

"The septa are rather distant, terminating where the costæ begin to enlarge. There is generally a short rib almost close to the aperture, and in one specimen I have noticed an additional short rib between the two long ones which precede the termination. In an individual sixteen inches wide, the septa are one inch and a half apart.

"The fossil occurs in the lower green sand on the south coast of the Isle of Wight."

The type-specimen is very well represented in Sowerby's figure, the enormous enlargement of the ribs on the body-chamber being well shown. Of these ribs, and counting from the aperture, the two largest are the third and fifth, the fourth is a trifle

¹ Published by permission of the Trustees of the British Museum (Nat. Hist.).

² G. C. Crick, Proc. Malac. Soc., vol. xii, November, 1916, pp. 118-20, pl. vi.

³ "Letter from Mr. James de Carle Sowerby to the Secretary, on the Genus *Crioceratites* and on *Scaphites gigas*": Trans. Geol. Soc. London, ser. II, vol. iv, p. 409, pl. xxxiv.

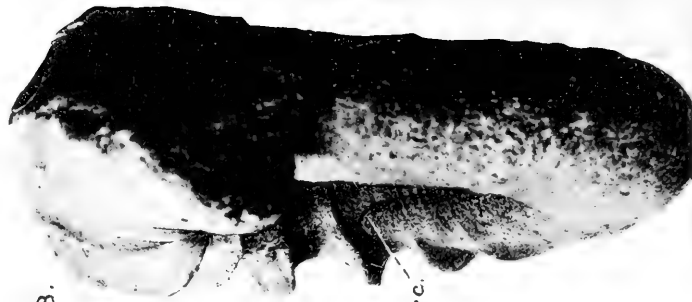




2.



1.



3.

m. s.c.

CRIOCERATITES BOWERBANKII, J. DE C. SOWERBY.
LOWER GREENSAND. I. OF WIGHT.

thicker but not quite so prominent. The last two, however, show a considerable diminution in size. About 40 mm. in front of the last complete rib there is another obscure rib, most apparent near the periphery, and about 20 mm. in front of this a portion of the peristome is visible. The peristome was plain, and in the fossil, which it must be remembered is an internal cast, there are several fairly-coarse lines of growth immediately posterior and parallel to it.

Not only are the ornaments much more feeble, but the body-chamber itself is very much reduced in front of the third (counting from the aperture) large rib. True the (morphological) left side of the fossil is abraded, but the fossil does not appear here to be either distorted or crushed. This condition of the anterior end of the body-chamber is evidently a senile character and indicates the extremely feeble condition of the animal and its approaching death.

Although the rough surface of the specimen, which is an internal cast, is not favourable for the preservation of delicate lines, there is what appears to be an obscure indication of one of the muscle-scars. When complete the scar seems to have been an oval area truncated posteriorly, approximately 45 mm. long and 40 mm. wide, but only its anterior and inner boundaries are preserved as an obscure impressed line. Commencing on the umbilical margin at a point half-way between the sixth and seventh (counting from the aperture) ribs the line passes forward and inward over the margin to within about 30 mm. of the suture of the shell, it then curves backward still passing inward until at about 28 mm. from its most anterior part it is only 10 mm. from the suture of the shell, then curving slowly outward it can be traced nearly as far as the last septal-suture.

EXPLANATION OF PLATE VII.

Crioceratites bowerbankii, J. de C. Sowerby, from the Lower Greensand, Aptian, Isle of Wight. Type-specimen. British Museum Collection, register number 46474.

FIG. 1.—Lateral aspect, showing the rapid decrease in size of the anterior part of the body-chamber. The body-chamber commences immediately above the left-hand edge of the scale. *m.sc.* anterior boundary of muscle-scar.

„ 2.—Peripheral view, showing the enormously-enlarged ribs on the body-chamber.

„ 3.—Apertural view (with the aperture turned slightly to the right), showing the rapid decrease in size of the anterior part of the body-chamber and (*m.sc.*) the boundary of the muscle-scar.

(In each figure the scale represents 4 inches = 10.15 cm.)

A REVISION OF THE TURRIDÆ (PLEUROTOMIDÆ) OCCURRING IN
THE PERSIAN GULF, GULF OF OMAN, AND NORTH ARABIAN
SEA, AS EVIDENCED MOSTLY THROUGH THE RESULTS OF
DREDGINGS CARRIED OUT BY MR. F. W. TOWNSEND, 1893-1914.

By JAMES COSMO MELVILL, M.A., D.Sc., F.L.S., etc.

Read 8th December, 1916.

PLATES VIII-X.

THE comprehensive study of the marine molluscan fauna of the Persian Gulf and its contiguous seas is of comparatively recent date, hardly any steps having been taken to classify or enumerate the members of the richest family occurring within that area, until 1875, when Messrs. Geoffrey and Hugh Nevill published an account of "New Marine Mollusca from the Indian Ocean, mostly Pleurotomidæ".¹ In this treatise about twenty-five species are named, but many of them occur beyond our assigned limits. These were all well described, but only fairly figured on the whole. Two years later, in 1877, Mr. Edgar Smith began his "Diagnosis of new species of Pleurotomidæ" in the British Museum,² and a series of papers followed, which were not completed till October, 1888. Very unfortunately, but owing to no fault of the author, who always spoke regretfully to me of the circumstances, none of them were figured. Over 160 species were diagnosed, and the types noted. During the past five or six years a few of them have been illustrated, either by Mr. C. Hedley³ or myself,⁴ but only a very few, and there can be no concealing of the fact that a great stumbling-block to the student has been occasioned by this omission. Many times I had discussed this question with Mr. Smith, and had resolved to delineate all that came from this particular province, from the actual types, and I find that thirty-five (or one-fifth of the total) of his species can be included.

I therefore venture to offer now the three plates accompanying this paper, as some slight memorial of one to whom molluscan science owes so much, and whose unvarying kindness, attention, and readiness to assist in every possible way those who asked his advice and help, so endeared the name of Edgar Albert Smith to all.

To discover these types I have been several times through the amassed stores of this family in the cases and drawers of the cabinets at the Museum, and only in two instances have I so far failed to find the objects of my search.

¹ Journ. As. Soc. Bengal, vol. xlv, pt. ii, 1875, pp. 83-94, pls. vii-viii.

² Ann. Mag. Nat. Hist., ser. iv, vol. xix, 1877, pp. 488-501; ser. v, vol. x, 1882, pp. 200-18, 296-306; ser. v, vol. xiv, 1884, pp. 317-29; ser. v, vol. xviii, 1888, pp. 300-17.

³ Mem. Austral. Mus., iv, pt. vi, 1903, p. 389.

⁴ Proc. Zool. Soc. Lond., 1901, ii, pl. xxi, figs. 4, 14; Proc. Malac. Soc. Lond., vol. x, 1912, p. 251, pl. xi, f. 13, 13a.

I may add that more than 180 species are treated of in this paper, and one-half of them have been described as new, mainly from Mr. Townsend's collections. The types are all in the British Museum. The Turridæ (Bolten's name *Turris*, 1798, antedating Lamarck's *Pleurotoma*, 1799) are certainly among the most, if not the most, attractive of all the genera of marine mollusca, and at the same time the most difficult to classify properly. This fact really adds incentive to their study, coupled with their infinite variety of contour, the many rare and abysmal forms, and the certainty of additions occurring to the family whenever new ground—or rather seas—are examined. Yet, so far, no student has made this one group his life-work. I am convinced that the fossil forms (mostly Tertiary) should be studied *pari passu* with the recent, before any satisfactory headway towards the much-needed accurate classification can possibly be reached.

Mr. T. L. Casey¹ has attempted this with some measure of success as regards the larger forms, both recent and fossil, though he has evidently mainly worked out the species of the last named in the United States far more completely than those of the Old World. He creates various new genera for the more pronounced species of considerable size, but notes his inability "after long and patient study of rather large material to devise a system of characters to serve for the definition of the subtribal groups" he includes under the collective term *Daphnellini*.

For the sake of convenience, an alphabetical sequence has been adopted in the enumeration of all the following species under what I assume to be their proper genera, but I have endeavoured, in the remarks that accompany each, to name their most likely affinities.

A large proportion of the forms from this region are endemic, so far as is known, and certain of them are very conspicuous for beauty of contour or coloration. In the first category might be placed such species as *Turris invicta*, *Mungilia Townsendi*, *Clavatula navarchus*, and *Drillia tasconium*; in the second, *Drillia resplendens*, *D. persica* var. *jacintha*, and *Cythara hypercalles*. Many *Daphnellæ* and *Pleurotomellæ*, the ten species of the latter not yet being known elsewhere, are of exquisite and most delicate design, pure white, and abysmal in distribution. It has been found necessary to institute a sub-genus (*Diaugasma*) for the curious *Daphnella epicharta*, M. & St., and another (*Veprecula*) for a series of deep-water *Clathurellæ* with nuclear and other peculiarities. Doubtless, as hinted by Mr. Casey, the vast genus *Mungilia* will be subdivided when the relations of the species are better known; indeed, I believe Mr. Iredale, to whom I am very greatly indebted for many useful hints in nomenclature, already has the matter in hand.

It now only remains for me to thank also Mr. J. R. le Brockton Tomlin for considerable assistance; and Mr. R. Standen, with whom I collaborated in the first enumeration of this Family,² as far as the

¹ Trans. Acad. Sci. St. Louis, vol. xiv, 1904, pp. 123-70.

² Proc. Zool. Soc. Lond., 1901, pp. 327-460.

Gulf was concerned; Mr. Townsend, as I have often had occasion to observe, in the care exercised in the preservation of the specimens collected, and in the labelling of exact localities, as well as in the selection of good dredging stations, exceeded most, if not all his forerunners, and to him I feel extremely grateful, now, as ever. Lastly, to Miss Gertrude M. Woodward I must express my especial gratitude for the admirable illustrations delineated with such consummate accuracy.

ABBREVIATIONS EMPLOYED TO INDICATE REGIONS OF DISTRIBUTION.

P.G. By these initials is to be understood the whole area of the Persian Gulf, likewise comprehending the Gulf of Oman, with Muscat and Jask, bordered eastward by long. $59^{\circ} 48' E.$

M.C. The Mekran coast of South Persia and Baluchistan, between long. $59^{\circ} 48' E.$ and the River Hab.

I. The east coast of continental India from east of the River Hab, abutting on Karachi, say long. $66^{\circ} 40'$, south-eastward to Panjim, lat. $15^{\circ} 50' N.$, long. $66^{\circ} 40' E.$

Class GASTROPODA.

Order PROSOBRANCHIATA.

Sub-order MONOTOCARDIA.

§ TOXOGLOSSA.

Family TURRIDÆ (= PLEUROTOMIDÆ).

I. Sub-family TURRINÆ.

Genus TURRIS, Bolten, 1798 (= PLEUROTOMA, Lamarek, 1799).

1. TURRIS ACUTA (Perry).

Pleurotoma acuta, Perry, Conchology, 1811, pl. liv, fig. 5.

„ *tigrina*, Lamarek, Anim. sans Vert., vol. vii, 1822, p. 95.

„ „ Deshayes, Anim. sans Vert., 2nd ed., vol. ix, 1843, p. 352.

„ „ Kiener, Coq. Viv., 1839, pl. viii, f. 1.

„ „ Reeve, Conch. Icon., vol. i, 1843, pl. i, f. 3.

„ „ Hedley, Proc. Linn. Soc. New South Wales, 1902, p. 28.

Lophiotoma „ Casey, Trans. Acad. Sci. St. Louis, vol. xiv, 1904, p. 130.

P.G. Gulf of Oman, Malcolm Inlet, at 24 fathoms, dead.

M.C. On soft mud, at 7 fathoms, but very scarce.

A widely distributed and not very variable species, extending to the Philippine Isles,¹ where it abounds, and also Fiji and other islands of the Eastern tropical Archipelago. See remarks under *T. indica*.

¹ Hidalgo, Cat. Moll. Test. Ins. Philip., 1904, p. 112.

2. *TURRIS ALBINA* (Lam.).

Pleurotoma albina, Lamarek, Anim. sans Vert., vol. vii, 1822, p. 96.

„ „ Reeve, Conch. Icon., vol. i, 1843, pl. ix, f. 77.

P.G. Gulf of Oman. Off Muscat, 30 fathoms.

I. Lat. 18° 43' N., long. 71° 41' E.

Reeve remarks upon the "squareness and equidistant arrangement of the spots which ornament the flattened keel formed by the filling up of the labral slit". The figured specimen was dredged by Surgeon R. Brinsley Hinds, R.N., in the Island of Cerat, Moluccas.

3. *TURRIS INDICA*, Bolt.

Turris indica, Bolten, Mus. Boltenianum, 1798, p. 124, No. 1591.

Pleurotoma marmorata, Lamarek, Anim. sans Vert., vol. vii, 1822, p. 95.

„ „ Reeve, Conch. Icon., vol. i, 1843, pl. iii, f. 21, a, b.

Lophiotoma marmorata, Casey, Trans. Acad. Sci. St. Louis, vol. xiv, 1904, p. 130.

P.G. Thairi, Mussandam, east side, 30 fathoms (1912). Malcolm Inlet (Kubbatt Ghazira), giant example, long. 94 mm., dredged at 55 fathoms. From this latter place a shell was procured that may prove a hybrid *indica* × *acuta*.

M.C. Not uncommon, often washed ashore.

I. Bombay.

A variable species, extreme forms being happily figured by Reeve. Distributed over the Eastern Tropics very widely, ranging from the Red Sea to Australia and Polynesia, and as far north as Japan, I do not agree with Tryon (Man. Conch., vol. vi, 1884, p. 165) that *hastula*, Reeve (Conch. Icon., vol. i, 1843, pl. xvii, f. 139), is the young of this species.

From the Cargados Isles came interesting albino specimens (Stanley Gardiner Expedition).¹ These are probably the *Pl. buelowi*, Sowb., and have the appearance of having been dredged at a considerable depth.

I may add that for this species and *acuta*, Bolt. (as well as *leucotropis*, Ad. & Rve., *jickeli*, Weink., *unedo*, Vil., and *virgo*, Lam.), Dr. Thomas L. Casey proposed a new genus, *Lophiotoma*, laying stress upon the stouter form, abbreviate, with straighter beak, more acutely elevated and less close-set spiral carina, and with deep anal sinus formed centrally *on*, and not *behind*, the peripheral keel, the latter being more strongly elevated and usually sub-duplex.

Possessing all these species, I have closely compared their structure with those few still allowed a place in the typical genus *Turris*, the result being that I prefer to consider them all so closely allied that it seems disadvantageous to separate them even subgenerically. The nepionic whorls are confessedly identical; it is simply a question of the carinæ being more pronounced in such a species as *acuta*, for instance; the same character of marking or painting is to be found, and to a great extent the same build and contour generally.

¹ Trans. Linn. Soc. Lond., ser. II, Zoology, vol. xiii, 1909, p. 118.

4. *TURRIS INVICTA*, Melv.

Turris invicta, Melvill, Ann. Mag. Nat. Hist., ser. VIII, vol. vi, 1910, p. 15, pl. ii, f. 27.

P.G. Telegraph cable at 29 fathoms. September 2, 1906. Bushire, Hinderabi Island, Gulf of Oman, 55 fathoms. Several.

One, especially large and fine, measures long. 90 × lat. 32 mm. Allied to *indica*, it preserves its individuality in all specimens found, especially as regards its remarkably abbreviate contour. So far as is at present known, it is endemic. This would be included in Dr. Casey's genus *Lophiotoma*, to which I referred under *T. indica*.

§ Subgen. GEMMULA, Weinkauff, 1876.

5. *TURRIS* (GEMMULA) CONGENER (Sm.).

Pleurotoma congener, E. A. Smith, Ann. Mag. Nat. Hist., ser. VI, vol. xiv, 1894, p. 160, pl. iii, f. 4, 5.

P.G. Gulf of Oman (*Investigator* Expedition), lat. 23° 47' N., long. 58° 30' E., 230 fathoms.

This fine species was originally dredged by the same expedition in the Bay of Bengal, and subsequently west of Travancore at 102 fathoms, also west of the Malabar Coast at 295–360 fathoms, from mud and sand. We had hoped to have found it among Mr. Townsend's collections.

Many other large abysmal species were found by the *Investigator*, but mostly in the Bay of Bengal, or off Ceylon, and the Malabar Coast, outside our limits. Most, if not all of them, have been figured by Messrs. Alcock, Annandale, MacGilchrist, and others in the *Illustrations of the Zoology of the Royal Indian Marine Survey Ship "Investigator"*.

6. *TURRIS* (GEMMULA) GEMMATA (Hinds).

Pleurotoma gemmata, Hinds, Proc. Zool. Soc. Lond., 1843, p. 37.

„ „ Reeve, Conch. Icon., vol. i, 1843, pl. x, f. 83.

„ *fusca*, Hombron & Jacquinot, Voy. Sud. Pol. Zool., vol. v, 1850, p. 3, pl. xxv, f. 19–20.

P.G. Gulf of Oman, lat. 24° 5' N., long. 57° 35' E., 205 fathoms, sand, abundant, none full grown. Also lat. 24° 58' N., long. 54° 56' E., 156 fathoms, equally common, and at two contiguous dredgings at 37 and 225 fathoms respectively, in sand and mud. A dark form occurs off Muscat at 20–40 fathoms.

M.C. Off Charbar, 40 fathoms.

P. fusca, H. & J., we consider synonymous; the dark form mentioned above might be considered a colour variety for which the name *fusca* would be congenial. Few of our examples are full grown; it is evidently an abysmal species.

The distribution is extended over the eastern tropics from the Red Sea to Australia. It does not, however, occur in Hidalgo's Philippine Catalogue. Hedley, in his Queensland List, separates "*Pleurotoma*" *gemmata*, Hinds, and "*Drillia*" *fusca*, H. & J., and

classes them accordingly in these two genera, but I cannot say I agree with this proposal.

7. TURRIS (GEMMULA) GILCHRISTI (Sowb.).

Pleurotoma gilchristi, G. B. Sowerby, "Marine Investigations in S. Africa," Cape Town, 1902, p. 99, fig.

M.C. Off Ras Maidani between Jask and Charbar, at 180 fathoms, 1914, occurs what appears to be this species, the type of which came from Natal. It is nearly allied to *P. ceylonica*, Sm., of which I have an example from the Hugh Nevill Collection. The tubercles, however, are smaller and more compact in *gilchristi*, and it is much less in latitude, proportionately, than the var. *gadurensis* of *T. granosa*, Helb. (= *carinata*, Gray).

8. TURRIS (GEMMULA) GRANOSA (Helb.).

Murex (Fusus) granosus, Helbling, Abhandl. Priv. Böhm. Math. Prag, Bd. iv, 1779, p. 116, pl. ii, f. 16.

" " " Dall, Journ. of Conch., vol. xi, 1906, p. 291.
Pleurotoma carinata, Gray, Griffiths' Cuvier Anim. Kingdom, vol. xii, 1834, pl. xxiii.

" " Reeve, Conch. Icon., vol. i, 1843, pl. vii, f. 56.

" *kieneri*, Doumet, Mag. de Zool., 1840, Moll., pl. x.

P.G. Fahal, 20-40 fathoms; Mussandam, 30 fathoms, 1912; Gulf of Oman, Muscat, 25-40 fathoms.

Var. *gadurensis*, nov.

Testa ut in typo, sed omnino minor, fere immaculata.

M.C. Gwadûr, one specimen at 70 fathoms. A few others, all much of the same calibre, off Ras Maidani, between Gwadûr and Jask.

The sculpture of this variety is identical with the type; the size about one-half, say 38 mm. as against 60-70 mm., the coloration most simple, nearly immaculate.

9. TURRIS (GEMMULA) MULTISERIATA (Sm.). (Pl. VIII, Fig. 3.)

Pleurotoma multiseriata, E. A. Smith, Ann. Mag. Nat. Hist., ser. iv, vol. xix, 1877, p. 491.

P.G. Koweit, 10 fathoms.

M.C. In many places, 5-20 fathoms, mud bottom.

I. Twelve miles west of Karachi, on the border of the Mekran coast, at 15 fathoms. Very large examples occurring in this locality, measuring $\frac{5}{8}$ inch.

Captain Tindall of the S.S. *Patrick Stewart* likewise procured it at Batticaloa, south of our limit.

We follow Paetel¹ in assigning this shell to the section *Gemmula*, but it stands somewhat alone in the assemblage, resembling in extreme miniature such a large deep-water form as *congener*, Sm. It is distinguished by the double row of tubercles, spirally running below

¹ Paetel, Cat. de Conchyl. Samml., 1887, p. 67.

the sutures, and the many close longitudinal liræ or costulæ descending obliquely. The colour varies from reddish brown to full ochreous, the latter colour predominant. There are specimens in the National Collection from Ceylon, the Persian Gulf, and China seas. The original type is now figured.

§ Subgen. TOMOPLEURA, Casey, 1904.

10. TURRIS (TOMOPLEURA) ACUTIGEMMATA (Sm.). (Pl. VIII, Fig. 1.)
Pleurotoma acutigemmata, E. A. Smith, Ann. Mag. Nat. Hist., ser. iv,
vol. xix, 1877, p. 489.

P.G. Gulf of Oman, Muscat, 20–40 fathoms.

I. Lat. 18° 58' N., long. 71° 45' E., 40 fathoms.

The locality of the type, now figured for the first time, is unknown. In my opinion, this may stand as distinct from *jubata*, Hinds, to which, however, it is very nearly allied. The author lays stress on the form being narrower, tubercles larger, and canal more abbreviate. It is merged by Tryon (Man. Conch., vi, pp. 171, 172) with Hinds' species, but this evidently only on surmise, since he had never beheld *acutigemmata*. We have it also from the Andaman Islands (Booley).¹

Tomopleura, Casey,² was instituted as a genus, while *Gemmula*, Weink., has been also raised to the same rank. I prefer treating both as sub-genera for the present.

11. TURRIS (TOMOPLEURA) CIRCUMVERTENS (Melv. & Stand.).

Drillia circumvertens, Melvill & Standen, Proc. Zool. Soc. Lond.,
1901, p. 436, pl. xxiii, f. 3.

P.G. Gulf of Oman, lat. 24° 49' N., long. 51° 56' E., 225 fathoms, mud; and lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

A small white species, of peculiar sculpture. The two uppermost nuclear whorls are smooth, globular, and shining, the two succeeding, longitudinally nodulously costate, the rest pronouncedly excavate at the sutures, a strong carina or keel just below, on each whorl, and another just above the sutures, the intermediate space smooth with crescent-shaped striation, the lower keel is the strongest, canal only slightly produced, spiral liræ running below the periphery to the base, twelve or thirteen in number. Long. 6, lat. 2.25 mm.

12. TURRIS (TOMOPLEURA) FAGINA (Ad. & Ree.).

Pleurotoma fagina, Adams & Reeve, Voy. Samarang, Moll., pt. 2, 1850,
p. 40, pl. ix, f. 2, a–b.

„ „ Tryon, Man. Conch., vol. vi, 1884, p. 167, pl. iii,
f. 22.

P.G. Henjam Island, 46 fathoms, sand.

A large species, dark brown, with regular spiral ribs. Only one specimen dredged. The type came from China. It may be considered one of the rarer species.

¹ Casey, Trans. Acad. Sci. St. Louis, vol. xiv, 1904, p. 138.

² Proc. Malac. Soc. Lond., vol. ii, 1897, p. 165.

Pl. annulata, Reeve, Conch. Icon., vol. i, pl. v, f. 35, of unknown locality, seems near akin.

13. *TURRIS* (TOMOPLEURA) *NIVEA* (Phil.).

Pleurotoma nivea, R. A. Philippi, Zeitschr. f. Malak., 1851, p. 92.

I. Karachi, 3-7 fathoms, loose stones, and muddy sand.

Originally described from Formosa.

Judging by the Indian examples, this hardly differs from the variety *violacea* (Hinds), excepting in the pure-white coloration, all the *violacea* I have seen being most delicately tinted the palest lilac.

(a) Var. *violacea*, Hinds.

Pleurotoma violacea, R. B. Hinds, Moll. Voy. *Sulphur*, 1844, p. 16, pl. v, f. 8.

„ „ Reeve, Conch. Icon., vol. i, 1843, pl. xxii, f. 186.

P.G. Basadu, Kishm Island, and Khor Khairi.

I. Karachi. Inside the harbour in 3-7 fathoms, loose stones and mud.

It is reported to range from the Red Sea to Japan, Philippine Isles, and Australia. The type figured by Reeve came from the north coast of New Guinea and Macassar Straits, 7-22 fathoms. It is therefore in all probability widely distributed over the whole eastern tropics. I am sorry it cannot be taken as the more typical form; but the name had been previously employed, by Mighels and C. B. Adams, so was rendered untenable. *T. nivea* proper is, in my opinion, only the same shell without the pale lilac tint.

(b) Var. *makemonos*, Jous.

Pleurotoma makemonos, F. Jousseume, Bull. Soc. Zool. France, 1883, p. 198, pl. x, f. 4.

„ „ Tryon, Man. Conch., vol. vi, 1884, p. 319, pl. xxxiv, f. 10.

P.G. Gulf of Oman, Jask Beach.

Originally described from Aden, this variety merges on the one hand into the type, and on the other approximates *pouloensis*, Jous. This latter, however, is a stouter shell, of a uniform dun colour, but, notwithstanding this, it is probably only another variety of *nivea*.

Pl. makemonos is known by its pale-brown hue, with longitudinal patches of a darker shade crossing it at intervals.

It is also reported from Japan.

(c) Var. *pouloensis*, Jous.

Pleurotoma pouloensis, F. Jousseume, Bull. Soc. Zool. France, 1883, p. 199.

„ „ Tryon, Man. Conch., vol. vi, p. 319, pl. xxxiv, f. 11.

P.G. Shaikh Shuaib Island.

M.C. Charbar.

I. Karachi.

Usually in 3-5 fathoms, amongst loose stones and muddy sand.

Described originally from Malacca.

Although the two last, here considered varieties, can usually be recognized, I fail, after having examined many examples from the Arabian Sea and Persian Gulf, to be able to draw a hard and fast line between them. *T. pouloensis* is the most incrassate of the series, and the coarsest in build, the typical *violacea* being a graceful, attenuate shell, with slightly more produced canal.

14. *TURRIS (TOMOPLEURA) PATRICIA* (Melv.).

Pleurotoma patricia, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 164, pl. x, f. 15.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms, 1903; lat. 25° 6½' N., long. 60° 39' E., 90 fathoms, 1914.

M.C. Astola Island, Charbar, 40 fathoms.

The tumid, longitudinally ribbed, and shining third and fourth whorls of this charming little species characterize it specially. In good condition the shell is tinged with pale violet. I possess examples of *Pl. loprestiana*, Calcara, from Adventure Bank (*Porcupine* Expedition), which show slight affinity, but are quite distinct in form, the effect of the tumid whorls just mentioned being to give *patricia* a somewhat dolioform contour. It appears to be widely distributed over the Gulf area, but is sparse in individuals.

15. ? *TURRIS (TOMOPLEURA) THISBE* (Melv.).

? *Drillia Thisbe*, Melvill, Proc. Malac. Soc. Lond., vol. vii, 1906, p. 77, pl. viii, f. 20.

P.G. Persian Gulf, Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

A small white shell, with mouth decidedly buccinoid. Nearly all the specimens seen are imperfect as regards the nuclear whorls. The shell is closely, spirally ridged. There are many differences of opinion among those I have consulted as to the proper status of this species, which may be the young of a *Tritonidea* or allied genus. At the same time it seems to possess some *Pleurotomoid* characters, but, until better material is obtained, I fear no quite satisfactory conclusions can be drawn.

Judging by the figure, it resembles in form, shape of aperture, and general sculpture, *Daphnella (Teres) mimica*, Sowb.,¹ from St. Vincent's Gulf, South Australia.

16. *TURRIS (TOMOPLEURA) TRYPANODES* (Melv.).

Pleurotoma trypanodes, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 57, pl. v, f. 12.

P.G. Henjam Island, 1906.

Arabian Sea, lat. 18° 58' N., long. 71° 45' E., 40 fathoms.

I. On cable, 100 miles west of Bombay, 1906.

¹ Proc. Malac. Soc. Lond., vol. ii, 1896, p. 27, pl. iii, f. 10.

An elegant tornate species, with produced canal, and spiral ribbing somewhat similar to that of *Pl. nivea*, Phil., but more regular. White, tinted yellowish around the upper double carinæ of each whorl; just below the sutures these carinæ are spirally deeply punctulate, an item omitted in the original description. These additional notes are taken from the specimen noted as from the cable, west of Bombay. The dimensions of this are long. 20, lat. 6 mm. As regards the nuclear whorls, the first two are vitreous, globular, smooth, and shining, the two next, also vitreous, but spirally nodulous.

17. *TURRIS (TOMOPLEURA) VERTEBRATA* (Sm.). (Pl. VIII, Fig. 4.)

Pleurotoma vertebrata, E. A. Smith, Ann. Mag. Nat. Hist., ser. iv, xv, 1875, p. 416.

„ *violacea*, Hinds?, Tryon, Man. Conch., vol. vi, 1884, p. 170, pl. iii, f. 29, 29a.

I. Karachi, Ratnagiri, south of Bombay (Abercrombie).

Also received from Oshima, Japan (Hirase).

This may, perhaps, stand on its own merits, as distinct from *violacea*, Hinds, with which several authors have placed it. It differs in size, also in less prominent spiral ribbing, the characteristics of which, however, are almost identical, and, above all, the chestnut zigzag longitudinal markings down the whorls, the same colour permeating the sutural region in more or less density. My largest example only measures 17 mm. in length, while *nivea* attains 25 mm. or more. I have lately received characteristic Japanese specimens, collected by Hirase. The chestnut painting is distinct and peculiar, in zigzag longitudinal flames on white ground.

Genus *ANCISTROSYRINX*, Dall, 1881.

18. *ANCISTROSYRINX ORIENTIS*, Melv.

Ancistrotyrinx orientis, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 56, pl. v, f. 3.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

In my description of this species I omitted to mention that *A. travancorica*, Smith, a very fine and large abysmal species, of ornate sculpture, had already been recorded from the Eastern tropical area, some way south of our limit. Mr. T. L. Casey,¹ following Cossmann's dictum, considers *Ancistrotyrinx*, Dall, preoccupied by *Cochlespira*, Conrad. Tryon, however, thinks the last = *Pleurotoma*, Lamk. (i.e. *Turris*, Bolt.).

DRILLIA, Gray, 1838.

19. *DRILLIA ALCYONEA*, Melv. & St.

Drillia alcyonea, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 435, pl. xxiii, f. 21.

P.G. Gulf of Oman, lat. 24° 55' N., long. 57° 59' E., 37 fathoms, sand and mud.

¹ Trans. Acad. Sci. St. Louis, vol. xiv, 1904, p. 144.

This species has not been found since by Mr. Townsend. It is a small (long. 12 mm.) shining white shell, superficially fasciolaroid.

20. *DRILLIA ANGRIASSENSIS*, Melv.

Drillia angriasensis, Melvill, Mem. Manch. L. & P. Soc., vol. xlii, No. 4, 1898, p. 11, pl. i, f. 3.

I. Angrias Bank, west of Bombay (Captain Tindall).

A white, smooth shell, with nodulous angled whorls, and almost plain last whorl, lip effuse, base sub-truncate. The type, in the British Museum, Natural History, is still unique.

21. *DRILLIA ATHYRMA*, Melv. & St.

Drillia athyrma, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 436, pl. xxiii, f. 22.

P.G. Gulf of Oman, lat. 24° 58' N., long. 57° 59' E., 37 fathoms, sand and mud.

Also at 142 fathoms, off Ras Maidani.

The examples subsequently secured are more mature than was the original type. The outer lip in the Ras Maidani examples is lobed, somewhat after the manner of *Pleurotoma lobata*, Sowerby.¹ The largest example, unfortunately with imperfect outer lip, measures longitudinally 26 mm., is whitish, the spiral raised ridge just below the suture of each whorl is pronounced, with ribs thick, straight, and somewhat oblique on the last whorl only. In a smaller, and more perfect specimen, the labral lobe projects almost at right angles to the slightly produced canal. The aperture is milky-white within, whorls in young specimens very closely spirally striate, slight chestnut maculations very sparsely cover the surface in certain examples, in others the coloration is simple, dead white or palest ochreous.

22. *DRILLIA AUDAX*, Melv. & St.

Drillia audax, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 313, pl. xxiii, f. 1.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

A distinct species, both in sculpture and painting. It has not been noticed elsewhere in the Persian Gulf region save in the particularly productive dredging mentioned above. It, however, is of fairly wide distribution, evidenced by its occurrence in the Savu Sea, East Indies (*Siboga* Expedition).²

23. *DRILLIA BAYNHAMI* (Sm.). (Pl. VIII, Fig. 9.)

Pleurotoma (*Drillia*) *baynhami*, E. A. Smith, Proc. Zool. Soc., 1891, p. 404, pl. xxxiii, f. 2.

P.G. Gulf of Oman, Muscat, 15 fathoms.

I. Karachi.

This seems very nearly allied, if not identical, with *Drillia suturalis*,

¹ Marine Investig. South Africa, vol. ii, 1903, p. 213, pl. iv, f. 9.

² M. M. Schepman, Prosobr. *Siboga* Exped., 1913, p. 414.

Gray.¹ The type, of which we give a figure, is a pale shell, of refined sculpture, tinted with pale brown. Most of the numerous specimens we have placed under this name seem best included under *interlinctata*, Sm., a species with more prolonged canal, and decided marking and coloration, especially interstitially. The type came from Aden.

24. DRILLIA CECCHI, JOUSS.

Drillia cecchi, Jousseume, Le Naturaliste, 1891, p. 232.

P.G. Henjam Island (1906), Gulf of Oman, Jask.

M.C. Local at 3–30 fathoms, muddy sand.

A pure-white species, which seems constant in its somewhat critical characters. The type came from Aden, and it has since been again collected there by Commander E. R. Shopland.² Near to *D. theoreta*, Melv., which is a highly coloured species, with more abbreviate canal.

25. DRILLIA CHIMASTRUM, sp. nov. (Pl. X, Fig. 11.)

D. testa compacta, fusiformi, solidula, nivea, unicolorata, anfractibus in specimine maximo ad 11, tribus supernis planiusculis, lacteo-vitreis, cæteris ventricosulis, ad suturas impressis, longitudinaliter costatis, costis incrassatis, anfractus ultimi numero tredecim, undique spiraliter regulariter liris, apertura breviter ovata, intus alba, sinu lato, canali paululum producto, margine columellari fere recto.

(*χέλμαστρον*, winter apparel, from the snowy-white colour.)

Long. 16, lat. 6 sp. max.

P.G. Mussandam, 30 fathoms. Malcolm Inlet, 35 fathoms. Gulf of Oman, Diamanayat Isles, 20 fathoms (15 April, 1912).

A pure-white, somewhat compressed and compact species, the whorls ventricose, compressed suturally, longitudinally ribbed, ribs straight, incrassate, crossed throughout by spiral flose liræ, mouth subovate, sinus distinct, broadened, columellar margin almost straight. It seems near to *putillus*, Reeve, and perhaps *spectrum* of the same author, but is a far more solid species than the last-named.

26. DRILLIA CLYDONIA, Melv. & St.

Drillia clydonia, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 437, pl. xxiii, f. 24.

P.G. Henjam Island, 1906. Muscat, 20–35 fathoms, 1914. Gulf of Oman, lat. 24° 49' N., long. 57° 56' E., 225 fathoms, mud.

A pretty species, not variable, with obliquely flexuose longitudinal ribs, surface either whitish, stramineous, or slightly rufous, shining, canal slightly produced; most nearly allied to *D. omanensis*, M. & St.

27. DRILLIA CRENULARIS (Lam.).

Pleurotoma crenularis, Lamarck, Anim. sans Vert., vol. vii, 1822, p. 92.

“ “ Reeve, Conch. Icon., vol. i, 1843, pl. vii, f. 54.

For localities see under variety A.

¹ Ann. Nat. Hist. (Charlesworth), vol. i, 1838, p. 29.

² Proc. Malac. Soc. Lond., vol. v, 1902, p. 172.

(a) Var. *atkinsonii*, Sm. (Pl. VIII, Fig. 7.)

Pleurotoma (Drillia) atkinsonii, E. A. Smith, Ann. Mag. Nat. Hist., ser. iv, vol. xix, 1877, p. 495.

P.G. Muscat, 25 fathoms.

M.C. Rarely, at 10-12 fathoms.

I. Bombay, where it appears the prevailing form, though the type has also been recorded (Abercrombie). Lieut.-Col. H. D. Olivier has also collected the typical *crenularis* at Bassein, near Bombay. Karachi (Townsend), both the type and the variety.

(b) Var. *griffithii*, Gray.

Pleurotoma griffithii, J. E. Gray MSS., Reeve, Conch. Icon., vol. i, 1843, pl. vii, f. 57.

P.G. Gulf of Oman, Jask, on hard sand. Muscat, 10-35 fathoms.

M.C. Charbar, at low spring tides.

I. Karachi, specimens washed up all along the coast.

I expect when all the forms allied to *crenularis* (and by this is meant *baynhami*, Sm., *intertincta*, Sm., *major*, Gray, etc., mostly separable by coloration, or some other peculiarity liable to vary) are studied really closely, that they will be found hardly worthy of separate specific rank.

28. DRILLIA DIVES, Melv. & St.

Drillia dives, Melvill & Standen, Ann. Mag. Nat. Hist., ser. vii, vol. xii, 1903, p. 311, pl. xxii, f. 13.

P.G. Gulf of Oman, Muscat, 25 fathoms.

In the original description this is represented as being allied to *D. clydonia*. I now think *D. philotima* its nearest ally. The latter, however, has far more frequent longitudinal costæ, and the mouth is narrower.

29. DRILLIA EUCHROËS, Melv.

Drillia euchroës, Melvill, Proc. Malac. Soc. Lond., vol. x, 1912, p. 250, pl. xi, f. 11.

P.G. On the Telegraph Cable, September 2, 1906.

A most distinct species, latiroid superficially, the sinus being very obscure, and the painting of spiral ochreous lines alternating with white and darker stramineous, somewhat resembling *Latirus turritus*, Gmel., or a miniature *Fasciolaria filamentosa*, Mart. It has occurred but very rarely.

30. DRILLIA FLAVIDULA (Lam.).

Pleurotoma flavidula, Lamarck, Anim. sans Vert., vol. vii, 1822, p. 92.

„ „ Reeve, Conch. Icon., vol. i, 1843, pl. viii, f. 66.

P.G. Koweit, 7 fathoms. Shaikh Shuaib Island, 36 fathoms (1906). Gulf of Oman, Jask, 175 fathoms (1912). Malcolm Inlet (Kubbatt Ghazira), very uncommon at 24 fathoms.

A species of bold contour, particularly abundant in Erythræan waters. The Jask specimens are fine and large, often covered with *Malluvium lissum* (Sm.), one of the Calyptræidæ, peculiar to these

seas and a deep-water form. The distribution of *D. flavidula* is wide, including Hong-Kong and China proper. But the largest example in my collection is from the northern shore of the Red Sea, that was picked up on a sandy beach many years ago by my cousin, the late Miss Mary Alexina Haldane, and kindly presented to me. This is about $2\frac{1}{2}$ inches in length (say 68 mm.), pale straw coloured throughout, and in perfect condition.

With this species I am inclined also to place *Pl. (Drillia) latisinuata*¹ of Smith. I possess a co-type of this "ex auctore", and at the suggestion of Mr. Le Brockton Tomlin, have well compared it with a large and variable series of *flavidula* in my collection. Mr. Smith admits the near alliance of the two species, and lays stress on "the upper half of each whorl being nearly smooth, as the plications extend scarcely beyond the central large spiral liration which marks the angulations of the whorls". This may be true as regards the type, but there are several intermediates, and I think we may consider *flavidula* as a protean species, and what may be called the form *latisinuata* does likewise occur in the Persian Gulf.

31. DRILLIA GRANATELLA, M. & St.

Drillia granatella, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 312, pl. xxii, f. 18.

P.G. Gulf of Oman, Muscat, 15 fathoms.

A very pretty little form, pomegranate pink in colour, whence the specific name. Allied to *persica*, Sm., but characteristic and peculiar.

32. DRILLIA INCERTA (Sm.). (Pl. VIII, Fig. 5.)

Pleurotoma (Drillia) incerta, E. A. Smith, Ann. Mag. Nat. Hist., ser. IV, vol. xix, 1877, p. 496.

P.G. Henjam Island, 10–14 fathoms (1906). Gulf of Oman, lat. $24^{\circ} 55' N.$, long. $57^{\circ} 59' E.$, 205 fathoms, sand. Also in contiguous sounding, at 37 fathoms, sand and mud.

A species of somewhat uncertain status, and therefore well named. The prolonged canal serves slightly to distinguish it, and its pale, colourless whorls; the sinus, too, is remarkably patent, but it is not easy to characterize its qualities for purpose of differentiation. We would refer to the author's description. The type now figured came from New Guinea. But few examples have been yet found in the Persian Gulf area. *D. jousseau mei*, Melv., from Aden (Shopland), is to be compared with it. This last has not occurred, so far, elsewhere.

33. DRILLIA INCONSTANS (Sm.). (Pl. X, Fig. 1.)

Pleurotoma (—?) *inconstans*, E. A. Smith, Ann. Mag. Nat. Hist., ser. IV, vol. xv, 1875, p. 417.

P.G. Henjam Island, 14 fathoms. Shaikh Shuaib Island, Pasni, 40 fathoms. Gulf of Oman, lat. $24^{\circ} 55' N.$, long. $57^{\circ} 09' E.$, 37 fathoms, sand and mud.

¹ Ann. Mag. Nat. Hist., ser. IV, vol. xix, 1877, p. 494.

I. Karachi. Angrias Bank and Malabar Coast (Captain Tindall), 5 fathoms.

This is a plentiful species, and appears to be more "inconstant" in colour than form. The hue varies from pale straw colour and almost white to chocolate-brown. Sometimes the tubercles, spirally arranged below the sutures, are shining white, the rest of the shell being darker, but this is a rare variety. So nearly akin is this species to certain forms of *pyramidula*, Reeve, that I expect they will be united some day, if not immediately.

34. DRILLIA INTERTINCTA (Sm.). (Pl. VIII, Fig. 6.)

Pleurotoma (Drillia) intertincta, E. A. Smith, Ann. Mag. Nat. Hist., ser. IV, vol. XIX, 1877, p. 497.

P.G. Henjam Island, Muscat, 5-15 fathoms, sand or muddy bottom. Largest examples measure $1\frac{1}{2}$ inches in length.

M.C. Extends along the Mekran coast past Charbar, almost to Gwadûr.

A handsome species, at one time rather confounded with *baynhami*, Sm. It is still very abundant where found, and we have seen many specimens without much variety. The dark-brown blotches at the interstices are very conspicuous: the trivial name was imposed in recognition of this. The canal is somewhat produced, form more attenuate proportionately than most of its congeners. It is mentioned by Hidalgo as occurring at the Island of Cebu, Philippines.

35. DRILLIA LITHORIA, Melv. & St.

Drillia lithoria, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. XII, 1903, p. 313, pl. XXII, f. 20.

P.G. Bahrein Islands, 6 fathoms, coral sand.

A small nodulous species, of the same character as *inconstans*, Sm., *prunulum*, Melv., *radula*, Hinds, but with the spiral nodules much fewer and larger in proportion. It is of very rare occurrence.

36. DRILLIA LUCIDA, G. & H. Nev. (Pl. IX, Fig. 7.)

Drillia lucida, G. & H. Nevill, Journ. As. Soc. Beng., vol. XLIV, pt. II, 1875, p. 84, pl. VIII, f. 15.

Pleurotoma (Drillia) disjecta, E. A. Smith, Ann. Mag. Nat. Hist., ser. VI, vol. II, 1888, p. 308.

P.G. Henjam Island, 10 fathoms. Gulf of Oman, Muscat, 10 fathoms, muddy sand.

The type of *lucida* is in the Indian Museum, Calcutta, and we, therefore, have not had an opportunity for comparing it with *disjecta*, but judging from the good figure, which is drawn on a considerably magnified scale, there can be little doubt that these are one and the selfsame species. We have figured the actual type of *disjecta* from the National Collection. Mr. Smith lays stress upon the upper ribs in this species being always nodulous, and thus being capable of being distinguished from the very nearly allied *persica* at sight. To my mind, nevertheless, these species are almost too near, and mainly

out of regard to the memory of the author I still keep them distinct for the present.

37. DRILLIA MINDANENSIS, Sm.

Drillia mindanensis, E. A. Smith, Ann. Mag. Nat. Hist., ser. iv, vol. xix, 1877, p. 493.

P.G. Investigator Expedition.

One specimen dredged, according to the author¹ of the species, in all respects similar to the type from the Philippine Isles excepting that the spire is a little shorter. I have neither seen this nor can I find its exponent in the Museum.

38. DRILLIA NITENS (Hinds).

Clavatula nitens, R. B. Hinds, Moll. Voy. Sulphur, 1844, p. 20, pl. vi, f. 17.

Pleurotoma ,, Reeve, Conch. Icon., vol. i, 1845, pl. xxii, f. 189.

Mangilia ,, Tryon, Man. Conch., vol. vi, 1884, p. 253, pl. xx, f. 2.

P.G. Dabai. Diamanayat Island, 20 fathoms.

I. Lat. 18° 58' N., long. 71° 45' E., 40 fathoms.

Our specimens are only half the size, longitudinally, of the fine shell figured by Reeve from New Guinea. The discoverer, R. B. Hinds, also found it plentiful in Celebes and at Malacca, from 7 to 22 fathoms. Our examples vary in body-colour from shining white to umber-brown. All are very shining, and, as Reeve remarks, it is "a characteristic and well-defined species". It appears in Hedley's Queensland list, and likewise in that of Hidalgo, from the Philippine Isles.

39. DRILLIA OBLIQUATA (Reeve).

Pleurotoma obliquata, Reeve, Proc. Zool. Soc. Lond., 1845, p. 115.

Reeve, Conch. Icon., vol. i, 1845, pl. xxix, f. 262.

Drillia ,, Tryon, Man. Conch., vol. vi, 1884, p. 203, pl. xi, f. 1.

P.G. Henjam Island, at 10 fathoms (1906).

M.C. Charbar, 10 fathoms. Local, but widely spread over the Mekran coast.

I. Karachi, at 5 fathoms. Amongst loose stones, etc.

The range of this species, distinguished by its heavy growth and few oblique ribs, extends from the Persian Gulf to Ceylon, Singapore, Malayana, and as far as Japan. It is a well-marked shell. This, and perhaps *nitens* also, might with propriety be transferred to *Tylotia*.

40. DRILLIA OMANENSIS, Melv. & St.

Drillia omanensis, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 438, pl. xxiv, f. 1.

P.G. Gulf of Oman, lat. 24° 55' N., long. 57° 59' E., 37 fathoms, sand and mud. Also at 110 fathoms.

M.C. Jask, 170 fathoms (1909).

¹ Ann. Mag. Nat. Hist., ser. VII, vol. xviii, 1906, p. 164.

The delicate spiral liræ, very close and fine, distinguish this species from its nearest allies. The canal is slightly produced, ribs stouter and straighter than in the allied *D. clydonia*, Melv. & St. It is not an uncommon species, though endemic.

41. DRILLIA PERSICA (Sm.). (Pl. IX, Fig. 6.)

Pleurotoma (Drillia) persica, E. A. Smith, Ann. Mag. Nat. Hist., ser. vi, vol. ii, 1888, p. 307.

” ” ” Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 439, pl. xxi, f. 14 (type).

P.G. Henjam Island. Fao. Bushire, at about 10–12 fathoms, Gulf of Oman, Muscat, 20 fathoms, not uncommon. Off Diamanayat Island, 100 miles south of Jask, at 20 fathoms.

I. Karachi, 5–15 fathoms, in thick clayey mud. Also reported from New Caledonia by Bouge & Dautzenberg.

See the remarks (*ante*, p. 154) under *lucida*, G. & H. Nevill. Mr. Edgar Smith gives 9 mm. as maximum length of this species, as against 7.5 mm. in *dissecta*, its very near ally, and which we have sunk as an absolute synonym of *lucida*, Nev. A dwarf form, however, exists, 6 mm. only in length, from the Gulf of Oman (lat. 25° 6' 5" N., long. 60° 39' E.). The specimens are bright brownish-pink, very shining. It may not perhaps have attained quite full growth, although the outer lip is fairly formed. It is quite distinct from *granatella*, Melv. A much larger and very beautiful variety seems worthy of a varietal name as follows:—

Var. *jacintha*, nov. (Pl. IX, Fig. 8.)

Shell brilliantly shining, fusiform, somewhat attenuate, white, the interstices deeply shaded with brown-pink, much larger than the typical form—say, long. 14, lat. 4.50 mm.

From the Persian Gulf.

If it were not for intermediates, this might be considered a fitting claimant for true specific rank.

42. DRILLIA PHILOTIMA, Melv. & St.

Drillia philotima, Melvill & Standen, Ann. Mag. Nat. Hist., ser. vii, vol. xii, 1903, p. 311, pl. xxii, f. 16.

P.G. Off the Bahrein Islands, 30–50 fathoms. Muscat, 7–30 fathoms.

A most graceful species, elegantly fusiform, scabrous, many-ribbed, white, tinted with madder brown or chestnut, its nearest ally being *D. dives*, Melv. & St., from the same seas. It has but rarely occurred, and, so far as is known, is endemic in this region.

43. DRILLIA PRUNULUM, Melv. & St.

Drillia prunulum, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 439, pl. xxiv, f. 2.

P.G. Henjam Island, Koweit, 10 fathoms. Gulf of Oman, Muscat, 15 fathoms.

I. Karachi (September, 1910).

A plum-coloured shell, larger in all its parts than *inconstans*, Sm., being of the same alliance. The largest specimen I have seen measures long. 18 mm. as against 8.50 mm. in *inconstans*. Indeed, the type of the latter only measures 5 mm.

The nearest ally seems *D. radula*, Hinds (Moll. Voy. *Sulphur*, 1844, p. 16, pl. v, f. 9), from the Straits of Malacca and Australia (Queensland), well figured by Reeve (Conch. Icon., pl. xxv, f. 223). The nodules in *radula* are shining white, contrasting with the dark-brown body-colour. I have examples from the Lombe Taylor Collection. It is larger (long. 20 mm.) and coarser in its sculpture than *prunulum*, the largest specimen of which that we have seen comes from Koweit, and measures long. 15 mm. The noduled riblets are here almost twice the number of those obtaining in *radula*. Notwithstanding this, doubtless *inconstans*, *lithoria*, *prunulum*, *pyramidula*, and *radula* have many characters in common, and probably spring from a common ancestor.

44. DRILLIA PYRAMIDULA (Reeve). (Pl. X, Fig. 2.)

Pleurotoma pyramidula, Reeve, Proc. Zool. Soc. Lond., 1845, p. 115.

„ „ Reeve, Conch. Icon., vol. i, 1845, pl. xxix,
f. 260.

Clathurella „ Melv. & St., Proc. Zool. Soc. Lond., 1901, p. 445.

P.G. Koweit, 10 fathoms. Henjam Island, Muscat, 10 fathoms.
Kuh i Mubarik, 45 fathoms.

M.C. Charbar, 40 fathoms.

So allied to *inconstans*, Smith, that I have caused the two to be figured in approximation to each other, to show the chief distinctions, which are: (a) in form, the present species tapering gradually to the apex, whilst *inconstans* is of more abbreviate build. Again (b), the spiral nodules so conspicuous a feature in Smith's species are hardly present in its ally, *pyramidula* being, to quote the words in the original description, "pyramidally elongated, very closely latticed with minute longitudinal and transverse ridges." The second and third nuclear whorls are carinate.

45. DRILLIA RESPLENDENS, Melv.

Drillia resplendens, Melvill, Mem. Manch. Soc., vol. xlii, 1898, No. 4,
p. 11, pl. ii, f. 8.

„ „ Melv. & St., Proc. Zool. Soc. Lond., 1901, p. 439,
pl. xxi, f. 11.

P.G. Muscat, 7-10 fathoms. Gulf of Oman, lat. 24° 55' N., long. 57° 59' E., 37 fathoms, sand and mud, only in young condition.

On the telegraph cable in three or four places amongst shell and other growths it attains a fair size (20-2 mm.), and is remarkably polished and fine in deep red-brown colour. An albino variety occurred off Muscat. A very bright and beautiful species, one of the most admired of the genus, and belonging to the same section of the genus as *lucida*, Nevill, and *persica*, Sm., the variety *jacintha* of which, just described above, almost exceeds *resplendens*, if possible, in select elegance.

46. DRILLIA ROBUSTA (Hinds).

Clavatula robusta, Hinds, Moll. Voy. *Sulphur*, 1844, p. 17, pl. v, f. 12.
Pleurotoma ,, Reeve, Conch. Icon., vol. i, 1845, pl. xxiii, f. 204.

P.G. Bahrein Isles.

We enter this with a degree of doubt. Only one specimen occurred, which probably belongs to this species, but its condition is not good. The type came from Hong-Kong Island (Hinds). Hidalgo mentions it as an Australian shell, probably not occurring in the Philippines.

47. DRILLIA SINENSIS (Hinds).

Clavatula sinensis, Hinds, Proc. Zool. Soc. Lond., 1843, p. 38.

Pleurotoma ,, Reeve, Conch. Icon., vol. i, 1843, pl. xviii, f. 153.

P.G. Mussandam, 45 fathoms (1915), a white variety. Muscat, 20-40 fathoms (1912), finely coloured live varieties.

M.C. Rare, an attenuate variety, occurs occasionally at 10-15 fathoms, near Gwadûr.

I. Karachi. Young examples only, dredged living.

A very well-marked species, well figured by Reeve. Originally described from the China Sea and Straits of Macassar, found at depth of from 5-25 fathoms.

I may add that Tryon¹ is in complete error in attempting to merge *Pl. intertincta*, Smith, with this species. There could hardly be two *Drillia* more dissimilar.

Hidalgo includes it in his Philippine Catalogue, and Hedley notes it from Queensland.

48. DRILLIA SPECTRUM (Reeve).

Pleurotoma spectrum, Reeve, Proc. Zool. Soc. Lond., 1845, p. 113.

,, ,, Reeve, Conch. Icon., vol. i, 1845, pl. xxv, f. 222.

P.G. Malcolm Inlet (Kubbatt Ghazira), 35 fathoms.

Gulf of Oman, lat. 26° 10' N., long. 52° 50' E., 29 fathoms, none living, mud and rocky basis.

These specimens are placed under *spectrum* with just a little doubt. They agree up to a certain point, and it was thought best to allow for a certain percentage of variability. The original examples, collected by Mr. Hugh Cuming at Puerto Galero, I. Mindoro, Philippines, are described as of thin texture; also as "a pale obliquely plaited shell minutely and delicately ridged across".

49. DRILLIA TASCONIUM, Melv. & St.

Drillia tasconium, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 440, pl. xxiv, f. 3.

P.G. Gulf of Oman, lat. 24° 55' N., long. 57° 59' E., 37 fathoms, sand and mud. Also a variety at Kuh i Mubarik (1894).

Near Jask, at 175 fathoms, fine, live examples (1912).

A curious species, isolated in appearance and character. At the time of description we compared it with the figure of *D. lucida*,

¹ Man. Conch., vi, p. 201.

G. & H. Nevill, misled by the highly magnified scale of the illustration. Our species is four times the size, say long. 28 mm.

D. pallida, Sowb., of which I possess a beautiful example from Central American shores, is also comparable, but it is not only smaller, whilst the costæ of the body-whorl are oblique, and the form more attenuate. *D. tasconium* is very liable to sea-breaks and slight distorsion, consequently it is not very easy to secure a really good-conditioned specimen.

50. DRILLIA TAYLORIANA (Reeve).

Pleurotoma tayloriana, Reeve, Conch. Icon., i, 1846, pl. xl, f. 366, a, b.

P.G. Gulf of Oman, Muscat, 15-40 fathoms. Also in the Persian Gulf proper, Shaikh Shuaib Island, 10 fathoms, fine examples.

Our specimens are precisely similar in every way to the type so excellently portrayed by Reeve. *D. variabilis*, Sm., *theoreta*, Melv., and *topaza*, Melv. & St., are the nearest allies. Hidalgo notes it as found by Quadras in the Island of Cebu, Philippines. Hedley, too, notes it from Queensland.

51. DRILLIA THEORETA, Melv.

Drillia theoreta, Melvill, Ann. Mag. Nat. Hist., ser. VII, vol. iv, 1899, p. 85, pl. i, f. 2.

P.G. Henjam Island, 20-25 fathoms, and a small brightly coloured variety at 10 fathoms. Shaikh Shuaib Island, Kishm, and other islands in the Gulf, seemingly generally distributed.

Smaller in all its parts, and with the whorls far less ventricose than obtains in *D. tayloriana*, Reeve; also some affinity with *D. cecchi*, Jous., is observable, but this species is always much paler and with little trace of pattern, the spire is likewise more attenuate, and it has more the character of an abyssal species.

52. DRILLIA TOPAZA, M. & St.

Drillia topaza, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 440, pl. xxiv, f. 4.

P.G. Gulf of Oman, Muscat, 15-20 fathoms.

An ally of *D. theoreta*, Melv., but much smaller, and with mamillate protoconch. The longitudinal ribs are very few, only six round the body-whorl. The coloration is also peculiar, reddish-pink and dark purplish-red beyond the sinus and round the mouth. It is a rare species, and decidedly local in its distribution.

53. DRILLIA VARIABILIS, Sm. (Pl. VIII, Fig. 8.)

Drillia variabilis, E. A. Smith, Ann. Mag. Nat. Hist., ser. IV, vol. xix, 1877, p. 495.

D. variabilis, Proc. Zool. Soc. Lond., 1878, p. 805, pl. l, f. 2, 3.

P.G. Off Dabai, among the pearl oyster beds at 6 to 8 fathoms. Gulf of Oman, lat. 23° 50' N., long. 27° 50' E., soft mud. And also lat. 26° 6' N., long. 51° 52' E., 15 fathoms, coral sand.

I. Telegraph cable at 47 fathoms 100 miles west of Bombay. Small examples near the mouth of the River Indus, Karachi.

This species has likewise been received from Andaman Isles (Booley),¹ whence indeed the original type came. It is also reported from Erythræan waters. We have figured the type, representing a much broader shell than is the case with its congeners, *tayloriana*, Rve., and *theoreta*, Melv. The examples I received from the late Mr. G. Booley, just mentioned, are pale in colour, freckled with pale brown, and echinately noded.

§ Subgen. TYLOTIA, nom. nov. (=CLAVUS, auctt. non Montfort, 1810).

Mr. Iredale assures me it is antagonistic to the laws of priority to continue using the name "*Clavus*" subgenerically, it having been published by Montfort twenty-eight years earlier for a different group than the accepted generic "*Drillia*", Gray, 1838. Accordingly, a new cognomen being necessary, I venture to propose *Tylotia*, which, being derived from *τύλος*, a nail or club, has the same meaning as *Clavus*. The type appears to be *canicularis*, Bolt. = *auriculifera*, Lam.

54. DRILLIA (TYLOTIA) CANICULARIS (Bolt.).

Strombus lividus, Chemnitz, Conch. Cab., ix, 1786, pl. 136, f. 1269-70.

" " Gmelin, Linn. Syst. Nat., 13th ed., tom. i, pt. vi, 1791, p. 3523.

" *canicularis*, Bolten, Mus. Boltenianum, 1798, p. 100, No. 1291.

Pleurotoma auriculifera, Lamarck, Anim. sans Vert., vol. vii, 1822, p. 91.

" " Reeve, Conch. Icon., vol. i, 1843, pl. viii, f. 69.

I. Bombay (Abercrombie).

Originally described from the Philippines, the present record shows considerable extension of range westward. It has not occurred yet further north.

Mr. C. Hedley² uses Gmelin's name; but Iredale³ does not agree with this, and writes exhaustive reasons in favour of Bolten's name being employed. I am very grateful to Mr. Iredale for the advice he has given me on this subject. This species I consider the type of the section.

55. DRILLIA (TYLOTIA) CRASSA (Sm.). (Pl. VIII, Fig. 10.)

Pleurotoma (Drillia) crassa, E. A. Smith, Ann. Mag. Nat. Hist., ser. vi, vol. ii, 1888, p. 301.

P.G. Muscat. Gulf of Oman, Jask.

I. Bombay (Abercrombie).

This species might, perhaps, be occasionally confused with *sacra*, Reeve; the author, in comparing the two, mentions the violet apex of *crassa*, and its "fewer ribs which are angled, and the upper ends

¹ Proc. Malac. Soc. Lond., vol. ii, 1897, p. 166.

² Proc. Linn. Soc. N.S.W., vol. xxxiv, 1909, p. 453.

³ Proc. Malac. Soc. Lond., vol. xii, 1916, p. 92.

of them not nodose at the suture, the coloration also being different in the two forms". It is a species of fair size, between 20 and 25 mm. longitudinally.

56. DRILLIA (TYLOTIA) FUCATA (Reeve).

Pleurotoma fucata, Reeve, Proc. Zool. Soc. Lond., 1845, p. 110.

" " " Conch. Icon., vol. i, 1845, pl. xx, f. 169.

" " " Tryon, Man. Conch., vol. vi, 1884, p. 189,
pl. xi, f. 86, 93.

" " " Bouge & Dautzenberg, Journ. de Conch.,
tom. lxi, 1914, p. 138.

I. Karachi, 5 fathoms, loose stones and mud.

I am not quite satisfied about the identification of this species, which occurred in Mr. Townsend's earliest gatherings at Karachi, but has not been met with since. It may be a form of *unizonalis*, Lam. Reeve did not know the locality of this species, but Tryon gives "West Indies", and it is also reported from New Caledonia by Bouge & Dautzenberg, who also give St. Jan, Antilles (Kobelt), South Africa (v. Martens), Oshima, Japan (Hirase), as stations for its occurrence.

57. DRILLIA (TYLOTIA) PRÆCLARA (Melv.).

Pleurotoma (Clavus) præclara, Melvill, Mem. & Proc. Manch. Soc., ser. iv, vol. vii, 1893, p. 1, pl. i, f. 2.

I. Bombay, up the coast (Abercrombie).

This large and conspicuous species is rare in its only known locality, and has not yet been found excepting in rather worn condition. It is 44 to 45 mm. in length by 16 in breadth. It seems undoubtedly a member of the sub-genus *Tylotia*.

58. DRILLIA (TYLOTIA) SACRA (Reeve).

Pleurotoma sacra, Reeve, Proc. Zool. Soc. Lond., 1845, p. 111.

" " " Conch. Icon., vol. i, 1845, pl. xxi, f. 183.

P.G. Shaikh Shuaib Island. Gulf of Oman, Muscat.

I. Karachi, local at 3-7 fathoms. Bombay (Abercrombie).

Some of our examples exceed the specimen figured by Reeve, and others possess a darkish slate-coloured fascia around the centre of the body-whorl, but otherwise the species does not vary much. Till recently the locality was unknown. A fine example I possess, which was received from the late Dr. J. C. Cox, is 1½ inches in length.

59. DRILLIA (TYLOTIA) UNIZONALIS (Lam.).

Pleurotoma unizonalis, Lamarek, Anim. sans Vert., vol. vii, 1822, p. 92.

" " " Reeve, Conch. Icon., vol. i, 1843, pl. xiii, f. 113.

Drillia (Clavus) unizonalis, Tryon, Man. Conch., vol. vi, 1884, p. 185,
pl. ix, f. 38.

P.G. Malcolm Inlet (Kubbatt Ghazira).

There is an element of doubt about the two or three examples recorded from the above locality. They were not very characteristic. The range of this species is wide throughout the tropics, embracing New Caledonia, Fiji, the Philippines, Solomon Isles, etc. By

Bouge & Dautzenberg¹ it is considered merely an unarmed variety of *Drillia (Tylotia) canicularis* (Bolt.).

II. Sub-family CLAVATULINÆ.

Genus ORTHOSURCULA, Casey, 1904.

60. ORTHOSURCULA AUSTRALIS (Roissy).

Murex turris australis, Chemnitz, Conch. Cab., vol. xi, 1795, pl. cx, f. 1827-8.

Pleurotoma australis, Roissy, Hist. nat. Moll. [suite à Buffon], vol. vi, 1805, p. 72.

” ” Kiener, Icon. Coq. viv., 1839, p. 6, pl. iv, f. 1.
Surcula ” Tryon, Man. Conch., vol. vi, 1884, p. 236, pl. ii, f. 9, and pl. v, f. 58.

Orthosurcula ” T. L. Casey, Trans. Acad. Sci. St. Louis, vol. xiv, 1904, p. 151.

I. South of Bombay (Lieut.-Col. Henry D. Olivier).

The headquarters of this species are China and the Philippine Isles; it has not yet been found in the Persian Gulf area proper. Casey, in subdividing the group, considers the types of his *Orthosurcula* to be the Upper Eocene species, *Pleurotoma longiforma*, Aldrich, and *Surcula transversaria*, Lamarck.

Genus SURCULA, H. & A. Adams, 1853.

61. SURCULA CATENA (Reeve).

Pleurotoma catena, Reeve, Conch. Icon., i, 1843, pl. v, f. 36.

P.G. Gulf of Oman, Muscat, 20-40 fathoms. April, 1912.

M.C. Charbar. In young condition 5-10 fathoms, fine adult examples 20-30 fathoms; all on soft muddy bottom.

A very select form, which apparently finds its headquarters in these seas. The largest example dredged off Muscat measures in length 71 mm.

This exceedingly beautiful species is allied to *fulminata*, Kien. Found also at Aden (Shopland).

62. SURCULA CINGULIFERA (Lam.).

Pleurotoma cingulifera, Lamarck, Anim. sans Vert., vol. vii, 1822, p. 94.

” ” Reeve, Conch. Icon., vol. i, 1843, pl. i, f. 1.

P.G. Generally distributed in the Gulf, extending to the Gulf of Oman, 5-10 fathoms, sandy mud. The largest example, 1 $\frac{5}{8}$ inches in length, occurred in lat. 26° 50' N., long. 54° 50' E. It extends to the Philippines (Hidalgo).

Var. *amicta*, Sm.

Pleurotoma amicta, E. A. Smith, Ann. Mag. Nat. Hist., ser. iv, vol. xix, 1877, p. 488.

P.G. Gulf of Oman, off Jask, 180 fathoms, 1914.

I. Bombay (Abercrombie); Bassein Harbour as far south as Goa (Lieut.-Col. H. D. Olivier). This was first described from the Hawaiian Islands, and is reported from Aden (Shopland).

¹ Journ. de Conch., tom. lxi, 1913, p. 136.

63. *SURCULA FULMINATA* (Kien.).

- Pleurotoma fulminata*, L. C. Kiener, Coq. Viv., 1839, pl. x, f. 2.
 ,, ,, Reeve, Conch. Icon., vol. i, 1843, pl. v, f. 37.
 ,, *tornata*, Dillwyn, var. *fulminata*, Tryon, Man. Conch.,
 vol. vi, 1884, p. 237, pl. vi, f. 81.

P.G. Mussandam, 27 fathoms. Gulf of Oman, Muscat, 5-10 fathoms; lat. 25° 32' N., long. 57° 47' E., 175 fathoms. Off Kuh i Mubarik, 25 miles west of Jask, 1914.

M.C. Generally distributed.

I. Karachi. Bombay (F. W. T.) (Abercrombie); Bassein and Bombay Harbour southwards to Goa (Olivier). It is also reported as far east as Java.

Var. *gloriosa*, nov. (Pl. VIII, Fig. 11.)

Testa breviter fusioidea, obesa, lævi, undique leviter arcte spiraler striatula, anfractibus 9-10, quorum supernis duobus hyalinis, lævissimis globulosis, his proximis tribus minute spiraler gemmatis, cæteris turrito-gradatis, infra suturas transversa callositate prominula præditis, deinde paullum excavatis, ultimo lævi, infra peripheriam multilirato, superficie brunneo vittata, et lineis fulgetrinis vel maculis conspersis decorata, apertura oblonga, alba vel pallide straminea, labro tenui, sinu lato, haud profundo, canali breviter producto. Long. 44, lat. 20, sp. max.; long. 40, lat. 16, sp. min.

P.G. Basadu. Jask, found on the beach.

Two specimens only, almost precisely similar, have as yet occurred of this form. The first, from Basadu, was the smaller, but more perfect as regards the nuclear whorls, the latter possessing the finer coloration.

Mr. Edgar Smith, who only examined the Basadu shell, expressed to me the opinion that it might be only a monstrous squat form of *fulminata*, but the discovery of a second shell emboldens me to propose for it varietal rank. It is wonderfully like *Perrona obesa* (Reeve) in form, and that is given undoubted specific status. At all events it is a handsome addition to the genus, its symmetry is admirable, and, should large suites of specimens occur in the future, recognition of its specific merits would undoubtedly have to be seriously considered.

64. *SURCULA HALICYRIA*, Melv.

Surcula halicyria, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 164, pl. x, f. 16.

P.G. Gulf of Oman, lat. 24° 49' N., long. 58° 56' E., 228 fathoms, mud bottom (October 26, 1900).

Unique at the present time, the type being in the National Collection. Allied to *S. undatiruga*, Biv., from the Mediterranean Sea, from which, however, it differs altogether in sculpture.

65. *SURCULA JAVANA* (L.).

Murex javanus, Linnæus, Syst. Nat., 12th ed., 1767, p. 550.

Pleurotoma nodifera, Lamarck, Anim. sans Vert., vol. vii, 1822, p. 96.

,, ,, Reeve, Conch. Icon., vol. i, 1843, pl. iv, f. 28.

I. Karachi, rare. Bombay (Abercrombie), cast ashore very

frequently, and often in good condition, after stormy weather, thence southward to Goa and Panjim (Lieut.-Col. Henry D. Olivier).

As found out by Mr. Sylvanus Hanley when investigating the actual types of Linnæus, this species must bear the name *javana*, in contradistinction to the species that formerly held it on false premises. That known now as *tornata*, Dillwyn, is an almost entirely smooth shell, while the one under discussion exactly conforms to Linnæus' description in the *Systema Naturæ*, as follows:—

“*javanus*. M. testa turrata cingulis nodosis immaculatis labro sinu separato. Habitat in Javâ, Noordgren. Simillimus M. *babylonico*, sed albus, immaculatus. Anfractus substriati, cincti carina vel tuberculis nodosi vel angulati.”

Dredged off the Philippine Islands (Watson), and fairly distributed in Java and the Eastern Archipelago.

66. SURCULA NELLÆ (Sm.). (Pl. VIII, Fig. 2.)

Pleurotoma nellæ, E. A. Smith, Ann. Mag. Nat. Hist., ser. IV, vol. xix, 1877, p. 489.

P.G. Locality not specified, dredged alive rarely.

I. Karachi.

This was at first placed by me in the sub-genus *Gemmula*, but its similarity to *S. tuberculata*, Gray, is so great that I have transferred it as above. It is a beautiful species, and the author remarks thus upon it: “A form of charming shape and purity, with whorls strongly excavated above, and a row of upright oblong tubercles encircling their bases, and two small contiguous keels around them just below the suture.” This type is Mauritian, and now figured for the first time. I suspect it to be a pale-white (occasionally suffused with lilac) deep-sea variety of the stouter and coarser *tuberculata*, Gray.

67. SURCULA TUBERULATA (Gray).

Pleurotoma tuberculata, Gray, Zool., Beechey's Voyage, 1839, p. 120.

” ” ” ” Reeve, Conch. Icon., vol. i, 1843, pl. ix, f. 72.

Surcula ” ” Tryon, Man. Conch., vol. vi, 1884, p. 237, pl. v, f. 66, 67.

P.G. Henjam Island, Gulf of Oman, Muscat.

M.C. A common species at 5–30 fathoms, soft mud, the most perfectly developed specimens coming from the greater depth.

I. Bombay (Abercrombie). Very worn specimens, at first confused with *Clavatula virginea*, Beck, a West African species.

This seems locally very abundant. It extends to China on the east, and to Aden on the west.

Surcula repallida, von Martens, described as a *Leucosyrinx*,¹ came from Aden; and has since been dredged at 300 fathoms off the Coromandel Coast by the *Investigator*.² Accordingly it probably will be found to occur in the Gulf of Oman.

¹ Deutsch. Tief See Exped. *Valdivia*, vol. vii, p. 80, pl. ii, f. 6.

² Ann. Mag. Nat. Hist., ser. VII, vol. xviii, p. 162 (1906).

Genus CLAVATULA, Lamarck, 1801.

68. CLAVATULA BIMARGINATA (Lamk.).

Pleurotoma bimarginata, Lamarck, Anim. sans Vert., vol. vii, 1822,
p. 83.

” ” Reeve, Conch. Icon., vol. i, 1843, pl. v, f. 34.
P.G. Gulf of Oman, Jask beach.

As Lovell Reeve aptly remarks, the salmon-pink hue of this species is unique in the genus.

The west and south coasts of Africa are the usual habitats of the group of nearly allied species to which this belongs. Tryon¹ indeed merges them *all* under the collective name of *muricata*, Lamk.

69. CLAVATULA NAVARCHUS, Melv. & St.

Pleurotoma (Gemmula) navarchus (Melvill & Standen), Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 310, pl. xxi, f. 15.

Clavatula navarchus, E. A. Smith, Ann. Mag. Nat. Hist., ser. VII, vol. xviii, 1906, p. 160.

P.G. Gulf of Oman, lat. 25° 19' N., long. 58° 10' E., 140 fathoms. Off Jask at 175 fathoms.

M.C. Between Charbar and Jask, dredged at 90–200 fathoms, in company with *Conorbis coromandelicus*, Sm., and *Rostellaria delicatula*, Nevill.

This magnificent species is now, we consider, placed in its correct genus and sequence. One specimen is 3 inches in length. Excepting in size, there seems no variation. It also was dredged by the *Investigator* Expedition, at Station 258, west of Travancore, 102 fathoms, sand. And Mr. E. A. Smith remarks that “the operculum is rather thick, semi-oval, 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”.²

III. Sub-family MANGILINÆ.

Genus MANGILIA, Risso, 1826.³

70. MANGILIA ADAMANTINA, Melv.

Mangilia adamantina, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 165, pl. x, f. 18.

P.G. Mussandam, 55 fathoms. Henjam Island. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms; and lat. 24° 54' N., long. 57° 55' N., 205 fathoms, mud.

¹ Man. Conch., vol. vi, 1884, p. 229.

² Ann. Mag. Nat. Hist., ser. VII, vol. xviii, 1906, p. 100.

³ This genus was named by Risso after Mangili, the Italian zoologist. He unfortunately wrote it at first *Mangelia*, afterwards correcting this and giving it as now usually spelt.

M.C. Off Charbar, common, 40 fathoms.

A constant species, fairly widely distributed, gregarious and plentiful where found; easily recognizable, being small, of lozenge shape, white, with a single spiral keel, moderately ribbed longitudinally, and crossed with apical lines, apical whorls vitreous, globular, swollen, and proportionately large.

71. *MANGILIA ALBATA* (Sm.). (Pl. IX, Fig. 3.)

Pleurotoma (—?) *albata*, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. x, 1882, p. 210.

P.G. Henjam Island, 10 fathoms (1906); Linjah Anchorage, 7–15 fathoms, rarely; Mussandam, 55 fathoms; Gulf of Oman, Muscat.

M.C. Charbar, 10 fathoms.

A small hexagonal species, local, but frequent where it does occur. There was, however, no sign of it in the prolific dredging at 156 fathoms in the Gulf of Oman, though *quisquilia*, its ally, occurred there commonly. The author of the species experienced doubts as to its position, but I think *Mangilia* is the best genus for its reception, at all events until the wished-for revision of this vast family can be undertaken. The nuclear whorls are smooth, white, third whorl centrally angled.

72. *MANGILIA ALBOLABIATA* (Sm.). (Pl. VIII, Fig. 13.)

Pleurotoma (*Mangilia*?) *albolabiata*, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. xiv, 1882, p. 321.

P.G. Coll. Pelly (Type in the British Museum). Also off Henjam Island, 15–20 fathoms, mud.

M.C. Charbar.

I. Karachi; Bombay (Abercrombie), in shell sand, mostly worn.

b. chilosema, Melv.

Mangilia chilosema, Melvill, Ann. Mag. Nat. Hist., ser. vii, vol. iv, 1899, p. 85, pl. i, f. 3.

M.C. Charbar, 40 fathoms, and at several places off the coast of Baluchistan, at 10–15 fathoms.

I. Karachi, exceedingly abundant among loose rocks, sand, and mud at low tide.

The affinities of this species and its variety lie with the New Caledonian *M. himerta* and *himerodes*, Melv. & St., and likewise with *M. vauquelini*, Payr., from the Mediterranean region. Typical *albolabiata* measures 4.5 mm. longitudinally, as against 7 to 9 or even more in the variety. As will be seen by the figure, the outer lip of the type, though apparently mature, is hardly expanded, and the sinus is obscure. *Chilosema*, on the other hand, as originally described, has both these characters well portrayed; a certain angularity likewise is conspicuous in the upper part of each whorl.

Still, the forms occurring so much together, with intermediates, compel the grouping together of two extreme forms.

The dull reddish central lateral and dorsal interrupted band is a guide to the species. Lastly, with regard to the nuclear whorls, the first two are smooth and white, the third slightly ventricose and cancellate. This would betoken alliance with *M. gracilentia*, Reeve, its variety *portia*, Sm., etc.

73. *MANGILIA ALTICOSTATA*, Sowb.

Mangilia alticostata, G. B. Sowerby, Proc. Malac. Soc. Lond., vol. ii, 1896, p. 31, pl. iii, f. 16.

P.G. Henjam Island, 10 fathoms. Khor Khawi, 12 fathoms, coral sand (March 19, 1909).

The specimens from the first locality agree with those received "ex auctore" from St. Vincent's Gulf, South Australia. It is nearest to *M. ichthys*, Melv., but far more elongate, 9-whorled in the largest example examined. The type is pure white; but from Khor Khawi came an interesting variety with spiral interrupted brown band in the interstices between the costæ of the two last whorls, and on the body-whorl, in addition to this, a second central conspicuous brown band, better defined than the others. This might be called var. *fasciata*.

74. *MANGILIA ANARITHMA*, Melv.

Mangilia anarithma, Melvill, Proc. Malac. Soc. Lond., vol. x, 1912, p. 251, pl. xi, f. 12.

M.C. Charbar, 40-3 fathoms.

The ribs are more rounded and thicker than is the case with *M. zebuensis*, Reeve, which seems its near ally. The two apical whorls are smooth and white, the third longitudinally lirulate, sinus hardly expressed. Local, but common where it occurs.

75. *MANGILIA APOLLINEA*, Melv.

Mangilia apollinea, Melv., Proc. Malac. Soc. Lond., vol. vi, 1904, pl. x, f. 20.

P.G. Muscat, 10-20 fathoms. Henjam Island, 10 fathoms. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

M.C. Charbar, 40 fathoms.

Allied nearly to *M. infulata*, Hedley, from Australian waters.¹ *M. polita*, Hinds, *ebur*, and *opalus*, both of Reeve, are likewise of the same alliance.

The single conspicuous central spiral keel, crossing the ribs at right angles, and bearing a beaded gemmule at each point of junction, is a distinguishing feature of this very beautiful little *Mangilia*. The surface is otherwise completely smooth and shining. The distribution is mainly identical with that of *M. adamantina*, Melv.; the apical whorls are much smaller than in that species, though equally smooth and white. Dredged during the "Siboga" expedition at Great Kei Island (Schepman).

¹ Proc. Linn. Soc. New S. Wales, vol. xxxiv, 1909, p. 457, pl. xlv, f. 92.

76. *MANGILIA ARCTA* (Sm.). (Pl. IX, Fig. 10.)

Pleurotoma (*Daphnella*?) *arcta*, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. xiv, 1884, p. 325.

P.G. Type in British Museum collection.

A narrow cytharoid species, evidently a near ally of the protean *M. gracilentata*, Reeve; the granulately cancellate third whorl hints at identity with this, and also the form of the mouth and outer lip. But the mature shell is more abbreviate and considerably smaller. As the author points out, there is much variation in the colour; some specimens are white, others reddish, and we have examples from Hong-Kong of a dark greenish brown.

77. *MANGILIA AVERINA*, Melv. & St.

Mangilia averina, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 441, pl. xxiv, f. 15.

I. Karachi.

An ally of *M. fairbanki*, G. & H. Nevill, *heptagona*, Dkr., *horneana*, Sm., etc. Pure white, with strong ribs, crossed by alternate strong or weak liræ, gemmuled at the points of junction. The type has the outer lip and columellar margin suffused with orange, but I have seen a variety with white lip and columella.

78. *MANGILIA BARBITON*, Melv.

Mangilia barbiton, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 166, pl. x, fig. 21.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

This species seems a link between *Mangilia* and *Cythara*, but is most probably placed correctly under the former name. A slight alliance with the rare *M. bathmis*, Melv., may also be traced; but this species is more gradate, and the sculpture is different.

79. *MANGILIA BATHMIS*, Melv.

Mangilia bathmis, Melvill, Proc. Malac. Soc., vol. vi, 1904, p. 57, pl. v, f. 4.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

Allied to *M. barbiton*, Melv., but the longitudinal ribs are far more incrassate, and it differs from *M. horneana*, Sm., in the canal being much more produced and the spiral ribs prominent. A very rare species.

80. *MANGILIA CALLICREDEMNA*, sp. nov. (Pl. X, Fig. 12.)

M. testa minuta, alba, fulgida, ovato-fusiforimi, anfractibus 8, quorum duo apicales vitrei, perleves, duobus his proximis levibus, unicarinatis, cæteris quatuor suturaliter profunde impressis, ad medium angulatis, et longitudinaliter costulatis, costis incrassatis, levibus, ad angulum nodulosis, ultimo biangulato, binis ordinibus nodularum ad juncturas costarum ornato, deinde ad basim fortiter striato, striis ad 8-9, apertura oblique ovata, labro tenui, sinu

perobscuro, margine columellari sinuata, canali lato, paullum producto. Long. 4·5, lat. 2 mm.

(καλλικρήθεμνος, with beautiful head band.)

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

Akin to *M. pupiformis*, Sm., this small novelty occurred sparsely with it. It differs in several particulars, notably in form, being far less attenuate and cylindrical, the median whorls are all strongly uniangulate, and the body-whorl is not so lengthened, proportionately, as is that of *pupiformis*.

81. MANGILIA DECIPIENS (Sm.). (Pl. VIII, Fig. 14.)

Pleurotoma (Mangilia) decipiens, E. A. Smith, Ann. Mag. Nat. Hist., ser. VI, vol. II, 1888, p. 312.

I. Bombay (A. Abercrombie), in shell sand, mostly worn.

The locality of the type is unknown. Nearly all the Bombay examples are worn and therefore not quite characteristic. The shell much resembles *M. albolabiata*, Sm., and may be a colourless variety of it. The three uppermost or nuclear whorls are described by the author as "leves"; this alone would distinguish it from its ally just mentioned, but all our specimens are beach-worn.

82. MANGILIA ERYMNA, sp. nov. (Pl. X, Fig. 6.)

M. testa minuta, crassa, corrugata, pallide punicea, anfractibus 5, quorum duo apicales semiplanati, leves, tertio globulari, arete cancellati, duobus ultimis rudicostatis, et spiraliter crassiliratis, numero costarum anfractus ultimi ad 10, lilarum ad 11, versus basim lira vel costa spirali fortiter prædita, deinde ad basim levi, sed multum incrassata, labro crasso, sinu obscuro vel absente, apertura anguste oblonga, canali brevissimo margine columellari obliquo, simplice. Long. 4, lat. 2 mm.

(έρυμνος, fortified.)

I. Bombay. Type in the British Museum.

A curious, thickened, somewhat corrugate shell, of a pale pink colour, very minute, the third apical whorl globular and closely cancellate, the two lower whorls coarsely ribbed and spirally lirate, the lowest lira on the body-whorl very strongly ridged, while below this to the base the shell is fairly smooth, the outer lip very thickened, sinus hardly expressed, columellar margin oblique, simple. Allied to *M. horneana*, Smith, etc.

83. MANGILIA FAIRBANKI, G. & H. Nev.

Mangilia fairbanki, G. & H. Nevill, Journ. As. Soc. Bengal, vol. XLIV, pt. II, 1875, p. 85, pl. VII, f. 2.

I. Karachi, fine and not infrequent. Bombay (Abercrombie).

Messrs. Geoffrey and Hugh Nevill give Ceylon and the Andamans as localities for this species, and compare it with its near ally *M. hexagonalis*, Reeve. The curious leaden-pink colour seems very characteristic, as also the attenuation of spire. The nuclear whorls are smooth, sinus white, shallow, sutural. Named after the

late Rev. S. B. Fairbank, one of the pioneers of Indian molluscan research.

84. *MANGILIA FORTISTRIATA* (Sm.). (Pl. VIII, Fig. 12.)

Pleurotoma (Mangilia) fortistriata, E. A. Smith, Ann. Mag. Nat. Hist., ser. vi, vol. ii, 1888, p. 313.

I. Bombay (Abercrombie).

Distinguished by its few, very incrassate longitudinal costæ, otherwise allied to *M. decipiens*, Sm. Apical whorls as in that species, smooth and polished. We have not seen it north of Bombay.

85. *MANGILIA FULVOCINCTA*, G. & H. Nev.

Mangilia fulvocincta, G. & H. Nevill, Journ. As. Soc. Bengal, vol. xlv, pt. ii, 1875, p. 85, pl. vii, f. 1.

P.G. Bushire (a dark variety); Henjam Island; Gulf of Oman, Jask, 1906.

I. Bombay (Abercrombie).

The authors also name Ceylon and Pooree as localities. A well-marked species, its nearest allies being *M. pellyi*, Sm., and *guerna*, Melv. The uppermost nuclear whorls are vitreous or white, third and fourth strongly keeled; the sinus to a great extent obsolete.

86. *MANGILIA GALIGENSIS*, Melv.

Mangilia galigensis, Melvill, Ann. Mag. Nat. Hist., ser. vii, vol. iv, 1899, p. 86, pl. i, f. 4.

P.G. Galig and Kharag Islands.

A handsome brownish species, allied to *M. townsendi*, Sowb., but differing in colour and the paucity, proportionately speaking, of longitudinal ribs. It has only been found on one occasion by Mr. Townsend.

87. *MANGILIA GRACILENTA* (Reeve). (Pl. IX, Fig. 12, var. *portia*, Smith.)

Pleurotoma gracilentia, Reeve, Proc. Zool. Soc. Lond., 1843, p. 184.

„ „ „ Conch. Icon., vol. i, 1843, pl. xiv, f. 114.

„ *contracta*, Reeve, Proc. Zool. Soc. Lond., 1843, p. 185.

„ „ „ Conch. Icon., vol. i, 1843, pl. xiv, f. 116.

Mangilia gracilentia, Reeve: Hedley, Proc. Linn. Soc. New S. Wales, vol. xxxiv, 1909, p. 456, pl. xlv, f. 91.

Paraclathurella gracilentia, Boettger, Nach. Deutsch. Malak. Gesell., Bd. xxvii, 1895, p. 56.

Pleurotoma (Drillia) portia, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. xi, 1884, p. 317.

? *Cythara elegantissima*, Melvill, Ann. Mag. Nat. Hist., ser. vii, vol. xii, 1903, p. 319.

P.G. Henjam Island; Mussandam, 30-55 fathoms; Koweit.

M.C. Gwadûr; Charbar, 40 fathoms.

Taking *M. contracta*, Reeve, which is evidently but a form of the widely spread *gracilentia* of the same author as an intermediate, I am forced to unite the *Pl. portia* of E. A. Smith. This seems to be the

commonest form in the Persian Gulf area, and its variety is great, both elongate and abbreviate forms occurring; others (as in the original type figured from the National Collection, which is that dredged by Sir Lewis Pelly in the Persian Gulf) have a wider mouth and sinus and shorter canal.

I suspect, too, that the shell described by me in 1903 as *Cythara elegantissima* is but another variety, and as such merge it provisionally.

M. gracilentia is placed in *Clathurella* by Hidalgo, in *Mangilia* by Hedley, in *Drillia* by Paetel. The peculiar swollen and cancellate third whorl are most distinctive, and when the time comes for the subdivision of these now much confused genera, I expect specific rank will be granted to the group ranged round this well-marked and widely distributed species, which is now only beginning to be understood, and to which will be relegated several other near allies, and consequently its synonymy will be extensive.

88. MANGILIA HORNEANA (Sm.). (Pl. IX, Fig. 15.)

Pleurotoma (Clathurella) horneana, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. xiv, 1884, p. 323.

P.G. Bushire.

I. Karachi. Amongst weed and rocks at low tide, locally most abundant, and probably extending much further south, to Ceylon and Madras.

The type is a gradate shell. The variety, with one or two more additional longitudinal costæ on each whorl, and closer, finer striation, may be thus characterized:—

Var. *compar*, nov. (Pl. X, Fig. 15.)

Testa ut in typo, sed nequaquam gradata, costis ad anfractus supernis magis numerosis, simul ac liris spiralibus tenuissimis, labro extus planato.

P.G. M.C. Fairly distributed.

Long. 8, lat. $3\frac{1}{2}$ mm.

This smoother variety is more abundant than the type, as will be seen on reference to the original description, and we think it is a pity it was not taken as the leading exponent of the species. It is also larger than the type, now figured from the collection of the British Museum.

89. MANGILIA HEPTAGONA (Dkr.). (Pl. IX, Fig. 14.)

Clathurella heptagona, Dunker, Malak. Blätt., xviii, 1871, p. 161.

I. Bombay.

I have inspected specimens of this hitherto unfigured species in the British Museum, reported from the above locality, and give a figure of it. It belongs to the same "gens" as *scitula*, Reeve, and I should not deem it a *Clathurella*.

90. MANGILIA HEXAGONALIS (Reeve).

Pleurotoma hexagonalis, Reeve, Proc. Zool. Soc. Lond., 1845, p. 118.

„ „ „ Reeve, Conch. Icon., vol. i, 1845, pl. xxxii, f. 293.

P.G. Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

This is considered by Tryon (Manual, vol. vi, 1884, p. 251) to be identical with *M. obeliscus*, Reeve, but I doubt this. I am, indeed, not sure that the true *hexagonalis* has been found in the region now treated of, the specimens not being in first-class condition. I have *obeliscus* from Hong-Kong only. I may mention that *M. agna*, Melv. & St., from Lifu and Japan, placed under *hexagonalis* by Bouge & Dautzenberg,¹ is, in my opinion, a good species.

M. pyramis, Hinds,² another six-sided, small white form, is very similar, but the outer lip is more roundly expanded and the sinus not so prominent.

91. MANGILIA ICHTHYS, Melv.

Mangilia ichthys, Melvill, Ann. Mag. Nat. Hist., ser. VIII, vol. vi, 1910, p. 13, pl. ii, f. 22.

P.G. Henjam Island; Mussandam, 55 fathoms.

M.C. Off Astola Island, 90 fathoms; Charbar, 40 fathoms (1906).

Allied to *M. obeliscus*, Reeve, which has not yet been found in this region, and *M. calcata*, Hedley, of which an unique specimen was dredged at 5-10 fathoms, off Hope Island, North Queensland, but, as pointed out by me in the description of *ichthys*, the characters of the sinus are altogether different in the two species. The ribs, too, of our species are more acute and strong; in *calcata*³ they are well described as "oblique, wave-like, radial folds, five to a whorl, expanded and projecting prominently at the summit of each whorl". The very fine spiral threads running over the whole surface are a characteristic feature of both species in common. *M. alticostata*, Sowb., a South Australian species that appears to have found its way to the region now treated of, may possibly be an elongate form of *ichthys* or, perhaps, *calcata*.

92. MANGILIA KOWEITENSIS, Melv.

Mangilia koweitensis, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 167, pl. x, f. 23.

P.G. Koweit, 10 fathoms.

A citharoid species, near *M. arcta*, E. A. Smith, with which I twice compared it, in the company of the author, and we determined it as quite distinct. Belonging to the *gracilentæ* "gens".

93. MANGILIA LUCIDA (Sm.). (Pl. IX, Fig. 16.)

Pleurotoma (Clathurella) lucida, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. xiv, 1884, p. 323.

I. Bombay (Abercrombie).

Allied to *horneana*, Sm., *gradata*, Nevill, *myrmecodes*, Melv. & St., etc., but more coarsely costate, the costæ few in number, while the spiral liræ are likewise sparse and very incrassate, about 10 only on the body-whorl. It has not yet occurred north of Bombay.

¹ Journ. de Conch., tom. lxi, 1913, p. 150.

² Reeve, Conch. Icon., vol. i, 1843, pl. xviii, f. 147.

³ Proc. Linn. Soc. New S. Wales, vol. xxxiv, 1909, p. 456, pl. xlv, f. 90.

94. MANGILIA MUNDA (Sm.). (Pl. IX, Fig. 5.)

Pleurotoma (Clathurella) munda, E. A. Smith, Ann. Mag. Nat. Hist., ser. vi, vol. ii, 1888, p. 316.

P.G. Coll. Pelly. (Type in the British Museum.)

We figure the type of this small species, concerning which the author remarks: "This is especially remarkable for the fine yet very prominent thread-like lirations encircling the whorls. The longitudinal ribs are stout, rounded, and equalling in width the interstices between them." It has not occurred in Mr. Townsend's gatherings. There is a prominent tooth-like projection just below the sinus in the outer lip. It is allied to *M. scitula*, Sm.; so with a little diffidence I remove it from *Clathurella*. The apical whorls are smooth, vitreous.

95. MANGILIA MYRMECODES, Melv. & St.

Mangilia myrmecodes, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 442, pl. xxiv, f. 6.

M.C. Charbar, 5 fathoms, mud.

I. Karachi, not uncommon.

The noduled costæ are particularly well defined. It resembles *bascarda*, M. & St., from Lifu,¹ and also has affinities with *horneana*, Sm., and *erymna*, Melv., now just described. *M. lucida*, Sm., may likewise be compared. The sinus is sutural, nuclear whorls white, smooth. Might be considered equally a *Clathurella*; the section to which it belongs seems to link the two genera. *Cythara gradata*,² Nevill, likewise seems comparable, a species which I know only from a figure, not very conclusively drawn.

96. MANGILIA OLIVIERIANA, sp. nov. (Pl. X, Fig. 7.)

M. testa parva, tenui, albo-lactea vel paullum cærulescente, fusi-formi, periostraco evanido ochreo-brunneo tenuissime contacta, anfractibus 8, quorum apicales 3 leves, tertio unicarinato, cæteris indistincte costellatis, et spiraliter rudiliratis, liris distantibus, ad suturas impressis, apertura patula, labro subexpanso tenui, sinu lato sed haud profundo, columella fere recta, canali brevissimo.

Long. 9, lat. 3 mm.

M.C. Off Charbar, 110 fathoms (1913).

A thin species, which one might expect, being so melanoid in 'facies', might live in brackish water, but this is evidently not the case, for it is abysmal in its distribution. It resembles no *Mangilia* we are cognizant of. Of a milky-white or bluish colour, with an olive-brown fugitive epidermis, it is 8-whorled, three being only very slightly costellate, and crossed with coarsish distant raised lines; the mouth is singularly wide, outer lip thin, sinus wide but very shallow, columella straight. A few examples occurred gregariously in the above dredging. I have the great pleasure in connecting with this interesting shell the name of a relative, Lieut.-Col. Henry D. Olivier, who, with his

¹ Journ. of Conch., vol. viii, 1896, p. 279, pl. ix, f. 13.

² Journ. As. Soc. Bengal, vol. xlv, pt. ii, 1875, p. 93, pl. vii, f. 18.

sister, Miss Maud Olivier, has given very great assistance in both collecting and cataloguing the marine Mollusca of Bombay and neighbouring coasts.

97. *MANGILIA OPALUS* (Reeve).

Pleurotoma opalus, Reeve, Proc. Zool. Soc. Lond., 1845, p. 112.

„ „ Conch. Icon., vol. i, 1845, pl. xxx, f. 274.

I. Lat. 18° 58' N., long. 71° 45' E., 40 fathoms.

Only occurred in these seas on the one occasion mentioned just above. There is close alliance between this species (described originally from Cayagan, Island of Mindanao, Philippines) and *Pl. ebur*, Reeve (Conch. Icon., species 275). *M. polita*, Hinds, is also near, and also, I should infer, *M. apollinea*, Melv., from these same seas, as well as *M. infulata*, Hedley, from Australia. Size seems made too important a feature in the apportionment of species of this group to the various subsidiary genera, as our shell, excepting for this particular, possesses the labial and oral attributes of a *Drillia*.

98. *MANGILIA PELLYI* (Sm.). (Pl. IX, Fig. 9.)

Pleurotoma (Mangilia) pellyi, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. x, 1882, p. 218.

P.G. Coll. Pelly. (Type in the British Museum.) Also Gulf of Oman, lat. 24° 55' N., long. 57° 59' E., 250 fathoms.

This shell, whose two near allies appear to be *M. fulvocincta*, G. & H. Nevill, and *M. querna*, Melv., differs from the former in its far more abbreviate contour, from the latter in its fine spiral striation. It was named in honour of the late Sir Lewis Pelly,¹ the then (1862-71) Political Agent for the Persian Gulf district, who was the first to employ the dredge in obtaining marine Mollusca from these seas, his collections being generously bestowed on the British Museum by the late Mr. R. MacAndrew.

99. *MANGILIA PERLONGA*, Melv.

Mangilia perlonga, Melvill, Ann. Mag. Nat. Hist., ser. VII, vol. iv, 1899, p. 87, pl. i, f. 5.

P.G. Muscat, 10-12 fathoms.

I. Karachi, only once found.

More regular in form and longer than *perplexa*, Nevill, which is allied. Apical whorls smooth, globular, vitreous-white, the third and fourth carinate, sinus situate just below the suture, broad but not deep.

100. *MANGILIA PERPLEXA* (G. & H. Nev.).

Clathurella perplexa, G. & H. Nevill, Journ. As. Soc. Bengal, vol. xlv, pt. ii, 1875, p. 89, pl. vii, f. 5.

P.G. Bushire, and near Fao, at the head of the Gulf.

I. Bombay (Abercrombie). Also occurring in Ceylon.

¹ At that time Colonel, afterwards Lieut.-General Sir Lewis Pelly, K.C.B., K.C.S.I., b. 1824, d. 1892, late M.P. for Hackney.

Compared with *M. fairbanki*, Nevill, by the authors, and yet placed in a different genus. The fact is that *Mangilia* and *Clathurella*, though distinct enough in the extremes, are yet so linked by species bearing common characteristics as to be often impossible to define satisfactorily. None of the specimens I have seen are apically perfect, and the authors do not mention their apical characters; but I consider this species allied to others now placed in *Mangilia*, and class it there accordingly.

101. MANGILIA PHÆA, Melv. & St.

Mangilia phæa, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 442, pl. xxiv, f. 7.

P.G. Linjah, $3\frac{1}{2}$ fathoms, sand.

One of the most uncommon species, very small (long. 4, lat. 1 mm.), angular, of a peculiar dark-brown suffused coloration, few-ribbed, crossed by sparse liræ, commencing slightly above the centre of each whorl. We cannot well compare it with any other known species.

102. MANGILIA POLITA (Hinds).

Clavatula polita, R. B. Hinds, Proc. Zool. Soc., 1843, p. 43.

„ „ Reeve, Conch. Icon., vol. i, 1843, pl. xviii, f. 150.

Drillia continua, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 312, pl. xxii, f. 17.

Daphnella polita (Hinds), Tryon, Man. Moll., vol. vi, 1884, p. 311, pl. xx, f. 59.

P.G. Mussandam, 47 fathoms; Henjam Island.

Although Reeve's figure of the type exhibits a more attenuate shell than ours, with produced canal, yet we have compared it with our specimens closely at the British Museum, and are satisfied as to their identity. The original specimen came from the Straits of Macassar, Celebes, and was dredged at a depth of 7 fathoms. Allied to *D. opalus* and *ebur*, Rve., and certainly not a *Daphnella*.

103. MANGILIA POSIDONIA, Melv.

Mangilia posidonia, Melvill, Journ. Malac., vol. xi, 1904, p. 84, pl. viii, f. 14.

P.G. Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

Near *M. adamantina*, Melv., from the same locality, but quite distinct, in my opinion. It is not so squarely angular, the two apical whorls are large and vitreous, third whorl flexuately radially costellate, the shell more fusiform in contour, more closely ribbed, the ribs and crossing liræ more acute, sharply defined and almost echinate at the points of junction.

104. MANGILIA PUPIFORMIS (Sm.).

Pleurotoma (*Drillia*?) *pupiformis*, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. xiv, 1884, p. 319.

Mangilia callistephana, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 166, pl. x, f. 22.

P.G. Coll. Pelly. (Type in British Museum.) Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms, very abundant.

The type-specimens collected by Sir Lewis Pelly are in poor condition, but I have but little doubt are the same as my *callistephana*, described twenty years later. Nuclear whorls smooth, second and third carinate. The double row of nodules encircling the whorls at the ribs, and the very narrow cylindrical contour, distinguish this interesting little shell. There is, however, a near ally in the same dredging, which I have described in this paper under the name of *M. callicredemna*.

105. MANGILIA PYCNOCHILA, Melv.

Mangilia (*Glyphostoma*) *pycnochila*, Melvill, Proc. Malac. Soc. Lond., vol. v, 1904, p. 58, pl. v, f. 6.

P.G. Mussandam, 47 fathoms.

Allied to *M. terpnisma*,¹ M. & St., but with much thickened outer lip and abbreviate contour. I now doubt its being a *Lienardia* (= *Glyphostoma*), the columella is plain and smooth, and the general 'facies' that of the typical genus. It has only occurred in small quantity.

106. MANGILIA QUERNA, Melv.

Mangilia querna, Melvill, Ann. Mag. Nat. Hist., ser. VIII, vol. vi, 1910, p. 13, pl. ii, f. 23.

P.G. Gulf of Oman, lat. 24° 52' N., long. 57° 35' E., 205 fathoms.

M.C. Off Charbar, at 40 fathoms.

A smooth form, allied to *M. fulvocincta*, Nevill, and *pellyi*, Sm., but differing in the absence of fine spiral striæ over the whorls, which both these species possess. The shell varies in colour from pure white to oaken-brown.

107. MANGILIA QUISQUILIA (Melv. & St.).

Clathurella quisquilia, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 315, pl. xxiii, f. 7.

P.G. Mussandam, 47 fathoms. Malcolm Inlet (Kubbatt Ghazira), large examples. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

M.C. Charbar, 40 fathoms.

Evidently not a *Clathurella*, but, like *M. albata*, Sm., which is an ally, we are not sure about its true generic position. It is very abundant in the latter dredging mentioned, whence came so many novelties. The figure quoted hardly does it justice, the outer lip not being perfect in the specimen figured. The sinus is wide, but shallow, the longitudinal costæ of the body-whorl numbering eight. The shell is a pure white in all the specimens examined. It appears most nearly allied to *Pleurotoma turris*, Reeve (Conch. Icon., vol. i, pl. xxxvii, fig. 344). This is an olive-brown species, reported also from the Persian Gulf district, first called *pagoda* by Reeve, an already occupied name, from, to quote his words, "the strong ribs continuing one under the other, and providing a peculiar pagoda-like form." This character, however, does not seem

¹ Proc. Zool. Soc. Lond., 1901, p. 443, pl. xxiv, f. 8.

noticeable in *quisquilia*. Again, the third whorl in *turris* is closely radially ribletted. The two nuclear whorls are globular and very smooth in both species.

108. *MANGILIA RECTA* (Sm.).

Pleurotoma (*Mangilia*?) *recta*, E. A. Smith, Ann. Mag. Nat. Hist., ser. VI, vol. ii, 1888, p. 310.

Mangilia recta, Sm.: Melvill, Proc. Malac. Soc. Lond., vol. x, 1912, p. 251, pl. xi, f. 13, 13a.

P.G. Coll. Pelly. (Type in the British Museum.)

M.C. Charbar, 7 fathoms.

A distinct species, with a peculiar waxy appearance, and greyish-olive in colour, striped with whitish. One of the Charbar specimens, in better condition than the actual type, was figured as given above.

The author particularly calls attention to the granular aspect of the third whorl, which is somewhat of the same character as those of *M. albolabiata*, Sm., *gracilentia*, Reeve, and its variety *portia*, Sm.

109. *MANGILIA SCITULA* (Sm.). (Pl. IX, Fig. 4.)

Pleurotoma (*Mangilia*) *scitula*, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. xiv, 1884, p. 321.

P.G. Mussandam, 55 fathoms. Muscat, 10-15 fathoms. Gulf of Oman, lat. 24° 58' E., long. 56° 54' N., 156 fathoms.

M.C. Charbar, 40 fathoms.

I. Karachi.

An abundant little white species, hitherto unfigured. The fusiform contour narrowed below, with rather small mouth, proportionately speaking, swollen upper whorls, and coarse spiral liræ, hexagonal, as remarked by the author, with very beautiful spiral, minutely punctate striæ between the lirations just mentioned. The type, now figured, was collected by Sir Lewis Pelly in the Gulf.

110. *MANGILIA SMITHII* (G. & H. Nev.).

Clathurella smithii, G. & H. Nevill, Journ. As. Soc. Bengal, vol. xlv, pt. ii, 1875, p. 88, pl. viii, f. 13.

P.G. Tumb Island.

M.C. Gwadûr (W. T. Blanford).

The type has a clear space below the sutures to the centre of each whorl.

Var. *clarisculpta* (Melv.).

Mangilia clarisculpta, Melvill, Proc. Malac. Soc. Lond., vol. x, 1912, p. 251, pl. xi, f. 13, 13a.

P.G. Mussandam, 55 fathoms. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

M.C. Charbar, at 40 fathoms.

Differs from the type in the very conspicuous and prominent spiral excavate ridge (or ridges) just below the sutures, especially on the penultimate and body whorls. I had not noted that G. & H. Nevill call attention to this variation from their type in the original

description, and since I find the two forms together, though *clarisculpta* is very much the commoner in the region we are treating of, I am inclined to agree with the authors, and class my species as a good variety. The two apical whorls in both this and the typical species are white, smooth, somewhat vitreous.

111. MANGILIA TERPNISMA, Melv. & St.

Mangilia terpnisma, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 443, pl. xxiv, f. 8.

P.G. Gulf of Oman, Muscat, 15 fathoms. Lat. 24° 58' N., long. 56° 54' E., 156 fathoms. Also lat. 25° 6' N., long. 60° 39' E., 40 fathoms, and contiguous soundings, *vide* original description.

Fine live examples are tinged with brown-red round the columella and outer lip. It seems locally abundant. It may by some be considered a *Glyphostoma*, but without much reason. *M. pyenochila*, Melv., is the nearest ally, perhaps, indeed, a marked variety with abnormally thickened labrum. It was dredged off Timor in the *Siboga* expedition.

112. MANGILIA THALIA (Melv. & St.).

Clathurella thalia, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 445, pl. xxiv, f. 10.

M.C. Charbar, 7 fathoms.

Very nearly allied to *portia*, Sm. = *gracilentia*, Reeve, and perhaps it had better be relegated to a variety of that protean form. It differs in its more graceful, fusiform shape, in the ochraceous colour, with brown tinge around the centre of the whorls, and in greater flexuosity of costæ, the spiral liræ at the point of junction with the ribs being gemmulate; the canal is shorter than generally obtains in *gracilentia*, but we require larger suites of specimens before the question can be actually decided.

113. MANGILIA THESKELOIDES, Melv.

Mangilia theskeloides, Melvill, Ann. Mag. Nat. Hist., ser. VII, vol. iv, 1889, p. 87, pl. i, f. 6.

I. Karachi.

As stated in the original description, this species differs much from its congeners in the Persian Gulf area, and is more nearly allied to certain New Caledonian species, e.g. *bella* and *interrupta*, Reeve, or *theskela*, Melv. & St.

114. MANGILIA TOWNSENDI, Sowb.

Mangilia townsendi, G. B. Sowerby, Proc. Malac. Soc. Lond., vol. i, 1895, p. 278, pl. xviii, f. 1, 2.

P.G. Henjam Island, Gulf of Oman. Especially fine at Jask.

M.C. Charbar, Gwadûr, Ormara, Astola Island, etc.; met with generally along the coast from low-water mark to 15 fathoms, on muddy sand.

The author compares this beautiful species to *M. attenuata*, Mont., a European species. The colour described happily as "griseo-virescens" is peculiar. *M. galigensis*, Melv., is the only near ally in the seas now treated of.

115. *MANGILIA TRITÆNIATA*, sp. nov. (Pl. X, Fig. 5.)

M. testa parva, fusiformi, pallide livido-lutescente, apud basim leniter puniceo-tincta, anfractibus 8, quorum apicales duo vel tres leves, globulares, quarto arcte cancellato, cæteris apud suturas multum impressis, longitudinaliter costatis, costis subacutis; in numero ultimum apud anfractum 15, undique spiraliter tenuiliratis, supernis una, ultimo tribus tæniis læte rufis ornato, apertura anguste oblonga, labro tenui, fortasse adolescente, sinu obscuro, columella simplice, obliqua, canali producto. Long. 8, lat. 2.5 mm.

(*tritæniatus*, thrice-banded.)

Hab.—Bombay. (Type in the British Museum.)

Perhaps not full grown, this interesting little species possesses a peculiarity in form, being in miniature much like a *Mitra* of the section *Turricula* both in form and disposition of coloration pattern, the triple band around the body-whorl being notable. The whorls are all considerably suturally impressed and ventricose, multicostate, and spirally finely lirate.

116. *MANGILIA TURRIS* (Reeve).

Pleurotoma pagoda, Reeve, Conch. Icon., vol. i, 1846, pl. xxxvii, f. 344; non *pagodus*, Reeve, *t.c.*, 1845, pl. xxvii, f. 242.

„ *turris*, Reeve, *t.c.*, 1846, erratum.

Drillia turris, Tryon, Man. Conch., vol. vi, 1884, p. 210, pl. xv, f. 30.

P.G. Gulf of Oman. Muscat, 10–20 fathoms.

I. Karachi, but very rarely.

I consider that this species, with its allies, *quisquilia*, Melv., and *albata*, Sm., had best be considered *Mangiliæ*. This is a dark-brown shell, very attenuate, and closely spirally lirate throughout. I have specimens from Hong-Kong. It is a narrower species than *quisquilia*, also found in the same seas.

117. *MANGILIA WOODWARDIÆ*, sp. nov. (Pl. X, Fig. 9.)

M. testa lata, fusiformi, solidula, sordide alba, anfractibus 7, quorum apicales 2 vitrei, globulares, tertio unicarinato, cæteris ad medium acutangulis, undique longitudinaliter obliquicostatis, costis ultimum apud anfractum ad 8, superficie levi, apud basim ult. anfractus paucilirata, apertura angusta, intus albescens, labro incrassato, sinu perobscuro, margine columellari ad basim recta, canali paullulum producto. Long. 9, lat. 4 mm.

P.G. Mussandam, 30 fathoms.

An interesting form, of which only one specimen was obtained. It seems to me sufficiently distinct, however, from the known recent species to attempt a description. The broadened fusiform contour, conspicuous central acute angle in the lower whorls, thickish oblique ribs, characterize it fully, the only ally known to me being *scalata*, Soubervie, from New Caledonia, with which Tryon merges *melanostoma*, Garrett, from Fiji, and *angicostata*, Reeve, from the same locality. These all seem, however, to differ considerably.

Reeve describes his *angicostata* (Conch. Icon., vol. i, pl. xxxvi, f. 327) as “a pure white hexagonal shell”; our species is eight-angled, and

is only half the size—9 as against 18 mm. *Melanostoma*, Garrett, is noted for its nigrescent columellar region, and *scalata*, Souv., from New Caledonia, is considerably larger than our shell, with a conspicuous interrupted black spiral band in the central portion of the interstices of each whorl, between the ribs, otherwise entirely pure white. I have much pleasure in honouring this little shell with the name of Miss Gertrude M. Woodward, who has so finely drawn the illustrations that accompany this paper.

118. *MANGILIA ZEBUENSIS*, Rve.

Mangilia zebuensis, Reeve, Proc. Zool. Soc. Lond., 1846, p. 65.

P.G. Gulf of Oman, 205 fathoms.

This little species, described originally from I. Cebu (or Zebu), Philippines, is evidently of wide distribution. I have examples from the locality just named—Cebu—which are larger than others from Singapore (coll. Archer) kindly presented me by Mr. Le Brockton Tomlin. The longitudinal ribs are sharply cut, and once angled centrally.

Genus CYTHARA, Schumacher, 1817.

119. *CYTHARA EDITHÆ*, Melv. & St.

Cythara edithæ, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 446, pl. xxiv, f. 11.

P.G. Henjam Island, 15 fathoms (April, 1906).

Gulf of Oman, Muscat, 10 fathoms.

A neat and regularly formed species, with six clearly-cut costæ on the penultimate and body whorls, surface closely finely striated, yellowish-white, ribs here and there flecked with pale reddish-brown maculations, the columellar margin is minutely multidenticulate.

120. *CYTHARA ELEVATA*, Sm.

Cithara elevata, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. xiv, 1884, p. 327.

P.G. Coll. Pelly. (Type in the British Museum.)

This is the only species described by Mr. E. A. Smith from the Persian Gulf that I have failed to find in the National Collection. By the description it seems quite distinct from the few other *Cytharæ* found in this region, *C. edithæ* appearing its nearest congener.

The locality of "Bushire" given by us in our former Catalogue to a shell erroneously called *Drillia elevata*, Sm.,¹ is inexplicable, and should be erased.

121. *CYTHARA GRADATA*, G. & H. Nev.

Cythara gradata, G. & H. Nevill, Journ. As. Soc. Bengal, vol. xlv, pt. ii, 1875, p. 93, pl. vii, f. 15.

I. Bombay (Rev. S. B. Fairbank).

A species of which I have seen no satisfactory, if genuine, specimens. It was named by Mr. Abercrombie and myself in our Bombay list as

¹ Proc. Zool. Soc. Lond., p. 437 (1901).

found by the former, but the shells were worn and upon re-examination they seem nearer typical *M. horneana*, Sm. The figure above referred to is not well drawn, and the type being in the Indian Museum, Calcutta, adds to the difficulty.

122. CYTHARA HYPERCALLES, Melv.

Cythara hypercalles, Melvill, Mem. Manch. Soc., vol. xlii, No. 4, 1898, p. 12, pl. i, f. 5.

P.G. Gulf of Oman, Muscat, 20 fathoms, sandy mud.

An elegant and very local species. Much larger than any form of *C. cylindrica*, Reeve.

123. CYTHARA LYRICA (Reeve). (Pl. X, Fig. 3.)

Mangilia lyrica, Reeve, Proc. Zool. Soc., 1846, p. 61.

„ *cylindrica* var., Reeve, Proc. Zool. Soc., 1846, p. 60.

„ *cylindrica* and *lyrica*, Reeve: Tryon, Man. Conch., vol. vi, 1884, pp. 267, 268, pl. xxiv, figs. 9, 21.

P.G. Henjam Island.

Many examples occurred, but all in dead condition. Reeve, followed by Tryon (Man. Conch., vi, 1884, pp. 267, 268), distinguished two species, *cylindrica* and *lyrica*, but E. A. Smith, discussing this with the writer, considered it was impossible to separate them. I hardly think I agreed with this entirely.

124. CYTHARA STRIATELLA, Sm. (Pl. X, Fig. 4.)

Cithara striatella, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. xiv, 1884, p. 327.

P.G. Coll. Pelly. (Type in the British Museum.)

We figure the type of this species, which has not occurred in the Townsend collections. It is distinguished by its seven prominent ribs, which are not continuous up the spire, but are irregularly disposed, to quote from the author's diagnosis.

125. CYTHARA TYPHONOTA, Melv. & St.

Cythara typhonota, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 446, pl. xxiv, f. 12.

P.G. Tumb Island, 17 fathoms, sand.

Characterized chiefly by its gradate whorls, well-ribbed, and with a smoky-black band spreading over the lower portion of the dorsal surface, most conspicuous just behind the outer lip. Only two specimens have yet been found.

Genus LIENARDIA, Jousseume, 1884 (= GLYPHOSTOMA, auctt. non Gabb, 1872).

126. LIENARDIA ARMSTRONGII (G. & H. Nev.).

Clathurella armstrongii, G. & H. Nevill, Journ. As. Soc. Bengal, vol. xlv, pt. ii, 1875, p. 93, pl. vii, f. 13.

I. Bombay (Abercrombie).

This species was originally recorded by the authors from the Paumben (or Pamban) Straits, South India, and is also Andamanese.

The beach-worn specimens collected as above have been identified with doubt, it being impossible to compare them with the types, now in the Indian Museum, Calcutta, with the rest of the Nevill collections. The figure gives a nodulous appearance to the columellar margin, and as "*Pleurotoma*" *arctata*, Reeve, so nearly allied to *spurca*, Hinds, is named as the nearest ally, it seems only equitable to propose its transference to the genus *Lienardia*.

127. LIENARDIA BIPPLICATA (Melv.).

Mangilia biplicata, Melvill, Proc. Malac. Soc. Lond., vol. vii, 1906, p. 77, pl. viii, f. 21.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

The double columellar plication, and the similarity to *L. spurca* (Hinds), in miniature, induce me to change the position of this species, and introduce it as a *Lienardia*, as I have provisionally done in the case of the last species.

128. LIENARDIA CARDINALIS (Reeve).

Pleurotoma cardinalis, Reeve, Proc. Zool. Soc. Lond., 1845, p. 115.

" " " " Reeve, Conch. Icon., vol. i, 1845, pl. xxx, f. 266.

Mangilia " " Tryon, Man. Conch., vol. vi, 1884, p. 258, pl. xv, f. 14.

Glyphostoma cardinale, Bouge & Dautzenberg, Journ. de Conch., tom. lxi, 1913, p. 173.

I. Karachi, 3 fathoms, loose stone bottom.

I have not seen the specimens reported from Karachi. It is allied to *M. rava*, Hinds,¹ according to Reeve. This is a species intermediate between *spurca*, Hinds, and *bicolor*, Angas. The type, as figured, exhibits a smoothish, spirally banded shell. I have examined this in the National Collection, but failed to identify any Persian Gulf *Mangiliae* with it. Included in *Clathurella*,² it is quoted by Hidalgo as from the Isle of Negros, Philippines.

129. LIENARDIA COMIDELEUCA (Melv. & St.).

Mangilia comideleuca, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 313, pl. xxiii, f. 5.

P.G. Mussandam, 47-55 fathoms.

Gulf of Oman, 37 fathoms.

This local species has been well figured; it evidently belongs to the same alliance as *spurca*, Hinds. Live examples are shining white, here and there tinged with stramineous suffusion occasionally.

130. LIENARDIA CRASSILABRUM (Reeve).

Pleurotoma crassilabrum, Reeve, Proc. Zool. Soc., 1843, p. 185.

" " " " Reeve, Conch. Icon., vol. i, 1843, pl. xiv, f. 118a, b, c.

P.G. Malcolm Inlet (Kubbatt Ghazira), 3 fathoms.

I. Karachi.

¹ Hinds, Moll. Voy. *Sulphur*, 1884, p. 17, pl. v, f. 18.

² Hidalgo, Cat. Moll. Tert. Filipinas, 1904, p. 123.

I believe this species to be widely spread, though there are not many records extant. Bouge & Dautzenberg recognize it from Lifu and I. Ticao, Philippines.¹

131. LIENARDIA CREBRILIRATA (Sm.). (Pl. IX, Fig. 17.)

Pleurotoma (Clathurella?) crebrilirata, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. xiv, 1884, p. 324.

P.G. Coll. Pelly. (Type in the British Museum.)

A species on the borderland between *Mangilia* and *Clathurella*, the apical whorls being smooth and the surface hardly cancellate. The type here figured is now in the British Museum.

Judging by the general formation of the shell, alliance with *L. armstrongii*, Nevill, is suggested. Apical whorls plain, not cancellate. This caused the author to hesitate about its location. I place it, provisionally only, in *Lienardia*.

132. LIENARDIA DITYLOTA (Melv.).

Clathurella ditylota, Melvill, Proc. Malac. Soc. Lond., vol. x, 1912, p. 252, pl. xii, f. 17.

P.G. Koweit, 11 fathoms. Bunder Abbas, 3-10 fathoms (1907). Henjam Island, 5-10 fathoms. Linjah Anchorage.

Gulf of Oman, lat. 25° 6' N., long. 60° 34' E. (1914), 60 fathoms. Muscat, 10 fathoms.

M.C. Astola Island, Gwadûr, Charbar.

I. Karachi. Bombay, dead specimens.

A common species in these seas, and undoubtedly a *Lienardia*. It has till recently been confounded with *Cl. polynesiensis*,² Reeve, of which the type came from Lord Hood's Island (Cuming). This last, which is also an abundant New Caledonian species, does not really run at all near the *L. ditylota*, and it is extraordinary and unaccountable they should have been considered identical. The name must therefore be entirely erased from our former catalogue (Proc. Zool. Soc. Lond., 1901, p. 445).

133. LIENARDIA OBTUSICOSTATA (Sm.).

Pleurotoma (Glyphostoma) obtusicostata, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. x, 1882, p. 304.

„ „ „ Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 444, pl. xxi, f. 4.

P.G. Koweit. Gulf of Oman. Muscat, 10 fathoms.

M.C. Locally abundant all along the coast of Baluchistan.

I. Karachi. Bombay (Abercrombie).

It has been noted as far south as Quilon (Captain Tindall).

A well-marked species, the nearest allies of which are *L. spurca* (Hinds) and *bicolor*,³ Angas, likewise *L. alliteratum*, Hedley, these two last being Australian species. The brownish ochreous shading of

¹ Journ. de Conch., tom. lxi, 1913, p. 175.

² Conch. Icon., vol. i, 1845, pl. xxxiii, f. 304.

³ Proc. Linn. Soc. New S. Wales, vol. xxxix, 1914, p. 728.

the former of them at the base of the body-whorl is distinctive; all the genuine specimens of this in my collection are so coloured. It is a narrower shell, too, than Hedley's new species. I doubt the occurrence of true *bicolor* in these seas, as has been reported (Proc. Zool. Soc. Lond., 1901, p. 444) in our former catalogue. It may be, however, that in time connecting links between these two nearly allied species may be found.

134. LIENARDIA PULCHRIPICTA (Melv. & St.).

Mangilia pulchripicta, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 443, pl. xxiv, f. 9.

P.G. Mussandam, 55 fathoms. Bushire, towards Fao, Gulf of Oman, lat. 20° 55' N., long. 37° 57' E., 37 fathoms.

Distinguished by the purplish blotches placed interstitially in the centre of the body-whorl, as is the case with *Drillia interincta*, Sm. It seems allied to *spurca* (Hinds), so we place it, provisionally, in the same genus. But few examples have as yet been collected.

135. LIENARDIA RUGOSA (Mighels).

Pleurotoma rugosa, Mighels, Proc. Boston Soc. N.H., vol. ii, 1845, p. 23.

P.G. Gulf of Oman, Muscat, 15 fathoms.

I. Karachi, in 3-7 fathoms, amongst loose stones and muddy sand. A widely distributed species throughout the eastern tropics.

136. LIENARDIA SOROR (Sm.).

Pleurotoma (Glyphostoma) soror, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. x, 1882, p. 303.

Clathurella opsimathes, Melvill & Standen, Ann. Mag. Nat. Hist., ser. vii, vol. xii, 1903, p. 314, pl. xxii, f. 19.

P.G. Bushire, Hinderabi Island, Galig, and Kishm Islands. Gulf of Oman, Muscat, 10-20 fathoms.

M.C. General all along the coast.

I. Karachi Harbour, where the finest specimens of all occur in 5 fathoms, among loose stones and muddy sand.

We merge our *opsimathes* with the type species without much hesitation. In the former the colour is more stramineous and the surface less shining, but the general characters are identical. The type of *opsimathes* came from Shaikh Shuaib Island, Persian Gulf.

137. LIENARDIA SPURCA (Hinds).

Clavatula spurca, R. B. Hinds, Moll. Voy. *Sulphur*, 1844, p. 17, pl. v, f. 14.

Pleurotoma spurca, Reeve, Conch. Icon., vol. i, 1846, pl. xxxiv, f. 312.

P.G. Linjah Anchorage, 3½ fathoms; Henjam Island, 15-28 fathoms; Bahrein Isles, Mussandam, 55 fathoms; Gulf of Oman, Muscat, 10-15 fathoms; lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

Var. *pasniensis*, nov.

Testa ut in typo, sed omnino albida.

P.G. Gulf of Oman, Pasni.

Live albino shells dredged off the above locality constitute a well-marked colour variety.

The largest examples of this interesting species, surely worthy of a more complimentary cognomen, come from the Linjah Anchorage, and measure long. 14 mm. It is of extended range. Hinds described the type from New Guinea and the Straits of Malacca in 5-18 fathoms, mud. Reeve¹ compares it with *argillacea*, also of Hinds, and from the same locality (Malacca). Judging from the figure it would seem almost identical. The smallest examples of this species that have come under my notice measure long. 9 mm., and are in my possession, labelled "From the Lombe Taylor Coll." Under the name *Clathurella spurca*, Hidalgo admits it to his Philippine Islands list, and Hedley, as *Glyphostoma spurcum*, from Queensland.

Genus CLATHURINA, nom. nov. = CLATHURELLA,² Carpenter, 1857,
DEFRANCIA, Millet, 1826, nom. præoc.

138. CLATHURINA AGLAIA (Melv.).

Mangilia aglaia, Melv., Proc. Malac. Soc. Lond., vol. vi, 1904, p. 165,
pl. x, f. 19.

P.G. Mussandam, 55 fathoms, rarely.

The ochreous, beautifully microscopically decussate third and fourth whorls are to be noted. A very elegant species, closely roundly ribbed and latticed, of which but few examples have come to light. In one specimen the third whorl is angled. The sinus is sutural, rather wide.

139. CLATHURINA ALBICAUDATA (Sm.). (Pl. IX, Fig. 13.)

Pleurotoma (Defrancia?) albicaudata, E. A. Smith, Ann. Mag. Nat.
Hist., ser. v, vol. x, 1882, p. 299.

P.G. Mussandam, 47 fathoms.

I. Karachi. On rocks amongst weeds at low tide.

The author calls attention to the contrast of coloration in this species, the apex and lowest portion of the body-whorl being white and the remainder of the shell rich brown. I have seen no variation in the many specimens examined.

140. CLATHURINA CATHARIA, sp. nov. (Pl. X, Fig. 8.)

C. testa minuta, candida, delicata, ovato-fusiforimi, anfractibus 8, quorum apicales 2½ pallide straminei, globulosi, microscopice arcte cancellati, cæteris costatis, costis rotundatis, crassis, undique spiraliter rudi-liratulis, numero costarum anfractus ultimi 9, lirarum 9, deinde

¹ Conch. Icon., vol. i, 1845, pl. xxv, f. 217.

² Mr. T. Iredale informs me that the name *Clathurella* cannot stand, the type being a large fossil, quite unlike the species hitherto grouped under this designation. No other cognomen has yet been proposed, and hence I would suggest *Clathurina*, taking as the type *Cl. foraminata* (Reeve).

superficie ad basim arcte striata, apertura angusta, labro paullum incrassato, columella obliqua, canali recurvo.

(καθάριος, pure.)

Long. 4, lat. 1.5 mm.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

The type is in perfect condition, and only one or two specimens have at present been found. Peculiar for its very rounded, incrassate ribs.

141. CLATHURINA FORAMINATA (Reeve).

Pleurotoma foraminata, Reeve, Proc. Zool. Soc., 1845, p. 118.

„ „ Reeve, Conch. Icon., vol. i, 1845, pl. xxxiii, f. 301.

P.G. Gulf of Oman, Muscat, 15 fathoms.

I. Bombay (Abercrombie).

Also reported from Aden (Shopland).

Var. a. *camacina*, Melv.

Clathurella foraminata, Reeve, var. *camacina*, Melvill, Mem. Proc. Manch. Soc., vol. xlii, pt. ii, 1898, p. 13, pl. i, f. 15.

P.G. Linjah Anchorage, 3½ fathoms.

I. Karachi.

A large dark form, more elaborate in sculpture than the type.

Var. b. *pyrgodea*, nov. (Pl. X, Fig. 13.)

Testa turrita, major, ad suturas pulchre gradata, anfractibus 8, regularibus, arcte cancellatis, ultimo dorsaliter spiraliter ad basim fossulato, labro fere recto, sinu suturali, lato, canali ad basim recurvo.

Long. 11, lat. 4 mm.

Hab. Mussandam, 55 fathoms.

This may be a monstrosity, but it is very regular in its formation; the deep ridge round the dorsal base of the body-whorl is a characteristic worth attention.

142. CLATHURINA CAVERNOSA (Reeve).

Pleurotoma cavernosa, Reeve, Proc. Zool. Soc. Lond., 1845, p. 118.

„ „ Reeve, Conch. Icon., vol. i, 1845, pl. xxxiii, f. 303.

M.C. Charbar, 40 fathoms.

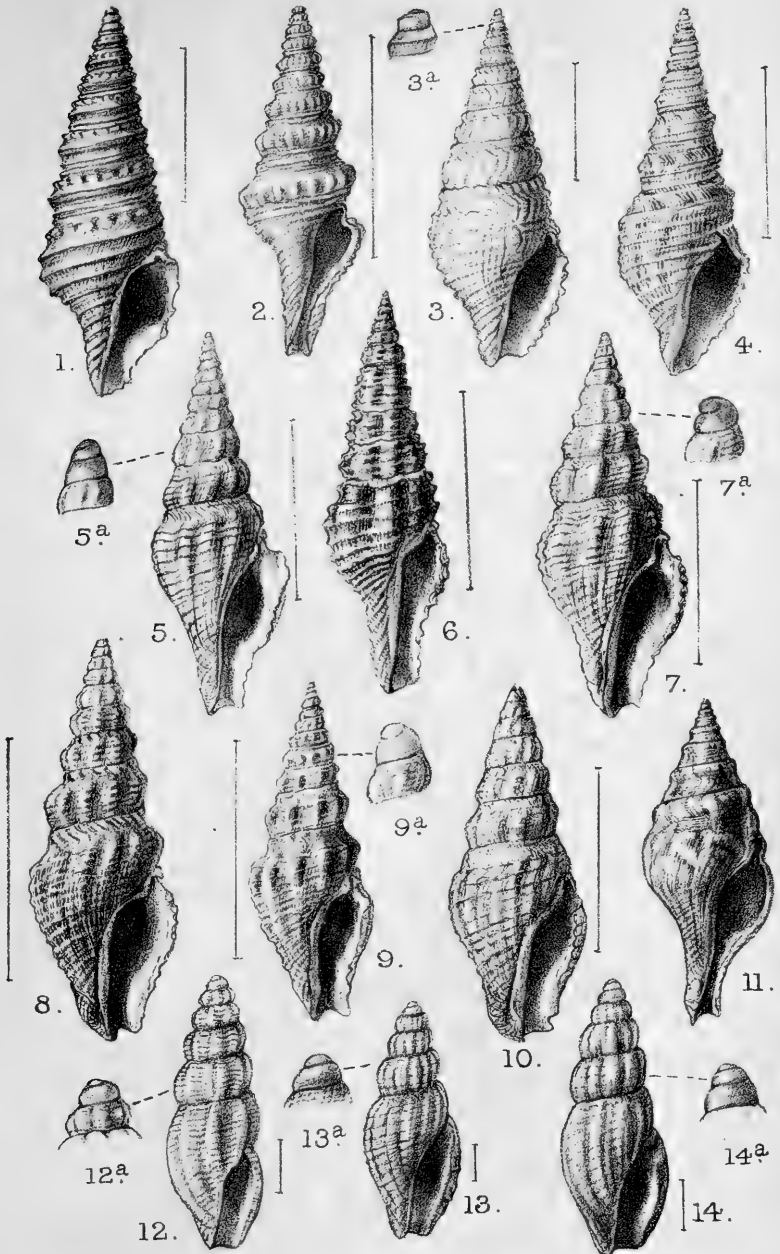
Slight doubt accompanies this determination, for the only three examples seen were in very poor condition. It extends to the Philippines, and Fiji Is. (Andrew Garrett).

143. CLATHURINA EPIXANTHA (Melv.).

Clathurella epixantha, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 59, pl. v, f. 8.

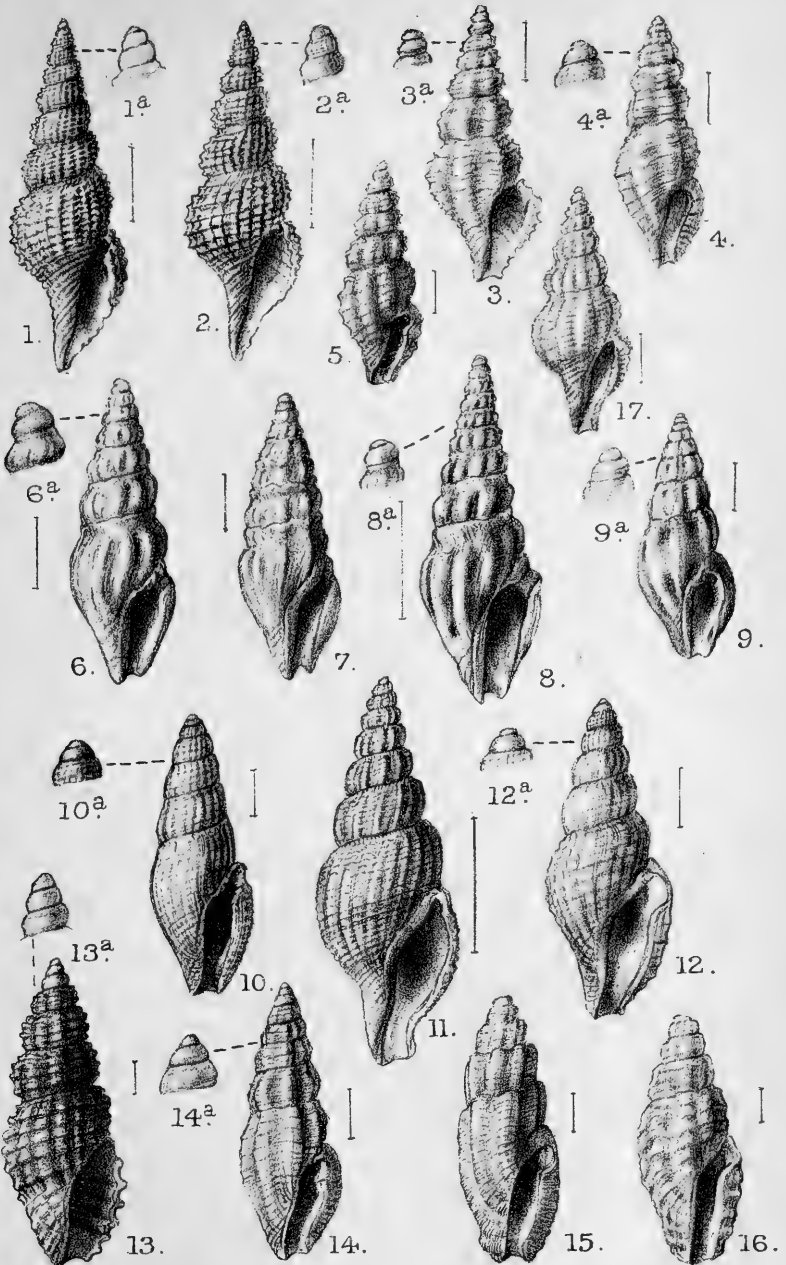
P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms. Also lat. 23° 55' N., long. 57° 48' E., 22 fathoms.

Since the original description was penned I have seen some brighter-coloured examples, tinged with yellow-ochreous. The mouth is particularly wide, and the sinus well expressed. Apical whorls obscurely striate, the acme itself being smooth and vitreous.

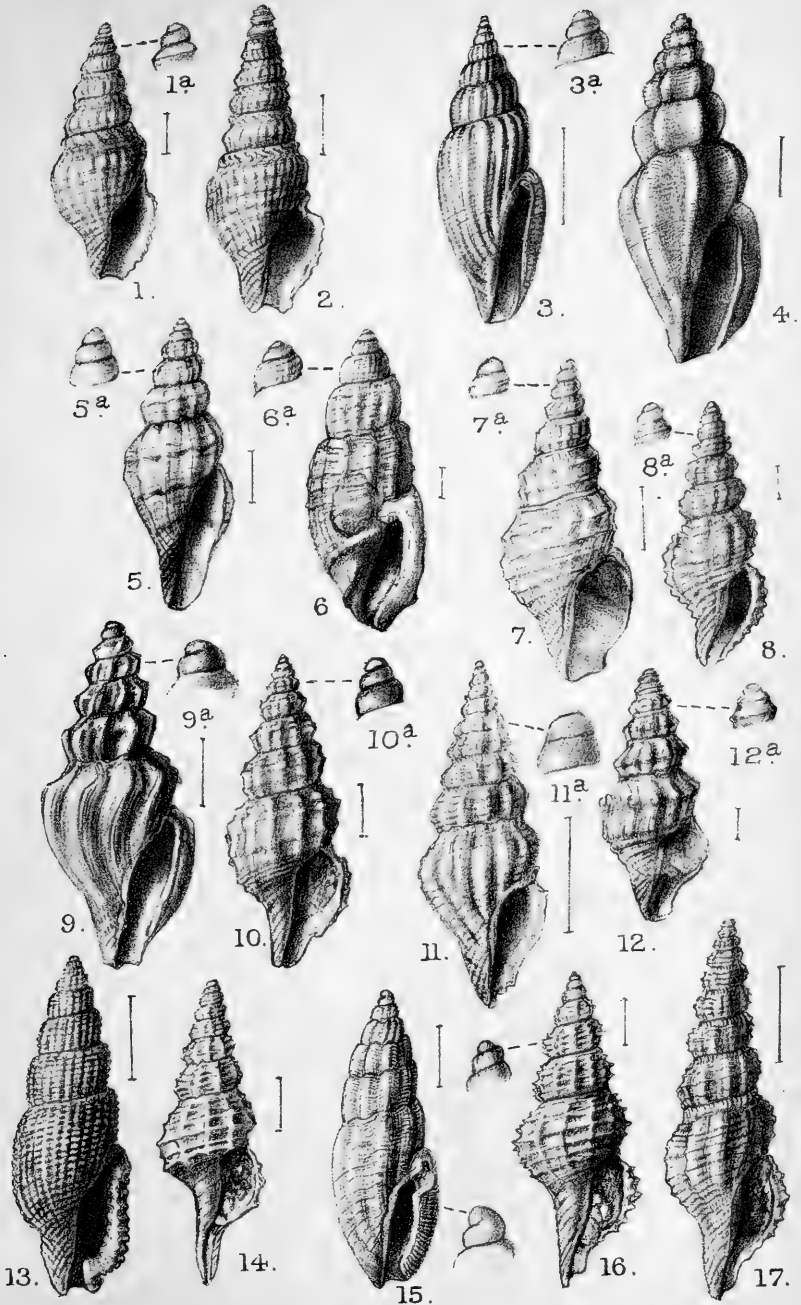


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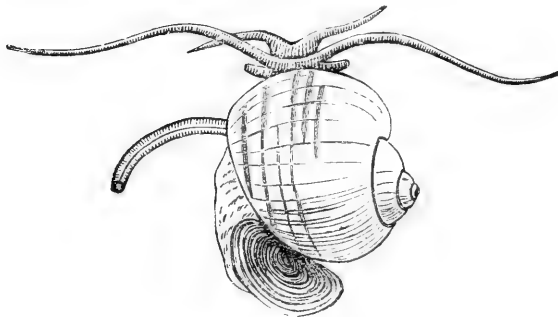
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See page iv of this wrapper.

144. CLATHURINA NETRODES, sp. nov. (Pl. X, Fig. 17.)

C. testa longa, gracili, attenuata, delicata, pallide albo-straminea, vel brunnea, infra suturas sparsim spiraliter brunnescente, simul ac infra peripheriam ad basim, anfractibus ad 10, quorum apicales 3, secundo et tertio minutissime sub lente cancellati, cæteris longitudinaliter costulatis, costis paucis, ad ultimum in numero 9, et spiraliter crassiliratis, liris 3-4, penultimo 6, ultimo anfractu ad 9, irregularibus, inde ad basim arcte striato, apertura ovata, sinu haud profundo, parvo, margine columellari fere recto, canali minime producto. Long. 12, lat. 3.50 mm.

(*νήτρον εἶδος*, spindle-, i.e. *Fusus*-shaped.)

Hab. "Persian Gulf," no specified locality.

Only a few examples have yet come to hand of this small but regularly formed species. It much resembles a *Fusus* in miniature, and with a strong lens the small nuclear whorls are seen to be closely cancellate.

145. CLATHURINA POLYHYMNIA (Melv.).

Clathurella polyhymnia, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 165, pl. x, f. 17.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

A distinct form, with many thickened longitudinal costulæ and close spiral lirations, gemmate at the points of junction. All our examples are somewhat apically worn, but a slight cancellation is observable in the third and keeled whorl, the second being also occasionally similarly carinate. Sinus at the suture, wide and well expressed.

146. CLATHURINA RECEPTORIA (Melv. & St.).

Daphnella receptoria, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 448, pl. xxiv, f. 15.

M.C. Charbar.

This large and handsome species has only once occurred. It seems too nearly allied with other carinate *Clathurellæ* not to be relegated to the genus in which, by common consent, they stand.

147. CLATHURINA SPANIONEMA, sp. nov. (Pl. X, Fig. 10.)

C. testa alba, parva, fusiformi, delicata, tenui, anfractibus 8, quorum apicales duo vitrei, globulosi, tertio sub lente pulchre cancellato, cæteris 5 apud suturas impressis, tribus supernis ad medium angulatis, undique longitudinaliter crassicostatis, numero ultimum apud anfractum duodecim, spiraliter liris paucis accinctis, ad juncturas gemmatis, apertura ovata, labro tenui, sinu obscuro, canali paullum prolongato, columella recta. Long. 8, lat. 3 mm.

(*σπάνιος νήμα*, with scanty threads or liræ.)

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

A small delicate species, white, eight-whorled, the third apical being beautifully cancellate. This point is unfortunately not well brought out in our illustration. The ribs are incrassate, spiral liræ few, in the last whorl they are absent just in the centre, the canal is prolonged somewhat, outer lip thin, columella straight.

148. *CLATHURINA TENUILIRATA* (Angas).

Clathurella tenuilirata, G. F. Angas, Proc. Zool. Soc. Lond., 1871,
p. 17, pl. i, f. 18.

„ „ „ Tryon, Man. Conch., vol. vi, 1884, p. 281,
pl. xxvii, f. 8, 9.

P.G. Gulf of Oman, lat. 26° 10' N., long. 82° 50' E., 33 fathoms,
mud and rock.

I have not been able to find the species so named from the locality just given. *C. tenuilirata*, Angas, type, was from Port Jackson, New South Wales, and it is unlikely this species occurs in the Persian Gulf area, but since it was thus named for Mr. Townsend by Mr. Edgar Smith, I do not feel justified in excluding it from this enumeration without more proof.

149. *CLATHURINA TINCTA* (Reeve).

Pleurotoma tincta, Reeve, Proc. Zool. Soc., 1846, p. 5.

„ „ „ Conch. Icon., vol. i, 1846, pl. xxxviii, f. 347.

P.G. Bushire. Gulf of Oman, Muscat, 2-8 fathoms.

I. Karachi; occurs at very low tide, amongst mud and weed on
rocks. Bombay (Abercrombie).

Var. *lemniscata*, G. & H. Nev.

Clathurella lemniscata, G. & H. Nevill, Journ. As. Soc. Bengal,
vol. xlv, 1875, pt. ii, p. 92, pl. vii, f. 11.

P.G. Bahrein Island.

M.C. Gwadûr (W. T. Blanford).

I. Bombay (Abercrombie), with the type in shell-sand; also
Rev. S. B. Fairbank, *seus* G. & H. Nevill.

Seemingly only differing in the continuous brown band below the sutures. The figure given by Nevill as quoted above is from a Mauritian type. It is also reported from Ceylon. The typical form is widely distributed throughout the eastern tropics.

§ Subgen. *VEPRECUA*, nov.

Shell small, thin, delicate, pale brown or white, fusiform, spire either very attenuate, or pagodiform, or broader, and ventricose, always much suturally impressed; whorls 10-12, the nuclear being 4-5, the first of these smooth, the second to the fourth or fifth very finely longitudinally radially costulate, the remainder either few or closely ribbed, crossed by frequent or more distant lirations, acutely echinate at the points of junction, interstices appearing deeply seated, almost smooth, quadrate or oblong, mouth oblong, outer lip thin, sinus deep and wide, situate immediately below the suture. Canal produced, fusiform.

(*Veprecula*, dim. of *repres*, a little thorn, from the echinate ribs.)

Type.—*Veprecula sykesii* (Melv. & St.).

This sub-genus of *Clathurina*, which I now venture to propose, consists of a few abysmal species with a strong resemblance to each

other, five in number, distributed over a great portion of the eastern tropics, having been noticed in Japan (A. Adams), Australia (Hedley), Persian Gulf and Gulf of Oman (Townsend). A superficial resemblance may be traced through such a species as *Cl. pseudohystrix*.¹ (Sykes), better known by the name of *hystrix* (Jan). In this species, as in so many true Clathurinæ, the nuclear whorls are bulbous, vitreous, closely spirally microscopically striate or cancellate.

150. CLATHURINA (VEPRECUA) ASPERULATA (Sm.). (Pl. IX, Fig. 1.)

Pleurotoma (*Defrancia*?) *asperulata*, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. x, 1882, p. 296.

P.G. Coll. Pelly. (Type in the British Museum.)

Differs from *Cl. reticulosa* (Sm.), according to the author (loc. cit., p. 297), by its longer spire, narrower form, closer reticulation, and smooth apical whorls. All the species seem very nearly allied. Also reported from Japan.

This does not occur in the Townsendian gatherings. I can hardly separate it from its too near ally, *Cl. reticulosa*. In my opinion, the apical whorls of the type (here figured) are worn, and the fine delicate radiate ribs obliterated. Should it be decided in future to unite these two species, both described in the same paper, the present species has precedence by one page.

151. CLATHURINA (VEPRECUA) HEDLEYI (Melv.). (Pl. X, Fig. 16.)

Clathurella hedleyi, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 59, pl. v, f. 9.

P.G. Mussandam, 47 fathoms. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

This species differs from its congeners in its greater ventricosity and roundness of whorl, the number of longitudinal costæ on the body-whorl is sixteen in the specimen figured, the spiral acute lirations are also more frequent than obtain in *sykesii* or *vepratica*. The apical whorls are microscopically longitudinally costellate, four in number. The type possesses a greater number of ribs than obtains in the more recently collected examples, but I cannot further separate them specifically.

152. CLATHURINA (VEPRECUA) RETICULOSA (Sm.). (Pl. IX, Fig. 2.)

Pleurotoma (*Defrancia*) *reticulosa*, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. x, 1882, p. 297.

P.G. Coll. Pelly. (Type in the British Museum.) Henjam Island, one or two specimens dredged at 40 fathoms.

Under *Cl. asperulata* its close affinity with the present species was mentioned, as the figures will also show. Besides the alleged difference in the nepionic whorls (*reticulosa* having the fine radial ribs which certainly obtain in the three other species now relegated to this section) the author states that *reticulosa* may be known by

¹ Proc. Malac. Soc. Lond., vol. vii, 1906, p. 187.

"the smooth furrow at the top of the whorls, the reticulated surface, and the rather produced canal". But, surely, two of these three characteristics are also present in *asperulata*, and as regards the third, the furrow at the top of the whorls seems very much the same in each. However, I keep them distinct at present out of regard for the author. Both these species are also reported from Japan.

153. CLATHURINA (VEPRECUA) SYKESII (Melv. & St.).

Clathurella sykesii, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 314, pl. xxiii, f. 4.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms. Abundant locally, in the dredging just mentioned, all the specimens being dead, and often fragmentary. The species is almost an exact replica in miniature of a typical *Fusinus*, so far as the contour is concerned. It is extremely narrow, and the longitudinal ribs on the body-whorl number only eight. The nepionic whorls are of the same character as those of *vepratrica* and *reticulosa*.

154. CLATHURINA (VEPRECUA) VEPRATICA (Hedley). (Pl. X, Fig. 14.)

Pleurotoma vepratrica, C. Hedley, Mem. Austral. Mus., vol. iv, 1903, p. 384, pl. vi, f. 97.

Pleurotomella ,, ,, Rept. Australasian Assoc., vol. xii, 1910, p. 365.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.
M.C. Charbar, 40 fathoms.

When, in 1904, I described *Cl. hedleyi*, I alluded to the fact of *Cl. vepratrica* (Hedl.) being almost exactly intermediate between that species and *Cl. sykesii* (Melv. & St.). There can be no doubt of this; and now that all three species are found together in the same seas, the question may be asked whether they are not varietal. I hardly think so: the extremely attenuate *sykesii*, with only 8 costæ on the body-whorl, the far more tumid and ventricose *hedleyi*, with 14 or occasionally 16, and the slightly angular *vepratrica*, stouter than *sykesii*, but attenuate in comparison with *hedleyi*, and 10-11 ribbed, always seem fairly easily separable. The nepionic whorls are very similar. But few of those we have been able to examine of any of the species are quite perfect, but many show three whorls, all very finely costulate. I have in my possession, from the Arthur Adams collection of Japanese shells, one example in perfect condition, of what I consider this species. Mr. Hedley's figure, as quoted above, should be consulted. This type has a five-whorled nepionic apex.

The species came from Australia, off Port Kemble, 63-75 fathoms; Botany Bay, 50-2 fathoms; off Cape Three Points, 41-50 fathoms; also off Cabbage Tree Island in 1880; and it is likewise recorded from the Torres Straits (Hedley). It seems to me that the peculiar nuclear whorls preclude the genus *Pleurotomella* being seriously considered for this species, as suggested in 1909 by its author, in his enumeration of Queensland shells.

Genus DAPHNELLA, Hinds, 1844.

155. DAPHNELLA AXIS (Reeve).

Pleurotoma axis, Reeve, Proc. Zool. Soc. Lond., 1846, p. 3.

" " " Conch. Icon., vol. i, 1846, pl. xxxiv, f. 311.

Muscat, 20-40 fathoms, large dead specimen.

P.G. Malcolm Inlet, 20 fathoms; Kais (or Gais) Island, 10 fathoms, amongst broken shell and coral sand. Gulf of Oman, lat. $24^{\circ} 55' N.$, long. $57^{\circ} 5' E.$, 37 fathoms.

I. Karachi.

A large, handsome species, spirally acutely lirated, tornate, with no cancellations.

Reported from Queensland by Hedley, and, under name *Clathurella axis*, from the Philippines by Hidalgo, and also Reeve, as collected by Hugh Cuming.

156. DAPHNELLA BUCCINULUM, M. & St.

Daphnella buccinulum, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 317, pl. xxiii, f. 9.

P.G. Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

A very inflated species, thin, and delicately very finely cancellate throughout, the body-whorl extending to two-thirds of the total length.

157. DAPHNELLA CECILIE, M. & St.

Daphnella cecilie, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 447, pl. xxiv, f. 13.

M.C. Without exact locality.

An almost unique species. Allied to *D. subula*, Reeve, of which it perhaps may be a variety, but is pure white, immaculate, finely cancellate on the uppermost whorls. It received its name in honour of Miss Cecilia Sturt, daughter of Mr. W. Neville Sturt, who received the type direct from Mr. F. W. Townsend in 1904-5.

158. DAPHNELLA DEA, Melv.

Daphnella dea, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 167, pl. x, f. 24.

P.G. Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

Resembling *D. thia*, Melv. & St., but far finer in its cancellations, a species hardly to be excelled in that particular, bearing all the characteristics of an abysmal form.

159. DAPHNELLA EUPHROSYNÆ, Melv. & St.

Daphnella euphrosyne, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 318, pl. xxiii, f. 12.

P.G. Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

Nearest to *D. subula*, Reeve, also occurring in these seas. It is, however, pure white throughout, with none of the sutural orange-brown maculation of the kindred species; the sculpture, however,

particularly of the upper whorls, is very similar. *D. ceciliae*, Melv. & St., is also a very near ally, but in this species the spiral lines are more prominent, as shown in the illustration quoted above.

160. *DAPHNELLA EVERGESTIS*, Melv. & St.

Daphnella evergestis, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 447, pl. xxiv, f. 14.

P.G. Gulf of Oman, lat. 24° 55' N., long. 59° 59' E., 37 fathoms, sand and coral mud.

A many-ribbed, elegantly cancellate species, of which but few specimens were found.

161. *DAPHNELLA HEDYA*, Melv. & St.

Daphnella hedya, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 318, pl. xxiii, f. 11.

P.G. Shaikh Shuaib Island, 15 fathoms.

This delicate mottled species, tinted towards the base with crimson-brown, has not since occurred. The whorls are very finely decussately cancellate, gemmulate at the points of junction. Some of the upper whorls are variciferous.

162. *DAPHNELLA LUCASII*, Melv.

Daphnella lucasii, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 167, pl. x, f. 25.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 150 fathoms.

A more effuse, inflated species than most of its congeners, in form like a minute *Fasciolaria*, banded over the whole surface with spiral raised liræ, occasionally somewhat interrupted, the apical whorls beautifully decussate, outer lip very effuse, canal recurved, slightly produced. It is named in honour of Mr. Bernard R. Lucas of Winnington, Cheshire, who has rendered me during many years most beneficent and generous service in sorting these minute organisms out of the mixed mass of dredged material.

163. *DAPHNELLA MACANDREWII* (Sm.). (Pl. IX, Fig. 11.)

Pleurotoma (Daphnella) macandrewii, E. A. Smith, Ann. Mag. Nat. Hist., ser. v, vol. x, 1882, p. 302.

P.G. Muscat, 15-22 fathoms; Mussandam, 47-55 fathoms; Malcolm Inlet (Kubbatt Ghazira), 35 fathoms; Henjam Island (1906).

Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms. Kuh i Mubarik. Daimaniyat Isles, 100 miles south of Jask (1912).

I. A broken specimen in the Abercrombie collection from Bombay. Its nearest ally is *D. veneris*, Melv. & St., a gradate shell, much more abbreviate in contour, with canal not so prolonged.

164. DAPHNELLA OMALEYI (Melv.).

Clathurella omaleyi, Melvill, Ann. Mag. Nat. Hist., ser. VII, vol. iv, 1899, p. 88.

P.G. Mussandam, 55 fathoms; Henjam Island (1906); Gulf of Oman; Kuh i Mubarik, 45 fathoms.

Telegraph Cable, lat. 25° 58' N., long. 57° 05' E., at 50 fathoms, amongst various shell growth.

M.C. Charbar, 40 fathoms.

This species was at first classed as a *Clathurella*, owing to supposed kinship with such a species as *Cl. robillardi*,¹ H. Adams, but the costæ are of a different and more irregular character. Superficial likeness to *Mangilia galigensis*, Melv., and *M. townsendi*, Sby., prevails, but the protoconch of our species is mostly delicately decussately cancellate, and the characters of the prolonged canal and outer lip decide us to place it in the genus *Daphnella*. It is a most delicate and beautiful shell, very regularly paucicostate, shining, the whorls crossed with very fine spiral striæ, gemmulate at the points of junction with the ribs. It was named in honour of Julian Adrian O'Maley, formerly of the Indian Government Telegraph Service, who died at Manchester in 1913, aged 48. He had taken great interest and part in the Persian Gulf dredgings.

165. DAPHNELLA SABRINA, Melv.

Daphnella sabrina, Melvill, Proc. Malac. Soc. Lond., vol. vii, 1906, p. 17, pl. vii, f. 22.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

Extremely highly sculptured, with many spiral carinæ, one being especially conspicuous at the periphery, the cross cancellations are pronounced and fine, the apical whorls ochreous, minutely decussate.

166. DAPHNELLA SATURATA (Reeve).

Pleurotoma saturata, Reeve, Conch. Icon., vol. i, 1845, pl. xxiv, f. 213.

" " " Proc. Zool. Soc. Lond., 1845, p. 113.

P.G. Muscat, 10–20 fathoms, and again at 40 fathoms.

A finely sculptured shell, conspicuous for a white somewhat raised band at the periphery of the body-whorl, and adorned with other minor spiral bands. The coloration is a deepish brown, outer lip crenulate, canal slightly recurved. The type came from Corrigidor Island, Philippines (coll. Cuming). See remarks under the next species.

167. DAPHNELLA SUBULA, Reeve.

Daphnella subula, Reeve, Proc. Zool. Soc. Lond., 1845, p. 113.

" " " Conch. Icon., vol. i, 1845, pl. xxiv, f. 211.

P.G. Gulf of Oman, lat. 26° 10' N., long. 52° 50' E., 33 fathoms, sand and mud.

M.C. Charbar Point, on rocks at 7–12 fathoms.

Astola Island, on rocks and algæ.

¹ Proc. Zool. Soc. Lond., 1869, p. 272, pl. xix, fig. 2.

This species and *D. saturata* (Reeve) were discovered at the same time and place (Corrigidor Island, Philippines) by Mr. Hugh Cuming, at a depth of 7 fathoms. Both are probably widely diffused throughout the eastern tropics. *D. subula* has a characteristic style of painting, as well as sculpture, and is well figured as given above. It is possible that our *D. euphrosyne* may be a more delicate, colourless, deep-water variety. Also reported from Queensland (Hedley).

168. DAPHNELLA TETARTEMORIS (Melv.).

Mangilia tetartemoris, Melvill, Ann. Mag. Nat. Hist., ser. VIII, vol. vi, 1910, pl. ii, f. 24.

M.C. Off Astola Island, at 90 fathoms.

A near ally of *D. omaleyi* (Melv.), differing in its quadrate sculpture, two acute keels existing on the lower whorls, one on the upper, crossing six remote yet regular ribs. The nuclear whorls are delicately decussately cancellate.

169. DAPHNELLA THIA, M. & St.

Daphnella thia, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 316, pl. xxiii, f. 8.

P.G. Shaikh Shuaib Island, 15 fathoms.

Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

A beautiful and delicate *Daphnella*, with a yellowish or golden tinge over the whole semi-pellucid surface. The decussating liræ are not so close as is the case in *D. buccinulum*, M. & St., or *dea*, Melv., but nevertheless very fine. The body-whorl is fairly tumid, spire slightly elongate, canal produced.

170. DAPHNELLA THYGATRICA, M. & St.

Daphnella thygatraca, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 316, pl. xxiii, f. 6.

P.G. Gulf of Oman, lat. $24^{\circ} 58' N.$, long. $56^{\circ} 54' E.$, 156 fathoms.

A peculiar shell, doubly keeled on the body-whorl, straw-coloured, with pale-red flame-ornamentation. It occurred only in the locality above given.

171. DAPHNELLA TRIVARICOSA, v. Mart.

Daphnella trivari-cosa, E. von Martens, in Moebius, Beitr. Meeresf. Insel Mauritius, 1880, p. 228, pl. xx, f. 1.

P.G. Malcolm Inlet. Gulf of Oman, locality not specified.

The uppermost whorls are strongly variced, the lower ones usually plain. This species only occurred in one dredging.

172. DAPHNELLA VENERIS, M. & St.

Daphnella veneris, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 449, pl. xxiv, f. 16.

P.G. Gulf of Oman, lat. $24^{\circ} 05' N.$, long. $57^{\circ} 25' E.$, 205 fathoms; lat. $25^{\circ} 04' N.$, long. $60^{\circ} 06'$, 60 fathoms.

Off Muscat, 20 fathoms (1907).

The nearest ally to this finely sculptured species seems to be *D. macandrewi* (Smith), from which it can readily be distinguished. The lower whorls are rarely variced (see remarks under this last-named species).

173. *DAPHNELLA XYLOÏS*, M. & St.

Daphnella xyloïs, Melvill & Standen, Proc. Zool. Soc. Lond., 1901, p. 449, pl. xxiv, f. 17.

P.G. Muscat, 10–20 fathoms, coral sand.

The nuclear, finely cancellate, whorls are ochreous tinted. Whole shell closely reticulate. When in live condition much tinted with dark-brown markings. Near *D. thia*, M. & St., which is a more coarsely grained species.

§ Subgen. *DIAUGASMA*, nov.

Shell minute, oliviform, smooth or microscopically spirally striolate, mainly on each side of the sutures, leaving the central portion of the whorl plain, in form cylindrical or elongate, compact, only slightly impressed at the sutures, nuclear whorls closely and very finely cancellate, whorls semi-pellucid, unicolorous white, or flecked with pale stramineous, mouth narrowly oblong, outer lip nearly straight, slightly thickened, sinus hardly expressed.

(*διαύρασμα*, transparency, from its vitreous appearance.)

174. *DAPHNELLA* (*DIAUGASMA*) *EPICHARTA* (M. & St.).

Daphnella epicharta, Melvill & Standen, Ann. Mag. Nat. Hist., ser. VII, vol. xii, 1903, p. 317, pl. xxiii, f. 10.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

This little species, which is in length but 5 mm., seems to appertain, with one or two others, to a distinct and peculiar section of *Daphnella*, so I now propose a new subgeneric title for it. *Pleurotoma olyra* and *vitrea*, both of Reeve,¹ judging by figure and description, are nearly allied, and would probably be included in the same category. The first of these, *olyra*, comes nearest to *epicharta*. It can be distinguished by its much larger size, say 11 mm. long, aperture wider, shorter spire, and pink-tipped apex. It is likewise semi-transparent, and the very delicate spiral striation across the whorls is represented by the author as sometimes evanescent altogether. *Pl. vitrea* is also, as its name would imply, glassy and pellucid, smooth centrally, but spirally striate, as is *epicharta*, round the sutures. This is a more elongate shell, 8 mm. in length, whorls slightly ventricose, outer lip expanded, and came from Singapore and Mindanao Island, Philippines (Cuming). *D. epicharta* is more oliviform, and might also easily be mistaken for a species of *Æsopus*, but there can be no doubt of its pleurotomid character.

¹ Conch. Icon., vol. i, 1845, pl. xxiv, f. 207, and pl. xxxiii, f. 300.

Genus PLEUROTOMELLA, Verrill, 1873.

Usually considered to be a section of *Daphnella*, but I think it may be raised to generic rank. The species possess a common "facies" wherever they are found. The shell is as a rule more or less turreted or gradate.

175. PLEUROTOMELLA ALCESTIS (Melv.).

Daphnella (*Pleurotomella*) *alcestitis*, Melvill, Proc. Malac. Soc. Lond., vol. vii, 1906, p. 78, pl. viii, f. 23.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

Allied to *Pl. amphiblestrum*, Melv., and *eulimenes*, Melv., but more fusiform in contour, with regular quadrate decussating sculpture, mouth oblong, canal slightly produced. Colour pure white.

176. PLEUROTOMELLA AMPHIBLESTRUM (Melv.).

Clathurella amphiblestrum, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 18, pl. v, f. 7.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

It is often difficult to draw a hard and first line between the Clathurinae and certain outlying Daphnelloid species, and this is a case in point. *Pl. amphiblestrum* is a somewhat coarsely cancellate species, the nuclear whorls ochreous, very finely and beautifully decussate. The anal sinus is very distinct, coming just below the suture. It seems comparable with *Daphnella brazieri*, Angas,¹ an Australian species, well figured by Hedley,² but this species is inclined to be slightly shouldered at the upper part of the whorls.

177. PLEUROTOMELLA AMPHITRITES (M. & St.).

Daphnella (*Pleurotomella*) *amphitrites*, Melvill & Standen, Ann. Mag. Nat. Hist., ser. vii, vol. xii, 1903, p. 316, pl. xxiii, f. 3.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

Found with *Pl. nereidum* (M. & St.), which differs from it in greater angularity of whorl and less obesity of contour. Both are pure white, delicately chased shells, of considerable beauty.

178. PLEUROTOMELLA EPHORA (Melv.).

Mangilia ephora, Melvill, Proc. Malac. Soc. Lond., vol. vi, 1904, p. 58, pl. v, f. 5.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

The projecting spiral ridge encircling the body-whorl amply characterizes this peculiar little species. The nuclear whorls are beautifully cancellate; sinus but lightly expressed.

179. PLEUROTOMELLA EULIMENES (Melv.).

Daphnella eulimenes, Melvill, Journ. of Malac., vol. xi, 1904, p. 84, pl. viii, f. 15.

P.G. Gulf of Oman, lat. 24° 08' N., long. 56° 54' E.; 156 fathoms.

A graceful species, of rare occurrence at the above very prolific

¹ Proc. Zool. Soc. Lond., 1871, p. 18, pl. i, f. 22.

² Mem. Austral. Mus., iv, pt. 6, 1903, p. 392, f. 107.

locality. The whorls are once conspicuously but slopingly angled below the sutures. Colour pure white. Eulimenes was one of the sea-nymphs or Nereïds of mythology.

180. PLEUROTOMELLA EVADNĒ, Melv.

Pleurotomella evadne, Melvill, Proc. Malac. Soc. Lond., vol. x, 1912, p. 252, pl. xii, f. 18.

P.G. Mussandam, 55 fathoms.

Curiously and unusually abbreviate, indeed almost round, the nuclear whorls finely decussate, outer lip slightly effuse, canal short. Quite buccinoid superficially. A rare species.

181. PLEUROTOMELLA HYPERMNESTRA, Melv.

Pleurotomella hypermnestra, Melvill, Proc. Malac. Soc. Lond., vol. x, 1912, p. 253, pl. xii, f. 19.

P.G. Mussandam, 55 fathoms.

Near *Pl. amphiblestrum* (Melv.), or especially *Pl. eulimenes* (Melv.), from the same seas. Its sculpture is finer than the former, and the longitudinal ribs only half the number of those obtaining in the latter species. The sinus is well expressed, apical whorls cancellate.

182. PLEUROTOMELLA ITAMA (Melv.).

Daphnella (*Pleurotomella*) *itama*, Melvill, Proc. Malac. Soc. Lond., vol. vii, 1906, p. 78, pl. viii, f. 24.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

This small species is of very different character to the others at present associated with it, though when examined with a high power it will be seen to possess many kindred qualities—the beautifully cancellate ochreous protoconch, incrassate riblets, crossed by close spiral liræ, canal slightly prolonged.

An Arctic species, named *Defrancia formosa* by Jeffreys,¹ is, judging by the figure, of much the same character.

183. PLEUROTOMELLA NEREÏDUM (M. & St.).

Daphnella (*Pleurotomella*) *nerëidum*, Melvill & Standen, Ann. Mag. Nat. Hist., ser. vii, vol. xii, 1903, p. 315, pl. xxiii, f. 2.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

This is comparable with *Daphnella vestalis*, Hedley, an equally exquisite form, the sinus in both is non-existent, and the ornamentation and shape very similar. Our species is the coarser of the two, and the whorls more sharply angled.

184. PLEUROTOMELLA RHYTISMEIS, Melv.

Pleurotomella rhytismeis, Melvill, Ann. Mag. Nat. Hist., ser. viii, vol. vi, 1910, p. 14, pl. ii, f. 25.

P.G. Gulf of Oman, lat. 24° 58' N., long. 56° 54' E., 156 fathoms.

The wrinkled sculpture and strong median peripheral angulation distinguish this small white species. Only a specimen or two have been yet found.

¹ Proc. Zool. Soc. Lond., 1883, p. 397, pl. xlv, f. 9.

EXPLANATION OF PLATES VIII-X.

PLATE VIII.

FIG.

1. *Turris* (*Tomopleura*) *acutigemmata* (Sm.).
2. *Surcula nellicæ* (Sm.).
3. *Turris* (*Gemmula*) *multiseriata* (Sm.).
4. *T.* (*Tomopleura*) *vertebrata* (Sm.).
5. *Drillia incerta* (Sm.).
6. *D. intertincta* (Sm.).
7. *D. crenularis* (Lam.), var. *atkinsonii*, Sm.
8. *D. variabilis*, Sm.
9. *D. baynhami* (Sm.).
10. *D.* (*Tylotia*) *crassa* (Sm.).
11. *Surcula fulminata* (Kien.), var. *gloriosa*, nov.
12. *Mangilia fortistriata* (Sm.).
13. *M. albolabiata* (Sm.).
14. *M. decipiens* (Sm.).

PLATE IX.

1. *Clathurina* (*Veprecula*) *asperulata* (Sm.).
2. *C.* (*Veprecula*) *reticulosa* (Sm.).
3. *Mangilia albata* (Sm.).
4. *M. scitula* (Sm.).
5. *M. munda* (Sm.).
6. *Drillia persica* (Sm.).
7. *D. lucida*, G. & H. Nev.
8. *D. persica* (Sm.), var. *jacintha*, nov.
9. *M. pellyi* (Sm.).
10. *M. arcta* (Sm.).
11. *Daphnella macandrewi* (Sm.).
12. *Mangilia gracilentia* (Reeve), var. *portia*, Sm.
13. *Clathurina albicaudata* (Sm.).
14. *Mangilia heptagona* (Dkr.).
15. *M. horneana* (Sm.).
16. *M. lucida* (Sm.).
17. *Lienardia crebrilirata* (Sm.).

PLATE X.

1. *Drillia inconstans* (Sm.).
2. *D. pyramidula* (Reeve).
3. *Cythara lyrica* (Reeve).
4. *C. striatella*, Sm.
5. *Mangilia tritentiata*, sp. nov.
6. *M. erymna*, sp. nov.
7. *M. olivieriana*, sp. nov.
8. *Clathurina catharia*, sp. nov.
9. *Mangilia woodwardiæ*, sp. nov.
10. *Clathurina spanionema*, sp. nov.
11. *Drillia chimastrum*, sp. nov.
12. *Mangilia callicredemna*, sp. nov.
13. *Clathurina foraminata* (Reeve), var. *pyrgodea*, nov.
14. *C.* (*Veprecula*) *vepratrica* (Hedley).
15. *Mangilia horneana* (Sm.), var. *compar*, nov.
16. *Clathurina* (*Veprecula*) *hedleyi*, Melvill.
17. *C. netrodes*, sp. nov.

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ON *ANODONTA CYGNÆA* (LINN.) CONTRASTED WITH *ANODONTA ANATINA* (LINN.); AND ON *PSEUDANODONTA ROTHOMAGENSIS*, LOCARD.

By H. H. BLOOMER, F.L.S., and H. OVERTON.

Read 8th December, 1916.

PLATE XI.

THE questioned relationship of *Anodonta anatina* to *A. cygnæa* is the reason the following work has been undertaken.

The intention in the first instance was to make a more exhaustive investigation, but the War has prevented the obtaining of specimens from a number of important places in this country as well as from the Continent. A comparison of the British species with the Continental forms of *Anodonta* would have conveyed a more comprehensive grasp of the subject, but since some considerable time must elapse before this is possible it is felt desirable to give the result of the research so far, incomplete though it may be.

It is further hoped that the ecological portion will induce other conchologists to record their experiences of similar areas.

Thanks are acknowledged to the following for their kindly help in specimens or notes: B. B. Woodward, A. S. Kennard, Dr. F. Haas, J. R. B. Masefield, F. Booth, W. Blake, B. R. Lucas, P. T. Deakin, and others.

ANODONTA CYGNÆA (Linn.).

Shell.—In the following description Jeffreys has, to a great extent, been followed.

Shell oblong, slightly ventricose, thin, moderately glossy, yellowish green or brown, transversely and irregularly grooved by the lines of growth, and wrinkled in the same direction on the posterior and ventral sides; periostracum thin; umbones placed at a distance of nearly one-fourth from the anterior extremity; ligament rather long and strong, partly concealed within the overlapping edges of the dorsal margin or hinge-line, which is straight; anterior side not gaping, rounded, and somewhat abruptly sloping ventrally; posterior side gradually sloping and compressed above, produced into a rounded wedge-like extremity and slightly gaping; ventral margin slightly curved; inside pearly white and sometimes iridescent; hinge slight, having a rather sharp ridge-like plate on the posterior side in each valve; muscular and pallial scars very slight and often indistinct.

Animal.—The specimen described (Pl. XI, Fig. 1) was taken from Bracebridge Pool, Sutton Coldfield. It measures 100 mm. antero-posteriorly by 55 mm. dorso-ventrally, is somewhat flattened dorsally, being nearly parallel to the long axis of the animal, is curved anteriorly, slightly curved ventrally, and more or less bluntly triangular posteriorly.

The colour of the proximal part of the foot is white or greyish white, sometimes tinged with orange, whilst the distal part is

usually of an orange shade, becoming more pronounced towards the keel. The mantle is generally of an orange shade, varying in intensity and occasionally spreading to the dorsal surface as well as colouring the labial palps and adductor muscles.

The mantle is thin and bordered by the circumpallial muscles which form a shallow band (Fig. 1, *C.M.*). At the posterior end the mantle encloses the siphonal apertures, the inhalent (*In.A.*) being larger than the exhalent one (*Ex.A.*). The mantle fringe of the former has from fifty to seventy tentacles on each side.

On the removal of the shell the exposed terminal or lateral parts of the pallial and pedal muscles present the following characters:—

The anterior adductor (*A.A.*) is curved anteriorly, flattened posteriorly, and has the ventral larger than the dorsal part.

The posterior adductor (*P.A.*) is posteriorly deeply and broadly convex; anteriorly it is slightly concave.

The anterior retractor pedis (*R.P.A.*) is irregularly shaped, with the ventro-anterior edge resting on the centre of the posterior side of the anterior adductor.

The anterior protractor pedis (*P.P.A.*) is round, and situated some distance from the ventro-posterior edge of the anterior adductor.

The posterior retractor pedis (*R.P.P.*) is of an oblong shape and has its posterior edge in contact with the dorsal side of the posterior adductor.

A certain latitude must be allowed in the description of the shape of the muscles as they all, more or less, vary, and this particularly applies to the protractor and retractor muscles. In these the chief point to be remembered is their relative position to the adductor muscles.

ANODONTA ANATINA (Linn.).

Shell.—In describing this species Jeffreys has again been closely followed.

Shell oval, rather ventricose, moderately thick, glossy, olive green or brown with darker transverse bands denoting the lines of growth, and irregularly wrinkled in the same direction; periostracum thick; umbones placed at a distance of about one-third from the anterior end; ligament comparatively short and prominent; dorsal margin or hinge-line ascending for some distance posteriorly; anterior side rounded and gaping ventrally, with an oblique slope towards the ventral edge; posterior side compressed above, curved, and abruptly sloping to a wedge-like extremity; ventral margin curved; hinge and ridge-like plate the same as in *A. cygnæa*; inside the shell is thick, pearly white and iridescent, while the muscular and pallial impressions are deep and quite distinct.

Animal.—The specimen described (Pl. XI, Fig. 2) was taken from Longmore Pool, Sutton Coldfield.

The dorsal edge is curved, but it ascends from the umbonal region for some distance towards the posterior end. The anterior edge is curved, whilst the posterior is very bluntly triangular with its apical

portion lying ventro-posteriorly. The ventral edge has a distinct symmetrical curve.

The colour of the foot is white or greyish white, often tinged with yellow, becoming deeper towards the keel, where at times orange replaces the yellow. The mantle has generally a yellow shade, occasionally passing to a light orange. Some pools yield specimens having no orange or yellow colour about them.

The mantle is bordered by a deep band of circumpallial muscles (Fig. 2, *C.M.*), which are deeper at the anterior and posterior ends, more particularly the latter, where they are developed and form the siphonal chambers. These are large and occupy the whole of the posterior area, the inhalent (*In.A.*) being much larger than the exhalent one (*Ex.A.*). The former is bordered by a tentacular fringe, each side having from 120 to 200 small tentacles.

The exposed terminal parts of the muscles present the following features:—

The anterior adductor (*A.A.*) is large with the anterior part curved and the posterior portion irregular, particularly the ventro-posterior part.

The posterior adductor (*P.A.*) is also large, inclined to be more or less spherical but slightly prolonged ventro-posteriorly and flattened antero-dorsally.

The anterior retractor pedis (*R.P.A.*) has a somewhat triangular shape with the base close to the posterior edge of the anterior adductor and the apex lying in a dorso-posterior direction.

The anterior protractor pedis (*P.P.A.*) presents an irregularly shaped and relatively large surface and lies near the ventro-posterior edge of the anterior adductor.

The posterior retractor pedis (*R.P.P.*) is bluntly triangular, with the base resting upon the dorsal edge of the posterior adductor.

As in *A. cygnæa*, too much importance must not be attached to the description of the shape of the retractors and protractors but rather their relative position to the adductor muscles.

THE TWO SPECIES CONTRASTED.

Shell.—The shell is relatively larger in *A. cygnæa*, but is more oval, ventricose, and thicker in *A. anatina*; the periostracum is usually thicker and of a darker colour—an olive green or brown—in *anatina*; the umbonal region is more central in *anatina*; the ligament is longer and nearly hidden by the dorsal growth of the shell in *cygnæa*, in *anatina* it is exposed and prominent; dorsally *cygnæa* is straight, whereas *anatina* is curved and from the umbonal region ascending for some distance posteriorly; the ventral part of the anterior edge is gaping in *anatina* and usually closed in *cygnæa*, but if gaping then only slightly; the ventral margin of *anatina* is a little more curved; posteriorly both species are wedge-shaped, but the extremity is more pointed and situated more dorsally in *cygnæa*; the muscular and pallial scars are far more distinct in *anatina*, whilst in *cygnæa* they are often difficult to trace completely.

Dorso-ventral sections of the shell show *cygnæa* to be of a uniform

thickness, whilst in *anatina* it greatly increases towards the ventral edge. This condition is also noticeable in young specimens of *anatina*.

Animal.—In *cygnæa* there is a comparatively straight and horizontal (to the long axis of the animal) dorsal edge, whereas in *anatina* from the umbonal region it is slightly curved and ascending for some distance posteriorly. Anteriorly *cygnæa* is slightly more curved than *anatina*. Ventrally the edge is more curved in *anatina* than in *cygnæa*, whilst posteriorly both species are triangular, being sharper in *cygnæa* than *anatina*.

The siphonal apertures are comparatively larger in *anatina* than in *cygnæa*, but in both the inhalent is larger than the exhalent aperture. Further in *cygnæa* they are situated near the centre of the posterior border, and, lying in an inclined plane, have a slightly dorsal aspect. In *anatina* they are more vertical, occupy a greater surface, and have a more ventral position.

The inhalent aperture is bordered by a tentacular fringe. The number of tentacular processes is less for *cygnæa* than *anatina*, being always under 100 on each side for *cygnæa* and more than 100 for *anatina*, approximately 50 to 70 for *cygnæa* and from 120 to 200 for *anatina*. Though the processes are fewer in number in *cygnæa* they are larger in size.

The colour of the mantle and foot of *cygnæa* is usually of an orange shade, whilst that of *anatina* is, when coloured, of a yellow shade. The intensity of the colouring is invariably greater in *cygnæa* than *anatina*.

The question of coloration deserves closer attention from the point of view of periodicity as well as distribution.

In *cygnæa* the labial palps, that is those portions below the line of attachment to the body of the animal, are not proportionately so large in area as in *anatina*, and in *anatina* the distal part is pointed and more produced rearwardly than in *cygnæa*.

The gills in *cygnæa* ascend gradually in a dorso-anterior direction, whilst in *anatina* they ascend much more rapidly and the dorso-anterior portion lies more dorsally than in *cygnæa*.

The circumpallial muscles of *anatina* form a considerably deeper band than that possessed by *cygnæa*.

The exposed terminal parts of the muscles of the right side, viz. :—

The anterior adductor muscle is curved on the anterior edge in both species. Dorsally *cygnæa* has a sharper curve than *anatina*. Ventrally *cygnæa* has a rounder edge than *anatina*. Posteriorly *cygnæa* has a more uneven edge than *anatina*. Further the muscle is relatively larger in *anatina* than in *cygnæa*, but in both species it has a tendency to vary in shape.

The posterior adductor muscle in *cygnæa* is broadly crescent-shaped, whilst in *anatina* it is somewhat spherical. In *anatina* it is comparatively very large, and is situated slightly more dorsally than in *cygnæa*. This muscle, like the anterior adductor, has a disposition to vary in shape, though in a lesser degree.

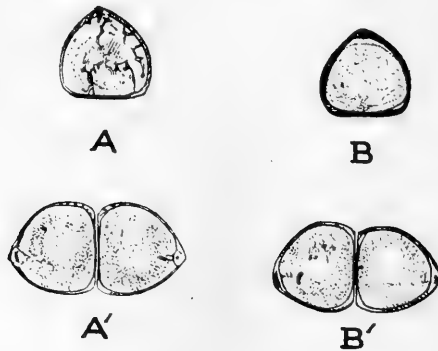
The anterior retractor pedis muscle is of an irregular shape in

cygnæa and triangular in *anatina*, with the base near the anterior adductor, but in *cygnæa* the apex lies in a dorsal plane, and the base is a little farther away from the adductor than in the other species.

The anterior protractor pedis muscle is larger in *anatina* than in *cygnæa*, and in the latter it is relatively farther away from the anterior adductor. Moreover, in *cygnæa* it lies in a direction ventro-posteriorly to the anterior adductor, whereas in *anatina* it is posterior to that muscle.

The posterior retractor pedis is of an oblong shape in *cygnæa* and triangular in *anatina*. In *anatina* it is close to the dorsal surface of the posterior adductor, and in *cygnæa* is a little farther away from the muscle with its dorsal edge nearly parallel to the long axis of the animal.

In describing and comparing the shape of the exposed parts of the muscles as viewed from the right side of the animal just after the removal of the shell, it must be borne in mind that there is often considerable variation when comparing one specimen with another of the same species, and further, the shape on the right side of the animal may be, and often is, different to that on the left side. Since this variation even extends to a comparison of the median sections it consequently does not follow that the spreading out of the muscles near the lateral extremities altogether explains the difference in the external shape. Great as the variation may be it is nevertheless confined within certain limits, and it is quite possible to determine the species by an examination of the exposed terminal parts of the muscles alone.



Embryos.—If the embryos when passed into the marsupium are examined under a low magnification it will be observed that there is a difference between those of *cygnæa* and *anatina* which is constant, namely, that the apical region or growing part is pointed in *cygnæa* (*A, A'*) and blunt in *anatina* (*B, B'*). Usually the sides are more curved in *anatina*, making quite a shoulder in the upper part, but this character is not quite so constant. The base or hinge region is the same in both species.

General Conclusions.—The examination of a large number of *A. cygnæa* has shown that the shells are fairly constant in form in any one area, whilst they have been found to present certain differences when contrasted with those of other areas. It has also been stated that there is a degree of variation in the external characters of the animals themselves as far as the muscular parts are concerned; there may further be a slighter variation in the position and shape of the siphonal parts and the number of tentacular processes, yet a critical examination bears conviction that they are true *cygnæa*.

A. anatina shows much more marked variation, although the type shell is invariably present and generally in considerable numbers. It is when the so-called doubtful specimens are scrutinized that the difficulties become apparent, and it is really astonishing what curious shapes the shell assumes in some areas. Out of one pool may be taken very many specimens all differing from each other: this, it must be admitted, more particularly obtains where *cygnæa* and *anatina* are found in the same water, though it may be only a coincidence and arise from some other cause. However, an examination of the external characters of the animals proves them to be variations of the type form of *anatina*, because of the predominance of the characters of this species. It is not to be presumed that hybridization does not occur, but at present no direct evidence is available of it taking place.

The conclusion at this stage points to the fact that *A. cygnæa* and *A. anatina* are distinct species, that hybridization is extremely doubtful, that *anatina* has a great tendency to vary, and in this respect it would seem that this species has arrived at a phase known to occur in other branches of Mollusca.

ECOLOGICAL STUDY OF THE ANODONS OF SUTTON PARK AREA.

The bulk of the material used in this investigation has been obtained from the vicinity of Sutton Coldfield and particularly Sutton Park. The latter, a large enclosed area, retains to a certain extent some of its natural features, and consists of heath and bog-land interspersed with elevated tracts clothed with oaks, hollies, pines, etc. The drainage is effected by two small streams running in a south-easterly direction, uniting outside the park, and thence flowing into the River Tame. From the beginning of the fifteenth to the end of the eighteenth century these streams were dammed up at various places to form pools, chiefly for industrial purposes. Some have since been filled in, but six situated within or on the border of the park area remain, viz.:—

Bracebridge Pool, made 1420.

Blackroot Pool, made 1757.

Keeper's Pool, made between 1420 and 1462.

Longmore Pool, made 1735.

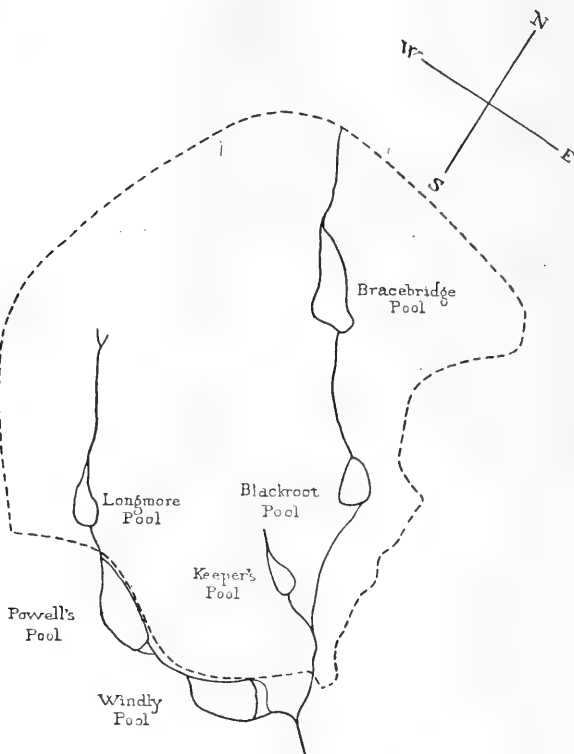
Powell's Pool, made some time during the eighteenth century.

Windly Pool, made during Norman times.

The accompanying sketch shows their respective positions.

Bracebridge Pool contains *A. cygnæa*. It is present in great numbers, and its shape is very constant. The specimen described in this work may be taken as typical of not only the pool but of the species. *A. anatina* is absent.

Blackroot Pool contains both *A. cygnæa* and *A. anatina*. *A. cygnæa* is normal, but *anatina* possesses a number of specimens which vary from the type. Only a limited number from this pool has been examined.



Scale, about 1 in. to the mile

In Keeper's Pool neither *A. cygnæa* nor *A. anatina* is found.

Longmore Pool contains only *A. anatina*. A very large number of specimens from this water has been examined. The type is quite prevalent, but there is also to be found a number varying more or less from it. Some viewed laterally are almost globose, and it is possible to find every grade of shape between the latter and the type.

Powell's Pool contains both *A. cygnæa* and *A. anatina*.

Windy Pool also contains both, and a great many have been examined. *A. cygnæa* is fairly constant in its shape, but in *anatina*,

though the type is common, there is a very large number of specimens which vary from the type. There is also a number of specimens which at first were considered of a doubtful nature. Were they hybrids or extreme variations of *anatina*? As previously explained they proved on a critical examination to possess such characters as undoubtedly determine them to be varieties of *anatina*, and as such they are accepted. It should further be noted that this tendency to vary is more pronounced in this pool than in Longmore Pool.

It will thus be observed that the first pool on each stream contains only one species, i.e. *A. cygnæa* in Bracebridge Pool and *A. anatina* in Longmore Pool, whilst the next pool in succession on each stream contains both. It is only when *A. anatina* is present that the tendency to vary prevails. The evidently interesting point is that Bracebridge Pool, which was made nearly 500 years ago, does not possess *A. anatina* but contains *A. cygnæa* in large numbers, and Longmore Pool, formed 180 years ago, does not contain *A. cygnæa* but has *anatina* in profusion, a considerable number of which varies from the type.

Since the above was written a few dead shells of *A. anatina* have been taken near the upper end of Bracebridge Pool. This is explained by the fact that a few years ago a local naturalist transferred some *Unio pictorum* and *A. anatina* from a pool which was being filled up and so introduced *A. anatina*. It must also be stated that a few dead shells of *A. cygnæa* have been likewise taken from the upper end of Longmore Pool, and there are strong grounds for believing an attempt has recently been made to introduce this species into this pool as well.

PSEUDANODONTA ROTHOMAGENSIS, Locard.

Shell.—Shell sub-oval, slightly compressed, moderately thick, glossy, dark olive or brownish-green colour, transversely grooved by lines of growth, and wrinkled in the same direction on the anterior and posterior sides; epidermis of medium thickness; umbones nodulous, placed at a distance of nearly one-fourth from the anterior end; ligament long and prominent; dorsal side from umbonal region curved anteriorly, also curved and ascending posteriorly; anterior side curved and sloping ventrally, widely gaping, slight oblique compression posteriorly inclined as from the umbonal region; posterior side compressed above, wedge shaped with the extremity situated somewhat ventrally; inside pearly white with the central part tinged a salmon cream colour, iridescent; hinge slight with a prominent ridge-like plate as in *Anodonta cygnæa*; muscular and pallial scars distinct.

Animal.—The specimen described was taken from the River Teme, near Knightswick, by Mr. W. H. Foxall, to whom we wish to express our thanks for this and other specimens he has allowed us to examine.

The animal examined measures 77 mm. by 43 mm. The dorsal portion is roughly triangular, with the apex about 10 mm. nearer the

posterior than the anterior end. The anterior part is rounded, whilst the posterior end is bluntly triangular.

In colour the mantle is slightly a greyish-white, whilst the anterior part has a sulphur tinge and the posterior part near the margin an orange one. The foot is white.

The mantle is bordered by the band of circumpallial muscles (Pl. XI, Fig. 3, *C.M.*), which are deeper at the posterior than along the anterior and ventral edges.

The inhalent aperture (*In.A.*) is nearly the same size as the exhalent one (*Ex.A.*). Along each side of them the inner longitudinal fold of the mantle is produced in a pronounced manner, and when required the free edges come together and close the apertures. On the inner surface of it, bordering the inhalent aperture, is a number of tentacular processes, about fifty on each side, arranged in four irregular rows. The row nearest the outer edge possesses the smallest in size but the largest in number. In the next two rows the processes are larger—the ones in the rear row alternating with those in front. In the last row are to be found the largest in size but fewest in number.

The exposed terminal parts of the muscles exhibit the following features:—

The anterior adductor muscle (*A.A.*) situated in the dorso-anterior part of the animal is nearly twice the size measured dorso-ventrally by antero-posteriorly, with rounded margins except on the posterior side, where the dorsal part curves inwardly and in the recess of which closely lies the anterior retractor pedis muscle. Below this is a slight contraction, and to the rear of the posterior part is situated the anterior protractor pedis muscle.

The posterior adductor muscle (*P.A.*) is large and somewhat round in shape, slightly projecting at the antero-ventral part and flattened at the antero-dorsal edge. On the latter rest the retractor pedis posterior muscles.

The anterior retractor pedis muscle (*R.P.A.*) is triangular in shape and situated close to the dorso-posterior edge of the anterior adductor.

The anterior protractor pedis muscle (*P.P.A.*) is of an irregular shape and lies a short way from the ventro-posterior margin of the anterior adductor.

The posterior retractor pedis muscle (*R.P.P.*) is of a triangular shape, with the base resting on the posterior adductor.

EXPLANATION OF PLATE XI.

FIG.

1. *Anodonta cygnæa* (Linn.).
2. *A. anatina* (Linn.).
3. *Pseudanodonta rothomagensis*, Locard.

All of the natural size.

A.A. anterior adductor muscle.

C.M. circumpallial muscle.

Ex.A. exhalent aperture.

F. foot.

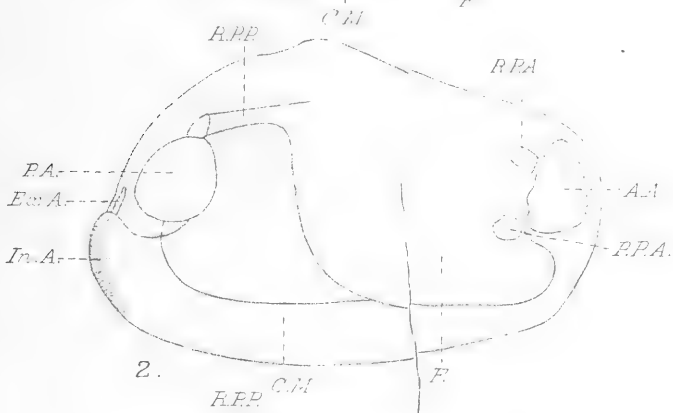
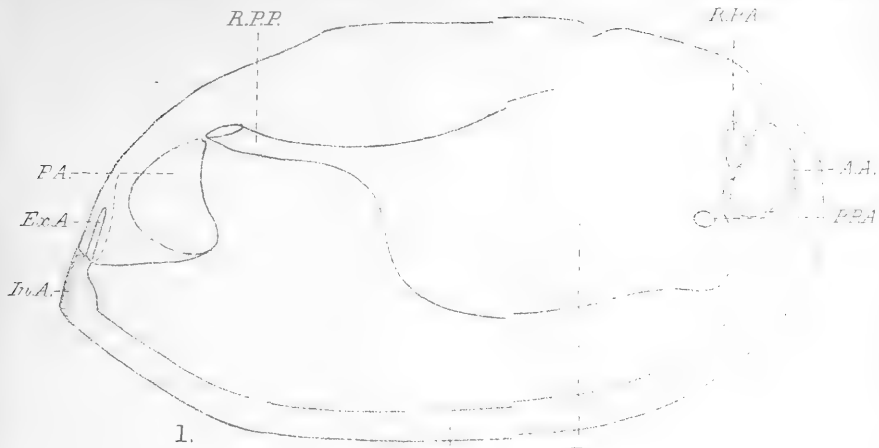
In.A. inhalent aperture.

P.A. posterior adductor muscle.

P.P.A. anterior protractor pedis muscle.

R.P.A. anterior retractor pedis muscle.

R.P.P. posterior retractor pedis muscle.

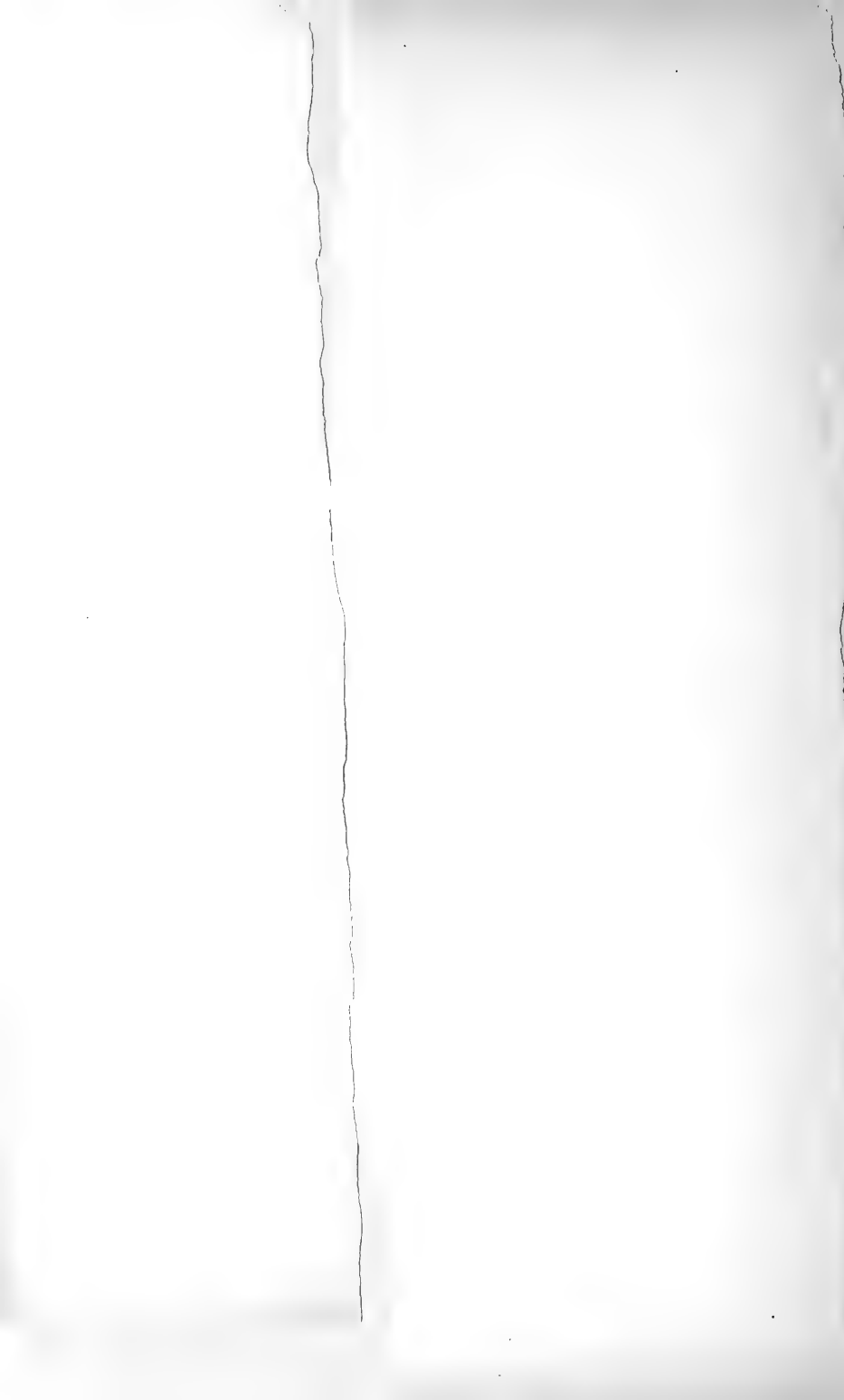


H.H.B. del.

Huth, Lith. London.

ANODONTA CYGNÆA.
PSEUDANODONTA

ANATINA AND
OMAGENSIS.



MALACOLOGICAL SOCIETY OF LONDON.

INCOME AND EXPENDITURE FOR THE YEAR ENDED DECEMBER 31, 1916.

| Dr. | £ s. d. | Cr. | £ s. d. |
|---|-------------------|-----|---------|
| To Balance from last year | 45 | 9 | 6 |
| Annual Subscriptions— | | | |
| Ordinary Members | £29 | 8 | 0 |
| Corresponding Members | 14 | 11 | 7 |
| Annual Subscriptions in arrear— | 43 | 19 | 7 |
| Ordinary Members | £3 | 3 | 0 |
| Corresponding Members | 15 | 0 | 0 |
| Annual Subscriptions in advance— | 3 | 18 | 0 |
| Ordinary Members | £4 | 3 | 6 |
| Corresponding Members | 2 | 18 | 6 |
| Entrance Fee | 7 | 2 | 0 |
| Life Member | 10 | 6 | 0 |
| Sale of "Proceedings" and Reprints | 5 | 5 | 0 |
| Donations | 8 | 3 | 4 |
| Dividend on £50 Metropolitan 2½% Stock | 2 | 0 | 0 |
| | 1 | 5 | 0 |
| | <u>£117 12 11</u> | | |
| By Cost of "Proceedings"— | | | |
| Printing and Postage | £20 | 9 | 7 |
| Illustrations | 17 | 0 | 0 |
| Printing Circulars | 37 | 9 | 7 |
| " Linnæan Society— | 1 | 10 | 0 |
| Expenses incurred by use of Rooms | £3 | 3 | 0 |
| Gratuities to Attendants | 2 | 0 | 0 |
| " To Secretary's Expenses | 5 | 3 | 0 |
| " Liabilities— | 18 | 7 | 0 |
| Secretary's Expenses | 1 | 17 | 1 |
| Printing Parts II and III, Vol. XII, etc. | 25 | 8 | 10 |
| Balance at Bank and Cash in hand less liabilities | 27 | 5 | 11 |
| | 45 | 5 | 10 |
| | <u>£117 12 11</u> | | |

We have this day examined the accounts of the Treasurer of the Malacological Society of London, and we find the above statement to be correct.

A. E. BORCOTT, Hon. Treasurer.
January 29, 1917.

HUGH C. FULTON
ALBERT E. SALISBURY } Auditors.

ANNUAL GENERAL MEETING.

FRIDAY, 9TH FEBRUARY, 1917.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. H. C. Fulton and Mr. C. Oldham were appointed scrutineers. The following report was read:—

“Your Council, in presenting their twenty-fourth Annual Report, have pleasure in again recording a year of continued progress.

“The papers printed during the past year have maintained their usual standard of excellence.

“It is with profound regret your Council have to record the loss by death of no less than seven members: Mr. E. A. Smith, I.S.O., Mr. J. H. Ponsonby-Fane, the Rev. Professor H. M. Gwatkin, Mr. W. T. Bednall, Mr. R. J. Lechmere Guppy, M. Henri Fischer, and Dr. W. Kobelt, while one member resigned.

“During the year two new members have been elected, so that the membership of the Society on December 31st, 1916, stood as follows:

| | |
|---------------------------------|-------|
| Ordinary members | 64 |
| Corresponding members | 86 |
| | <hr/> |
| Total | 150 |

“The financial condition of the Society continues satisfactory. We still hold £50 in Metropolitan stock, and the balance on the ordinary account is well maintained.

“The usual three parts of the ‘Proceedings’, Parts 1–3 of Vol. XII, were issued in two numbers, in March and December respectively. They comprise 120 pages of text, illustrated with 6 plates and 5 sets of text-figures.

“The following authors have very kindly assisted in the cost of these illustrations, or have furnished drawings, photographs, or blocks for reproduction: The Rev. Dr. A. H. Cooke, G. C. Crick, H. Fulton, T. Iredale, W. L. May, the late E. A. Smith, I.S.O., G. B. Sowerby, and the Rt. Hon. Lord Walsingham.

“Portraits of two of our Past Presidents, the late E. A. Smith, I.S.O., and E. R. Sykes, as frontispieces to Vols. XI and XII, were subscribed for and presented by R. H. Burne, the Rev. Dr. A. H. Cooke, G. C. Crick, A. S. Kennard, Dr. J. Cosmo Melville, R. B. Newton, the late J. H. Ponsonby-Fane, H. O. N. Shaw, Mrs. Sykes, J. R. Le B. Tomlin, and B. B. Woodward.

“Further, the thanks of the Society are especially due to the Council of the Linnean Society, through whose kindness it has been permitted, since the year 1894, to hold its meetings in Burlington House.”

On the motion of Mr. A. E. Salisbury, seconded by Mr. H. C. Fulton, the foregoing was adopted as the Annual Report of the Society.

The following were elected Officers and Council for the year 1917 :

President.—J. R. Le B. Tomlin, M.A., F.E.S.

Vice-Presidents.—The Rev. Dr. A. H. Cooke, M.A., F.Z.S., A. S. Kennard, F.G.S., Alexander Reynell, H. O. N. Shaw, B.Sc., F.Z.S.

Treasurer.—Dr. A. E. Boycott, F.R.S.

Secretary.—G. K. Gude, F.Z.S.

Editor.—B. B. Woodward, F.L.S.

Other Members of Council.—The Rev. E. W. Howell, M.A., G. C. Crick, F.G.S., Tom Iredale, R. Bullen Newton, F.G.S., A. E. Salisbury, E. R. Sykes, B.A., F.L.S.

On the motion of Mr. A. S. Kennard, seconded by Mr. Tom Iredale, a unanimous vote of thanks was passed to the retiring Officers and members of the Council, and to the Auditors and Scrutineers.

ORDINARY MEETING.

FRIDAY, 9TH FEBRUARY, 1917.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

The President delivered his Annual Address entitled "A Reference List of the Marginellidæ".

Mr. A. S. Kennard proposed, and Mr. Tom Iredale seconded, a vote of thanks to Mr. Tomlin for his address, and requested him to allow the same to be printed *in extenso* in the Society's Proceedings.

ORDINARY MEETING.

FRIDAY, 9TH MARCH, 1917.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. E. Le Cronier Lancaster was elected a member of the Society.

The following communications were read:—

1. "The Genitalia of *Acanthinula aculeata*." By Dr. A. E. Boycott, F.R.S.
2. "The Radula of the genus *Cominella*." By the Rev. Dr. A. H. Cooke, M.A., F.Z.S.
3. "A colony of *Nucella lapillus* with operculum malformed or absent." By the Rev. Dr. A. H. Cooke, M.A., F.Z.S.
4. "Note on the adventures of the genus name *Lucena*." By B. B. Woodward, F.L.S.
5. "Note on the Da Costa plates adapted for Rackett's edition of Pulteney's Catalogues." By B. B. Woodward, F.L.S.

Mr. B. B. Woodward exhibited a specimen of *Helicella scitula*, probably from Asia Minor, taken from a packet of tobacco. Mr. Tom Iredale exhibited a species of *Marginella (sensu lato)* procured by Dr. N. Annandale, Director of the Zoological Survey of India, in fresh water in the Tale Sap, Siam, apparently the first record of such an occurrence. The Linnean Society exhibited copies of the two editions of Pulteney's "Catalogues" in connexion with Mr. Woodward's paper.

ORDINARY MEETING.

FRIDAY, 13TH APRIL, 1917.

The Rev. Dr. A. H. COOKE, M.A., F.Z.S., Vice-President, in the Chair.

The following communications were read:—

1. "The Radula of the genus *Euthria*." By the Rev. Dr. A. H. Cooke, M.A., F.Z.S.
2. "The generic position of *Northia*." By the Rev. Dr. A. H. Cooke, M.A., F.Z.S.
3. "Molluscan Notes, III." By H. C. Fulton.
4. "Description of a new species of *Trichodiscina* from Colombia." By H. C. Fulton.
5. "Description of a new species of *Vivipara*, from Siam." By H. C. Fulton.
6. "More Molluscan name-changes, generic and specific." By Tom Iredale.

Mr. Alexander Reynell exhibited a plate from the article "Conchology" in *Cyclopædia Londinensis*, 1802, and "A System of Conchology", by T. Lloyd, from *A New Royal Encyclopædia*, by W. Henry Hall, the plates of which were dated 1791. There were no plates of Conchology. This is probably the earliest Cyclopædian article on Conchology.

OBITUARY NOTICES.

EDGAR ALBERT SMITH,¹
1847-1916.

Not only our Society but the whole malacological world has sustained irreparable loss in the passing of our Editor, who was one of the founders of this Society, its President for 1901-3, and its Editor from 1904 to 1916.

Edgar Albert Smith, son of the well-known entomologist Frederick Smith, was born in London 29th November, 1847. He was educated both at the North London Collegiate School and privately, being well grounded in Latin amongst other subjects, as his excellent diagnoses bear witness.

In 1867 he entered the service of the Trustees of the British Museum, where his father had already been for many years in the Zoological Department, in charge principally of the Hymenoptera.

Edgar Smith's first work was in connection with the celebrated collection of shells made by Hugh Cuming and acquired by the Museum in 1846, at which he worked under Dr. J. E. Gray. From 1871 he was in immediate charge of the Molluscan Collection, whilst till 1878 he was also responsible for the rest of the marine invertebrates with the exception of the Crustacea. On the removal of the natural history collections from Bloomsbury to South Kensington, the arrangement of the Molluscan Collection in the then new Natural History Museum was, of course, his peculiar care and was planned by him with a special eye to the convenience of the numerous students and amateur collectors who have not been slow to avail themselves of it.

In addition to his strictly curatorial work his official duties entailed an exceedingly large correspondence in dealing with the requests for information and advice that rained down on him from all quarters. To these correspondents as well as to personal applicants the benefit of his very extensive knowledge and experience was always most freely given with a courtesy, and amiable and unassuming manner, that won him the regard and friendship of all with whom he came in contact.

Specialization under these circumstances was impossible, nevertheless to some subjects he naturally gave more prominent attention, such as the fauna of the great African Lakes and the marine shells of South Africa, to which perhaps may be added the non-marine shells of Borneo and New Guinea.

In 1895 Edgar Smith obtained his well-deserved promotion to the post of Assistant Keeper in the Zoological Department, and in 1903 his long and meritorious service received acknowledgment in his creation as a Companion of the Imperial Service Order. When his time for retirement came in 1912 his colleagues, joined by many friends, united in presenting him with an address and numerous

¹ For Portrait see Frontispiece to vol. xi.

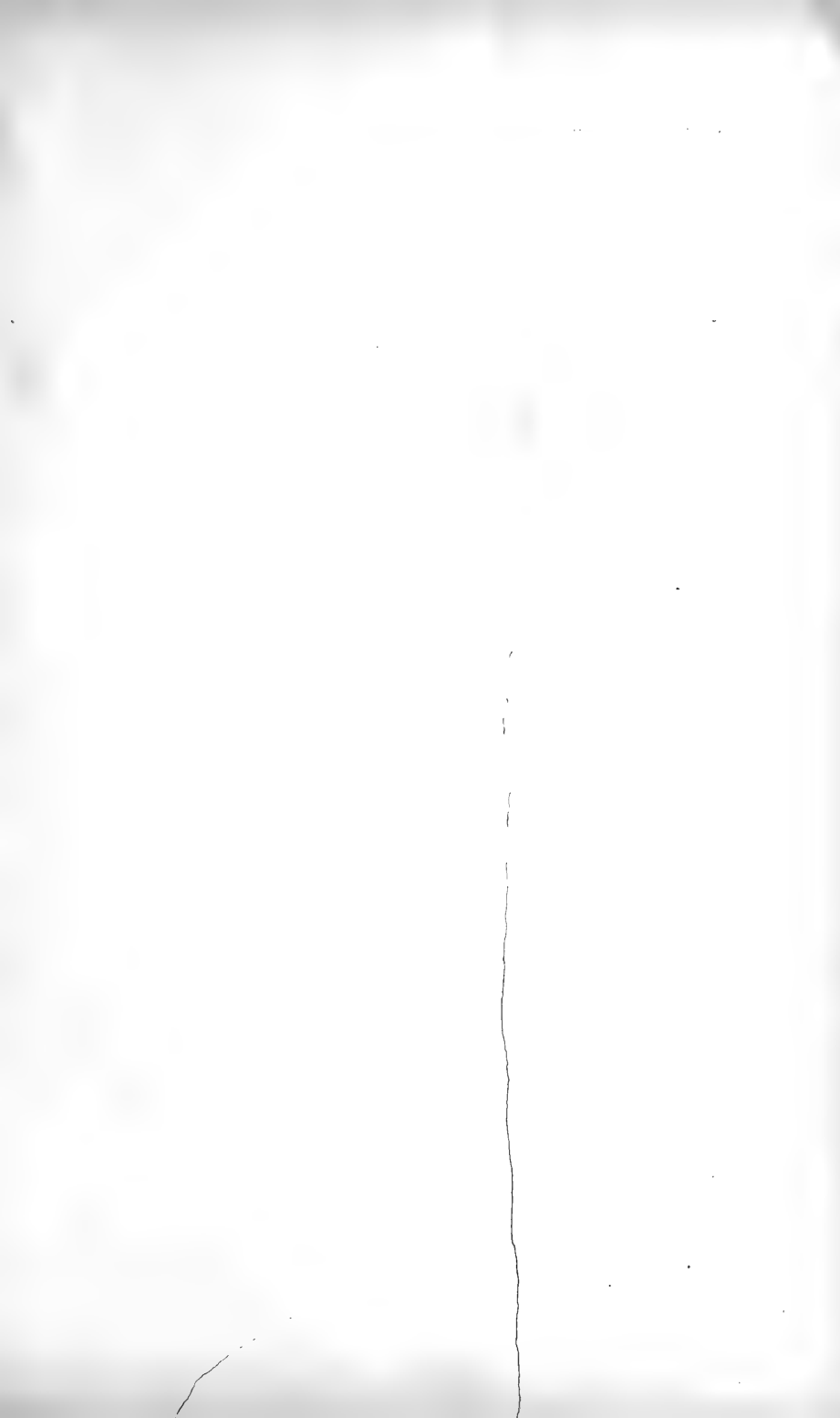
testimonials, but owing to peculiar circumstances his official connection with the Museum was at the last moment prolonged, and it was not until 31st March, 1913, that his final retirement took place. He continued to work on at the Museum in a voluntary capacity and hoped to do so, as he himself wrote, for years to come. Unfortunately a painful malady, which an operation failed to relieve, seized him, and after more than six months' severe suffering, stoically borne, he passed away on 22nd July, 1916.

He had married in July, 1876, and leaves a widow, four sons and two daughters.

Smith became a Fellow of the Zoological Society of London in 1872, and a member of the Conchological Society of Great Britain and Ireland in 1886, being its President for 1890. He was further a Corresponding Member of the Linnean Society of New South Wales, and of the Academy of Natural Sciences at Philadelphia, whilst he was also made an Honorary Member of the Midland Malacological Society, as well as of the Malacological Section of the Birmingham Natural History and Philosophical Society. He served as a member of the British Association Committee which was appointed in 1890 to "Report on the present state of our knowledge of the Zoology of the Sandwich Islands", and which reported regularly from 1891 till 1912.

Save for ten papers on Echinoderma, published between 1876 and 1879, the whole of his wonderful industry and energy was applied to the systematic study of the Mollusca, whilst working out and incorporating in the national collections the many gatherings acquired from all the world around. The more important of these were naturally those collected during the principal surveying voyages. Thus the Mollusca obtained during the Antarctic voyage of the *Erebus* and *Terror* (1839-43), which had lain by untouched, were dealt with by him in 1875. The Arctic specimens, collected on the polar voyage of the *Alert* and *Discovery* (1875-6), were described in 1878. The results of the *Transit of Venus* Expedition (1874-5) to Kerguelin's Land and Rodriguez were set forth in the special volume (vol. clxviii) of the *Philosophical Transactions* of the Royal Society in 1879. The accounts of shells procured during the voyages of the *Alert* to the Straits of Magellan and the Indo-Pacific (1878-82) were published in 1881 and 1884. The fine reports on the Lamellibranchia and Heteropoda brought home by the *Challenger* Expedition (1873-6) were, however, the most noteworthy of this series, and appeared in 1885 and 1888 respectively. Mention must also be made of his reports on the molluscan collections of the *Southern Cross* in 1902, from Sokotra 1903, from the Maldives and Laccadives 1902 and 1903, from the National Antarctic Expedition of 1901-4 in 1907, and finally the *Terra Nova* Expedition of 1910 in 1915.

Of minor papers some 300 in all came from his facile pen, contributed to many different scientific serials besides our own "Proceedings", of which he edited vols. vi to xi (1904-15). These were mainly descriptive papers, but in his Presidential Address to





*General
John Somersby*

TREASURER 1900-1916.

the Conchological Society of Great Britain and Ireland in December, 1890, he touched "On the Nomenclature of certain genera of British Land and Freshwater Shells", whilst his Presidential Addresses to this Society, in February, 1902 and 1904, covered wider ground, being devoted, the former to "The supposed similarity between the Mollusca of the Arctic and Antarctic Regions", and the latter to a discussion "On the Mollusca of Lake Tanganyika", provoked by the conclusions that had been published by J. E. S. Moore.

B. B. W.

JOHN HENRY PONSONBY-FANE,
1848-1916.

By the death of J. H. Ponsonby-Fane, Malacology has lost one of her most painstaking workers, possessed of a large store of knowledge and experience.

Born on July 21, 1848, the eldest son of the Rt. Hon. Sir Spencer Ponsonby-Fane, G.C.B., he was educated at Harrow, and on leaving school became a clerk in the Privy Council Office. In 1875 he married the eldest daughter of Mr. Harvie Farquhar, and leaving the Privy Council Office became a partner in the banking firm of Herries, Farquhar & Co., remaining on when the business was later transferred to Lloyds Bank, Limited. On the death of his father he added the additional name of Fane to the more familiar one, to us, of J. H. Ponsonby.

After he was about 30 his health was never really very good, and of late years he gradually gave up attending the meetings of this Society, as of others. Recently it had become more noticeable that his powers of recovery from illness were not so great, and this summer he suffered greatly from neuritis of the spine, which gradually became worse, and he passed away on September 11, 1916.

Probably few men were so widely known to workers in other countries; he was a regular correspondent, and his practice of generally spending his holidays abroad added to the ever-growing circle.

His keen interest in Mollusca developed at an early age and remained with him all his life. Originally he formed, by collecting, exchange, etc., a large general collection of all branches; then, by degrees, he began to specialize, and one by one he parted with various groups until his collection became composed mainly of Helicoid land shells and their allies, some Bulimoid groups, and the Terrestrial Operculates. A regular student at the British Museum, it will be hard to visualize the "Shell Gallery" without his presence and that of Mr. Edgar Smith, I.S.O.

A man of retiring disposition, he hesitated to add largely to the vast accumulation of molluscan literature, but his knowledge was ever at the service of students, eminent or humble equally, and one has only to turn over the pages of any periodical or textbook to see how much others have been indebted to him. Few there are who have not turned to him for help in a difficulty, and readily was that

help always given; quite an appreciable amount of time was devoted to naming specimens for those unable easily to attend a museum.

He was one of the first to assist in the formation of this Society, and his successful labours as our Treasurer for years past will be known to all.

Individually, he wrote but little; a few notes on the Land Shells of Gibraltar, British Fauna, descriptions of four Helicoids, and critical remarks on *Libera* and *Sculptaria* comprise his principal contributions.

His main writings were in association with Dr. J. C. Melvill, and devoted to the South African land fauna; over 200 new species were described, and the noteworthy addition to a but little-known fauna may be realized from the study of their check-list published in our Proceedings (vol. iii, 1898). The long series of papers forms a most valuable addition to molluscan literature, and has stimulated the collecting and study of this fauna, which, save for the papers of Krauss and Sturany, had previously received but little special attention.

He also described, with Mr. E. R. Sykes, new species of land shells from Tenerife and Buru.

His zeal for accuracy is well illustrated by a quotation from one of his letters, written when there was some question (happily unfounded) as to the validity of a species described by him, which he desired should be investigated at once—"It is bad enough to make a stupid mistake, but it is criminal to stick to it." Ever ready to accept criticism and weigh it carefully, we have lost a valued worker, a kind friend, and one who largely helped the study he loved and the students of it.

E. R. S.

ROBERT JOHN LECHMERE GUPPY,
1836-1916.

By the death of R. J. L. Guppy, who died at his home in the Island of Trinidad, on August 5th, 1916, the Society loses another of its senior members. Mr. Guppy was born in London on August 15th, 1836, his father being the Hon. R. Guppy, M.A., Barrister-at-law, for many years the Mayor of San Fernando, Trinidad. After qualifying as a civil engineer young Guppy visited Australia, Tasmania, and New Zealand, ultimately settling down in Trinidad, where he helped in the construction of the Cipro Railway, although later he became interested in educational work, when he was rewarded with the important appointment of Chief Inspector of Schools, from which he retired in 1891, after a service of nearly a quarter of a century. He was a great student of natural science, and did much to encourage the work of the scientific societies of Trinidad, serving as President of the Scientific Association of Trinidad, as well as of the Royal Victoria Institute Board.

His special studies embraced the geology, palæontology, and recent zoology of the West Indian region generally, although more

particularly of Trinidad. On these subjects he contributed some seventy or eighty memoirs and papers, which are scattered through various serials dating from 1863 to 1913, thus covering a period of fifty years. He would seem to have been more greatly attached to palæoconchology and the recent Mollusca, as his writings were certainly more voluminous on these subjects than on other organic groups. He first pointed out the undoubted occurrence of Cretaceous rocks in Trinidad through his discovery of *Trigonia subcrenulata*, Orbigny, at Point-à-Pierre, a Pelecypod which had been previously chronicled from rocks of similar age at Bogota, South America. Many valuable researches were also published by him on the Kainozoic Mollusca of Trinidad, Dominica, San Domingo, Jamaica, Anguilla, Tobago, and South America (Venezuela). On the recent Mollusca, however, he dealt principally with the determination and distribution of the terrestrial and fluviatile forms from Trinidad, Dominica, Grenada, St. Vincent, and other West Indian islands, besides Venezuelan Guiana in South America. His papers on marine shells were devoted chiefly to lists of specimens found in the Gulf of Paria, Trinidad, and another describing the second largest example of a *Pleurotomaria* (*P. adansoniana*), which had been discovered off the Island of Tobago, having an altitude of 150 millimetres. The genus *Guppya*, named after him by Mörch in 1893, was applied to a land-shell with Helicoid affinities, being founded on Guppy's *Conulus vacans* from Trinidad.

At the time of his death Mr. Guppy, besides being a member of our Society from 1894, was a corresponding member of the Zoological Society of London, and of the New York and Philadelphia Academies of Science. He died within ten days of celebrating his 80th birthday.

R. B. N.

NOTES.

ON THE ADVENTURES OF THE GENUS NAME *LUCENA*. (Read 9th March, 1917).—In 1815 Oken (Lehrb. Naturg., iii, p. 312) created the superfluous name *Lucena* for Draparnaud's *Succinea*, giving as example *Lucena putris*.

In 1821 J. D. W. Hartmann applied the name to Draparnaud's *Helix naticoides* [= *H. aperta*], which he called *Lucena tapadu* (Neue Alpina, i, pp. 202, 208, note, and 245 [as *L. tapadu*], pl. i, f. 30 and 31), and put *L. putris, succinea*, etc., into *Amphibina* (his own corruption for *Amphibulina* of Lamarck). He inveighs against Férussac, who puts it with his *Cochloides* (Tabl. Syst. Limaçons, 1821, January ed., p. 30, June ed., p. 26), maintaining (Neue Alpina, i, p. 208, note, and again later in Sturm's Deutschl. Fauna, vi, hft. 5, pp. 27, 28) that its correct place was with Férussac's *Seminudæ*, next to *Daudebardia* [= *Helicophanta*, Fér.]. Here he places it in the "Verzeichniss" given in Sturm (vi, hft. 5, p. 54), and the species *tapadu* not being German its place is taken by *Lucena pulchella*, described in a footnote as "n.sp."

This last *nomen nudum* caught the eye of J. E. Gray, who without further research, and oblivious of the fact that *Helix pulchella* was duly cited by Hartmann two pages further back, mistook it for a synonym of the latter, and accordingly so rendered it in his edition of Turton's Manual, 1840 (p. 142), tacking on to it a reference to Hartmann's "t. 1, f. 6", which is for *Helix pulchella*, that for *Lucena* being f. 8. This erroneous citation was copied bodily by Dupuy (Hist. nat. Moll. France, p. 161, 1848). Moquin-Tandon also blindly accepted this synonymy (Hist. Moll. France, ii, 1855, p. 140), and seeing that the alleged Hartmann's *Lucena* (1821) had priority over Risso's *Vallonia* (1826) gave the former name to the section of *Helix*, which he established for Müller's *H. pulchella*. Pilsbry fortunately evaded this pitfall, and Hartmann's *Lucena tapadu* appears correctly under *Helix aperta* (Man. Conch., ser. II, vol. ix, p. 316), whilst his *Lucena pulchella* is, properly, ignored.

B. B. WOODWARD.

NOTE ON THE DA COSTA PLATES ADAPTED FOR RACKETT'S EDITION OF PULTENEY'S CATALOGUES. (Read 9th March, 1917).—No further light has been shed on the former proprietorship of these plates since Mr. Reynell's description of them (Proc. Malac. Soc., xii, 1916, p. 43), but in going through Pulteney's 1799 edition with the Rackett second (1813) edition, it was noticed that a number of references to "Trit. Brit." in the former had all been omitted in the latter.

Turning to Pulteney's "Explanation of the abbreviated Names of Authors" on p. 24, the following consecutive entries are seen:—

"*Da Costa*. Da Costa, E. Mendez, British Conchology, French and English, with 17 Tables, Lond., 1778, 4to.

Trit. Brit. Triton Britannicus; a new Impression of the foregoing Plates, with Seven additional Tables. MS."

This last, then, is obviously the source of the plates for the Rackett edition, the seventh plate having been cut up and the figures distributed as already described. Hence, Rackett's statement on p. 23: "The plates of *Da Costa's British Conchology* have been revised and altered, and six additional ones engraved, to give further illustration to the descriptions."

Since Mr. Reynell's article was written an excellent holograph of Rackett's has been found in the Linnean Society's copy of his edition of Pulteney's Catalogues, establishing the fact that the inscriptions in the copies of Maton & Rackett's "Descriptive Catalogue of British Testacea" are in his handwriting.

B. B. WOODWARD.

THE GENITALIA OF *ACANTHINULA ACULEATA*.

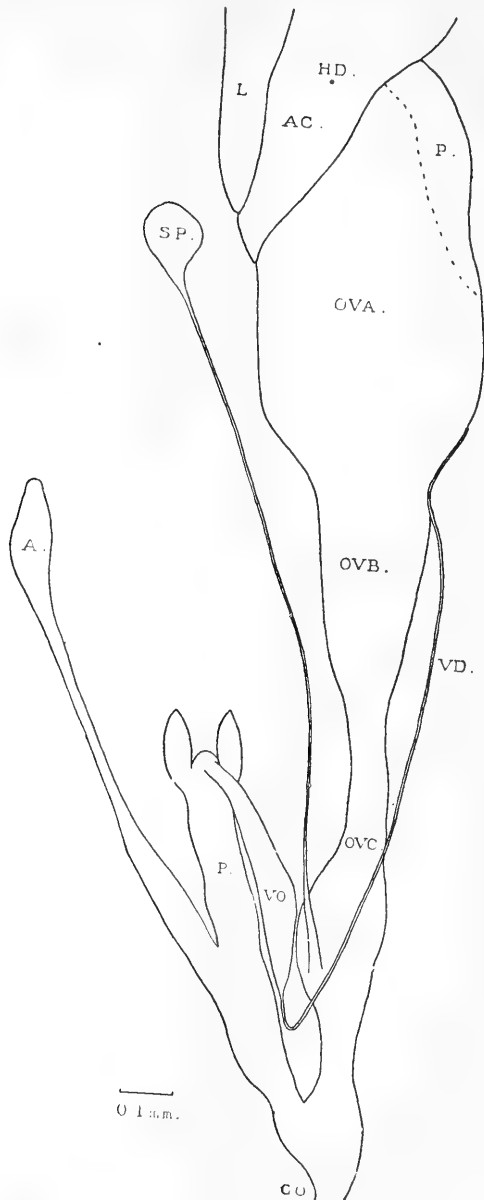
By Dr. A. E. BOYCORP, F.R.S.

Read 9th March, 1917.

THE following account of the genital apparatus of *A. aculeata* is based on the examination of twenty adult specimens from six localities, displayed by complete series of microscopical sections. The figure has been reconstructed from one such specimen, the parts being separated in the drawing so that they may be shown on conventional lines for easy comparison with other species. The male and female ducts diverge not far from the *genital orifice* (*GO*), and through the interval between them passes the right ocular retractor. The *penis* (*P*) in its lower part is generally similar in structure to the lower part of the oviduct without any particular abundance of muscular tissue; for a distance of about 0.1 mm. or rather less above the origin of the appendix (*A*) there is, however, a well-developed muscular sheath loosely embracing the organ. At its upper end the penis divides into three; on either side is a curious horn, the minute structure of which does not appear to differ materially from that of the upper part of the body of the penis and suggests no special function; the main channel of the penis continues upwards a little way beyond the origin of the horns and then curves over to join the vas deferens, which is embedded in the wall of the penis for some little distance below the actual junction. The *vas deferens* (*VO* and *VD*) loops round below in the customary fashion and is divided into two distinct parts, an ascending limb not much less bulky than the penis itself and a long (about 1.2 mm.), thin, descending limb lying in close relation with the oviduct into which it eventually opens above. The *appendix* to the penis (*A*) has a duct wide below and narrow above, and finally ends in a bulbous swelling, the terminal expansion being due as much to an increase in the substance of the wall as to a larger lumen. This appendix naturally lies folded up in a more or less complicated way, most commonly in a double M loop with the terminal bulb close to the upper end of the penis. Its minute structure is not suggestive of its function; I found no definite contents in the bulb. The *oviduct* (*OV*) may as usual be divided into three parts. Below is a simple conducting tube constituting the *free oviduct* (*OVC*). This expands above into the *glandular oviduct* (*OVB*), a wider tube with voluminous walls of mucinous cells, the lumen still remaining relatively simple: one small section of the wall forms a little recess lined with cubical, ciliated epithelium and lies in close relation to the upper end of the descending limb of the vas deferens, which eventually opens into it. Above the origin¹ of the vas deferens the oviduct expands still further and forms the complex folded *spermoviduct* (*OVA*) with massive mucinous walls. In the upper part there is

¹ The figure indicates the actual, not the superficial, origin of the vas.

the special mass of glandular tissue (*P*) with granular cells generally known as the *prostate*, the lumen opening into that of the spermoviduct.



The *hermaphrodite duct* passes into the substance of the albumen gland at the point shown in *HD*; it is sharply flexed on itself at the point of entry, though whether there is a definite vesicula seminalis is perhaps a question of terminology. The duct of the *spermatheca* (*SP*) arises rather low down on the free oviduct; it is long (about 1.4 mm.) and for the most part narrow, in its upper part not more than some 0.007 mm. wide over all. The globular spermatheca lies exceptionally high up, being overlapped by the lower ends of the *albumen gland* (*AG*) and *liver* (*L*). There are no traces of anything like a *dart-sac* or *mucous gland*, or other accessory organs on the female side.

My findings therefore correspond with those of Wiegmann, whose drawing was published posthumously by P. Hesse.¹ Wiegmann adds the statement, of which I have not been able to assure myself, that the retractor muscle is bifid, making attachment to the appendix as well as to one of the horns of the penis. The only detail in which my results differ is the relative length of the duct of the spermatheca, which I should be inclined to make longer than he does, but this is a difference which might be due to dissimilar methods if I am right in assuming that he was ingenious enough to arrive at his result by gross dissection.

How far these data serve to place *aculeata* in its correct taxonomic position I would not presume to say. The genitalia are certainly curious for one of the helicoids, in the absence of mucous glands and the presence of a penile appendix; among our native snails an appendix to the penis is most easily seen in *Ena*,² and similar appendices appear to occur in *Pupilla muscorum*, *Lauria umbilicata*, and *Vertigo minutissima*.³ L. Germain⁴ includes it in the "Pupidae" on the ground of its anatomical characters, which he does not detail. The radula is figured by E. W. Howell,⁵ who suggests a relationship to *Vertigo* for both *aculeata* and *lamellata*. How far *aculeata* is really close to *lamellata* is another question. The radulae (Howell, loc. cit.) are in general similar but with well-marked differences, the shell of *lamellata* is rather peculiar in having no finished peristome, the genitalia are incomparable since I could find no male organs in *lamellata*,⁶ the duct of the spermatheca is relatively much longer in *aculeata*, the "prostate" differs in its relation to the oviduct in the two species. Steenberg (loc. cit., p. 84) says, but without details, that the anatomy of the two species is different.

A hermaphrodite genital apparatus of this kind was found in nine out of the twenty specimens examined, but the male parts were absent from the other eleven. All the specimens were adult in the sense that the shells had a well-finished reflected peristome and rib, and were of adult dimensions (about 2½ mm. wide and high). Their

¹ Nachrichtsbl. Deutsch. Malak. Gesell., 1915, p. 56.

² See e.g. J. W. Taylor's figure in Monograph, vol. i, p. 361.

³ C. M. Steenberg, *Danmarks Fauna: Landsnegle*, 1911, pp. 168, 170, 172; A. Moquin-Tandon, *Hist. Nat.*, vol. ii, 1855, p. 392, and pl. xxviii, fig. 1.

⁴ *Mollusques de la France*, vol. ii, 1913, p. 190.

⁵ Proc. Malac. Soc. Lond., vol. xi, 1914, p. 159; vol. viii, 1908, p. 127.

⁶ *Journ. Conch.*, vol. xv, 1917, p. 175.

origins do not suggest any seasonal or local influence; eight of fourteen spring specimens and three of six collected towards autumn had no male organs. It is not that the male organs were rudimentary or ill-developed, they were not there at all, and the lower genitals were reduced to an oviduct and spermatheca, not different in any obvious way from those present in specimens with the full complement of male organs.¹ On the other hand, these individuals were not females, since in each one of the twenty specimens, whether the penis was present or not, plenty of eggs and spermatozoa were found in the hermaphrodite gland and duct.² Such an arrangement is remarkable and is, I think, unknown among the larger snails whose viscera are familiar.

| LOCALITY. | DATE. | NUMBER OF SPECIMENS. | NUMBER WITH MALE ORGANS. |
|----------------------------------|--------------|----------------------|--------------------------|
| Rotherwas, Hereford. | April, 1915. | 4 | 2 |
| Aldenham, Herts. | Sept., 1915. | 2 | 0 |
| Radlett, Herts. | April, 1916. | 1 | 0 |
| Monks Risborough, Bucks. | April, 1916. | 1 | 0 |
| Rotherwas, Hereford. | April, 1916. | 8 | 4 |
| Great Hampden, Bucks. | Sept., 1916. | 1 | 1 |
| Scarborough, Yorks. ³ | Sept., 1916. | 3 | 2 |
| | | 20 | 9 |

The condition in these eleven specimens was in short similar to that found uniformly in twenty *lamellata*,⁴ and its interpretation is equally difficult. They might be functionally only females; the presence of abundant spermatozoa is against this, though it is well known that in comparatively highly developed animals (*e.g.* frogs) the sexual glands may produce a certain number of gonads inappropriate to the sex of the individual. They might be self-fertilizing hermaphrodites; such is unusual, but is known to occur under stress of circumstances in a certain number of pulmonates,⁵ and is a general possibility. They might be functionally both male and female, it being pretty clear that the vagina could function as an intromittent organ. They might be cyclically unisexual, though I think that any question of proterandry or proterogyny is excluded by the absence, rather than the presence in an atrophied condition, of the male organs, and by the abundance of spermatozoa. They might be abnormal abortive individuals, sexually impotent, a sort of

¹ The specialized segment of the wall of the glandular oviduct which is associated with the origin of the vas deferens was present, though not perhaps so fully developed as in those individuals in which that duct was found, and in some cases a short tag of vas deferens arising from it and soon ending blindly below.

² The spermatozoa were mostly in the duct. In one aphyllid specimen, a mass of spermatozoa extended from the upper part of the spermooviduct to near the genital orifice, and there were a few in the spermatheca, but it cannot of course be known where they came from.

³ I am much indebted to Mr. J. A. Hargreaves for these specimens.

⁴ *Journ. of Conch.*, vol. xv, 1917, p. 175.

⁵ *Arion ater*, *Limnæa auricularia*, *L. pereger*, *Planorbis vortex*.

molluscan free-martin; it is difficult on this hypothesis to explain the normal structure of such organs as are present or the frequency of the condition.

The only anatomical point which I have observed which might help to a decision between these various possibilities is that the glandular organ with granular cells in connection with the spermoviduct, which is known as the prostate, was not found where the penis was absent. This suggests, though quite indefinitely, that these individuals were not functional males.¹

Hermaphroditism is often associated with an indifferent capacity for locomotion, and it is a clear advantage to snails that, when two do happen to meet, both should be able to produce spermatozoa as well as eggs. Hence arises another consideration which may have to do with the absence of male organs. Large snails walk faster than small snails, and with very small species the rate of progression may become so slow that the chance of two individuals meeting becomes so trivial that it is not worth while to maintain an effective male copulatory apparatus. Locomotion becomes so slow that the habit of self-fertilization is added to the hermaphrodite structure. That dispersion of the members of a family from their birthplace is limited in the same way is no substantial objection to this view when we consider that the time devoted to sexual confluence is very small compared to that spent in wandering in search of food. It is perhaps also noteworthy that *aculeata* is not a gregarious species; the area in which it occurs may be circumscribed rather closely by environmental conditions, but the individuals generally occur in groups of one each, and the density of the population is low; it is not an "abundant" species as is often, e.g. *Carychium minimum*, in the same habitats.² As far as I know, *lamellata* has much the same habits, though it is perhaps more abundant where it occurs. In some other small snails gregarious habits render congress more likely, e.g. *Pyramidula rupestris*, *Pupa umbilicata*, *Vertigo* spp., and in these a penis is found, though whether in all specimens I do not know; male organs are also described in *Carychium*.

On the whole I incline to the speculative explanation that the aphyllic state is due to the simplification of structure which is necessarily associated with diminution in absolute size, that an animal cares more for what it does than for the apparatus by which it does it, and that both phallic and aphyllic forms are alike hermaphrodite and reproductive. The view that the possibilities of organic action are limited by narrow morphological boundaries has been productive enough along the line of phyletic speculation, but

¹ An organ of similar histological constitution is present in *lamellata*, but in connection with the lower part of the glandular oviduct, and hence possibly different in character; *aculeata* has nothing like it in the *lamellata* position.

² I am referring especially to dead leaves, particularly beech leaves, in woods. In the few specimens of *Punctum pygmaeum* from the same habitat which have been examined, no penis has been found.

it is essentially mechanistic in character, and fails to take into account the demonstrated capacity of living organisms to achieve their ends by self-regulated means. We should not, in other words, be too quick to assume that an *aculeata* is at any very grave disadvantage in maintaining its individuality and reproducing its kind because it has no penis; the majority, at any rate, of *lamellata* have abandoned that organ in favour of the roominess afforded by its absence, and reduced their genitalia to the simplest essentials.

THE RADULA OF THE GENUS *COMINELLA*, H. & A. ADAMS.

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 9th March, 1917.

THE genus *Cominella* appears to occur in two principal nuclei of geographical distribution, (1) the Cape, (2) South Australia, Tasmania, and New Zealand. It has not been reported from South American waters, where, in the extreme south, it appears to be replaced by a considerable development of the genus *Euthria*, and, though there is an outlying species (*fucata*, A. Ad.) said, on inconsiderable authority, to come from Japan,¹ it has not been recorded from Western North America. The Philippines is another doubtful locality for another doubtful species (*crocea*, A. Ad.).

Kobelt, in 1878, enumerated² 34 species in all: Cape 12, New Zealand 9, Chatham Is. 1, Port Western 1, South Australia 4, Tasmania 1, Swan R. 1, Darnley Is. 1, doubtful localities 4. Tryon's sweeping methods³ reduced these to about 20. G. B. Sowerby listed⁴ 17 species in all from South Africa, the generic position of 4 of which was doubtful. Paul Bartsch, in 1915, added⁵ 4 more species to this list, making 21 in all. H. Suter⁶ recognizes 10 species from New Zealand and the outlying island groups, from the Kermadecs to Campbell Is., two at least of which (*costata*, Quoy, *lineolata*, Lam.) have also been found in Australian waters.⁷

For the purposes of the present paper the radulæ of the following species (all from the collection of the late Professor H. M. Gwatkin) have been examined:—

AUSTRO-NEOZEALANIAN SPECIES.

adelaidensis, Crosse.
alveolata, Kien.
costata, Quoy.
filicea, Cr. & Fisch.
huttoni, Kob.
lineolata, Lam.
lurida, Phil.
maculata, Mart.
maculosa, Mart.
virgata, H. & A. Ad.

CAPE SPECIES.

delalandii, Kien.
elongata, Dunk.
lagenaria, Lam.
limbosa, Lam.
porcata, Gmel.
tigrina, Kien.

I. The general facies of the radula of the AUSTRO-NEOZEALANIAN group is as follows: Rhachidian tooth with three sharp narrow cusps

¹ *Cominella fortilirata*, Sowb., from Urup, Kurile Is., Ann. Mag. Nat. Hist., ser. VIII, vol. xi, 1913, p. 557, seems a very doubtful *Cominella*.

² Jahrb. Deutsch. Malak. Gesell., Bd. v, p. 231.

³ Man. Conch., vol. iii, 1881, pp. 201-7.

⁴ *Marine Shells of South Africa*, 1892, pp. 9-11.

⁵ *Report on the Turton Collection of South African Marine Mollusks* (Smithsonian Inst. Bulletin 91).

⁶ *Manual of the New Zealand Mollusca*, 1913, pp. 381-91.

⁷ W. L. May, *Vict. Nat.*, vol. xxx, 1913, pp. 55-60.

nearly equal in length, set closely together on a base shaped like a truncated horse-shoe, cusps simple; laterals bicuspid on a simple base, cusps large, slightly curved, never denticulate.

I have counted in

| | | | | | |
|----------------------------------|------|----------------|------------------|------|----------------|
| <i>adelaidensis</i> ¹ | 91 + | rows of teeth. | <i>lineolata</i> | 123 | rows of teeth. |
| <i>alveolata</i> | 113 | „ | <i>lurida</i> | 104 | „ |
| <i>costata</i> | 107 | „ | <i>maculata</i> | 109 | „ |
| <i>filicea</i> | 112 | „ | <i>maculosa</i> | 115 | „ |
| <i>huttoni</i> | 98 + | „ | <i>virgata</i> | 97 + | „ |

SPECIAL CHARACTERISTICS OF THE RHACHIDIAN TOOTH IN THE VARIOUS SPECIES.

1. *adelaidensis*.—Cusps rather narrow and close together. The lines of the base are somewhat square, and the two lower prolongations (hereafter called the wings) of the base are thickly rounded.

2. *alveolata*.—Cusps rather short, further apart than in *adelaidensis*, base-lines not quite so square, wings short, rounded at the ends.

3. *costata*.²—Cusps small, narrow, very close together, wings of the base greatly prolonged, narrowed at their lower ends, lines of the base rounded, not squared.

4. *filicea*.—Cusps short, somewhat elevated above the upper base-line, wings of the base prolonged a little, but not nearly so much as in *costata*, angles of base-lines rounded.

5. *huttoni*.²—There is scarcely any recognizable difference between this species and *lineolata*.

6. *lineolata*.—Closely corresponds to *alveolata* both in the form of cusps and shape of base.

7. *lurida*.³—Cusps short, equal in length, rather close together, wings of base decidedly prolonged, but not so much as in *costata*.

8. *maculata*.²—Cusps prominent, close together, base rounded above, wings short and rounded.

9. *maculosa*.—Cusps markedly triangular in shape, well apart from one another, base as in *maculata*.

10. *virgata*.—Cusps sharp and small, separate from one another, base not prolonged into wings, rather angulate above.

The species of the whole group lie remarkably close together, and the one markedly characteristic difference is the prolongation of the wings in *costata*, *filicea*, and *lurida*. The shape of the laterals is constant, and exhibits scarcely any appreciable difference in the various species.

¹ “+” means that a few rows at one or other end of the specimen were missing.

² T. Iredale has pointed out (Trans. N.Z. Inst., xlvii, 1914, p. 465) that by the laws of nomenclature the name *eburnea*, Reeve, must displace *costata*, Quoy, *quoyana*, A. Ad., that of *huttoni*, Kob, and *adspersa*, Brug., that of *maculata*, Mart. These names are accordingly adopted in the explanation of the figures.

³ The dentition of *lurida* has been figured by Hutton, Trans. N.Z. Inst., xiv, 1882, p. 162, pl. vi; that of *maculata*, *maculosa*, and *virgata*, *ibid.*, xv, 1883, p. 120, pl. xiii.

II. The CAPE GROUP of species is distinguished by two very marked types of radula.

(a) Rhachidian tooth rather bluntly tricuspid, base deep and squarish, arched below, no wings; laterals tricuspid, the smaller inner cusp in the Austro-Neozealanian group being replaced by a two-denticled cusp, simple, deeply cut.

(b) Rhachidian tooth bluntly long oblong, base slightly arched below, angled in front, set with a number (4-7) of small sharp denticles, laterals quadricuspid, large, cusps boldly curved, the three inner forming a group, of which the central is much the largest.

I have counted in

| | | | | | |
|-------------------|-------|----------------|----------------|------|----------------|
| <i>delalandii</i> | 112 + | rows of teeth. | <i>limbosa</i> | 116 | rows of teeth. |
| <i>elongata</i> | 109 | „ | <i>porcata</i> | 116 | „ |
| <i>lagenaria</i> | 120 | „ | <i>tigrina</i> | 95 + | „ |

SPECIAL FEATURES OF THE VARIOUS SPECIES.

Group (a).

elongata.—Cusps of the rhachidian tooth not much elevated above the upper edge of the base; base deep, pinched in at the sides and slightly arched below; lateral tricuspid, the two inner cusps very close together, deeply cut.

tigrina.—Cusps of the rhachidian tooth considerably elevated above the upper edge of the base, the two outer cusps set at an angle with the central; base markedly angulated at its upper edge, pinched at the sides, deeply arched below; lateral tricuspid, the two inner cusps further away from another than in *elongata*, not so deeply cut.

Group (b).

delalandii.—Rhachidian tooth with four denticles; base angulated at the upper edge, slightly arched below; lateral showing no sign of denticulation on any of the cusps, exterior of the three interior cusps large, central very large, curved over the interior cusp, which is very small, not serrated.

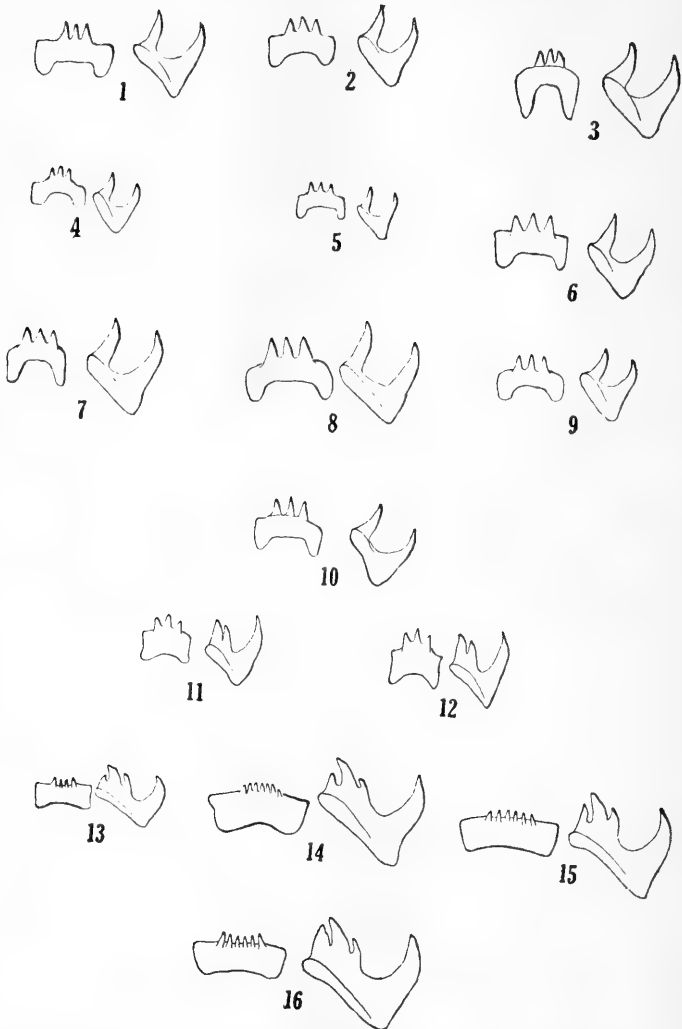
lagenaria.—Rhachidian tooth with seven denticles; upper edge of base slightly produced at the ends, base considerably arched; in the laterals the interior cusp shows signs of serrations on the outer edge, the exterior cusp of the group of three is very small, curiously curved inward.

limbosa.—Rhachidian tooth with six denticles; base squarely oblong, slightly rounded at upper angles, lower edge scarcely arched; both the exterior and interior cusps of the group of three large, blunt, the interior slightly serrated on the inner edge.

porcata.—Denticles of the rhachidian tooth six in number, rather larger than in the other species; base with the upper angles rounded, very slightly arched below; interior cusp of the group of three very large, with faint traces of serration on the inner side, exterior cusp of this group small and narrow. In some of the laterals there are clear traces of a supplementary denticle or knob, between the tricuspid inner tooth and the great outer cusp.

GENERAL CONCLUSIONS.

The species of *Cominella* whose radula has been examined fall into three very well-marked groups, of which (1) is confined to Australia and New Zealand while (2) and (3) are characteristic of the



Cape. The radula of the species comprised in Group 1 are singularly alike in the shape of their teeth, both rhachidian and lateral, while those of the species falling under (2) and (3) manifest considerable individual differences.

Group 1 exhibits teeth of a very simple character. Group 2 is closely allied to Group 1, the most marked point of contrast being the bifid cusp in the lateral. Group 3 is by far the most specialized as regards radula, and, while preserving a certain tie of kinship, stands well apart from the other two, both as regards shape and denticulation of the rhachidian and in the elaboration of the cusps of the laterals.

It is hoped that the facts now brought together may be of use, as throwing light on the general inter-affinities of the group as a whole, and possibly on the vexed question of distinction of species.

EXPLANATION OF FIGURES.

FIG.

1. *Cominella adelaidensis*, Crosse : Australia.
2. " *alveolata*, Kien. (= *lineolata*, Lam.): Port Phillip.
3. " *eburnea*, Reeve (= *costata*, Quoy) : New Zealand.
4. " *filicea*, Cr. & Fisch. : Port Jackson.
5. " *quoyana*, A. Ad. (= *huttoni*, Kob.) : New Zealand.
6. " *lineolata*, Lam. : Tasmania.
7. " *lurida*, Phil. : New Zealand.
8. " *adspersa*, Brug. (= *maculata*, Mart.) : New Zealand.
9. " *maculosa*, Mart. : New Zealand.
10. " *virgata*, H. & A. Ad. : New Zealand.
11. " *elongata*, Dunk. : Cape of Good Hope.
12. " *tigrina*, Kien. : South Africa.
13. " *delalandii*, Kien. : St. James', Cape Town.
14. " *lagenaria*, Lam. : Cape of Good Hope.
15. " *limbosa*, Lam. : Sea Point, Cape Town.
16. " *porcata*, Gmel. : Algoa Bay.

A COLONY OF *NUCELLA* (OLIM *PURPURA*) *LAPILLUS* (LINN.)
WITH OPERCULUM MALFORMED OR ABSENT.

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 9th March, 1917.

VISITING Lydstep (a few miles west of Tenby) in August, 1915, at a very low tide, I took a living specimen of *N. lapillus* off the face of the cliff, and observed that it had no operculum. Thinking that perhaps the act of pulling the specimen off the rock had torn the operculum away, I examined further specimens, with the result that it appeared that this particular colony of *Nucella* were suffering, to a considerable extent, from malformation of the organ.

Of 121 specimens examined,

- (1) The operculum was more or less perfect in 54.
- (2) " " decidedly imperfect in 56.
- (3) " " absent altogether in 11.

In class 2 the imperfection was not always of the same nature. Sometimes the operculum was considerably reduced in size, so that, when the animal was withdrawn, only a portion of the aperture was covered. Occasionally the operculum was perfect as regards size, but was thin, and of a very light horn colour, almost white, instead

of dark brown or black. Sometimes the forward edge was ragged and untrimmed, instead of being sharp and clearly rounded.

In the cases where the operculum was absent altogether, the area left uncovered was not smooth, as it is when one peels off an operculum from a perfect specimen. The surface where the operculum should have been was contracted, wrinkled, and raised into knotty humps, as if the animal were making some effort to compensate for such protection as is afforded by the operculum, by a thickening of the integument in that area.

What particular purpose is served by the operculum in this and many other kindred species of Mollusca is not quite clear, since the animal remains normally adherent to the rock by its foot, on some point on the upper surface of whose hinder portion the operculum is carried. It is only when the animal becomes detached from its position that the operculum closes the mouth of the shell, and it is clear that to become detached is the last thing which is desirable for species which normally live adherent; in many cases they must be unable to regain their position.

In the present case it seemed probable that overcrowding and under-feeding were the cause of the defects of the *Nucella*. In size the shell was not more stunted than specimens to be found on almost any exposed coast. But there must have been thousands of them on the perpendicular cliffs at Lydstep, clinging closely together, and with no food but barnacles and an occasional limpet. Under such circumstances it is not surprising that signs of decadence should manifest themselves.

It never seems possible to predict what particular form of decadence will result from any given diminution of the optimum of environment. The only case at all parallel to this, as far as *Nucella* is concerned, occurred in a group of *N. lapillus* found living at Minehead. Near the harbour, where the water is specially muddy, and the holding ground foul with decayed wood and lumps of rotten clay, specimens occur whose shells are riddled with some boring worm, with the result that they are decollate, the suture often deeply pitted, and the base of the columella and the outer lip eaten away and ragged, so that the whole shell presents a most forlorn and wretched appearance. Yet, in every case examined, the operculum was perfectly normal in shape, size, colour, and thickness.

THE RADULA OF THE GENUS *EUTHRIA*, GRAY.

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 13th April, 1917.

THE generic name *Euthria* appears to cover a variety of species which in certain points differ widely from one another. Founded by Gray in 1850 (Fig. Moll. Anim., No. 67), its type is the Mediterranean *cornea*, L. Kobelt catalogued¹ the genus in 1878. Suter recognizes²

¹ Jahrb. Deutsch. Malak. Gesell., vol. v, 1878, pp. 237-8.

² Manual New Zealand Mollusca, 1913, pp. 373-81.

7 species from New Zealand and the outlying islands, and there is at least 1 Tasmanian species; Bartsch enumerates¹ 9 more from the Cape; 4 species, perhaps not all of them *Euthria*, have been described² from Japan, there is 1 from Kerguelin Island (*chlorotica*, Marts.), and an outlying species, not always regarded as *Euthria* (*dira*, Reeve), ranges from Puget Sound to the Californian islands. The Magellanic region, including the Falklands, appears to be the nucleus of a rich development of *Euthria*. Strebel, under the groups *Pareuthria*, *Glypteuthria*, and *Anomacme*, has enumerated³ 17 species from this region, and Thiele⁴ and E. A. Smith⁵ have added 1 and 2 respectively. Even so, the list of species described is probably not exhausted.

Of the forty-three species mentioned above, the radula of *cornea* was figured by Troschel⁶ (*Gebiss der Schnecken*, ii, pl. vii, f. 11). Hutton has figured the radula of *flavescens*, *linea*, *striata*, and *vittata*, and, doubtfully, of *littorinoides*.⁷ Troschel figures (pl. vii, f. 12) as of *lineata*, Chem. (= *linea*, Mart.), a radula which is certainly that of *littorinoides*. Thiele has figured⁸ the radula of *Pareuthria innocens*, Smith.

In illustration of the present paper the radulae of ten species are figured, seven of them for the first time. All are from the collection of the late Professor H. M. Gwatkin. The results suggest that the forms hitherto grouped under *Euthria* are susceptible of considerable subdivision, and that some must probably be removed from that genus altogether.

The specimens examined fall into four distinct groups.

Group 1.—Rhachidian tooth tricuspid, cusps somewhat blunt, elevated, base sloping away rapidly, slope interrupted on each side by a blunt knob or tooth, base deeply arched below; laterals tricuspid, simple, not much curved. To this type belong *cornea*, L., and *linea*, Mart.

¹ Bull. U.S. Nat. Mus., 91, 1915.

² *E. badia*, A. Ad., *virata*, A. Ad., Journ. Linn. Soc. Lond., vii, 1863, p. 108; *Buccinum ferreum*, Reeve, Conch. Icon., iii, 1847, Bucc. f. 102; *Euthria fuscolabiata*, Smith, Ann. Mag. Nat. Hist., ser. IV, vol. xv, 1875, p. 421.

³ Zool. Jahrb., Syst. xxii, 1905, p. 599 f.; Wissensch. Ergebn. Schwed. Südpol. Exped., vol. vi, pt. i, 1908, p. 28. Strebel's groups are founded solely on supposed conchological differences, mainly of structure. "The genus," he remarks, "includes species of such different forms that a revision and fresh grouping appears necessary." He admits that the systematic value of the groups he names, *Pareuthria*, *Glypteuthria*, etc., is questionable, without any simultaneous knowledge of their anatomical relations.

⁴ *Pareuthria plicatula*, Thiele, Deutsch. Südpol. Exped., vol. xiii, 1912, p. 212.

⁵ *Thesbia* (?) *innocens*, Smith, Nat. Antart. Exped. 1901-4, vol. ii, 1907, Moll. Gastrop., p. 4, pl. i, f. 1; *Euthria atrata*, Smith, Proc. Zool. Soc. Lond., 1881, p. 29, pl. iv, fig. 5.

⁶ Troschel's figure of *Euthria lineata*, Chem. (*Gebiss*, vol. ii, pl. vii, f. 12), represents by mistake some other radula.

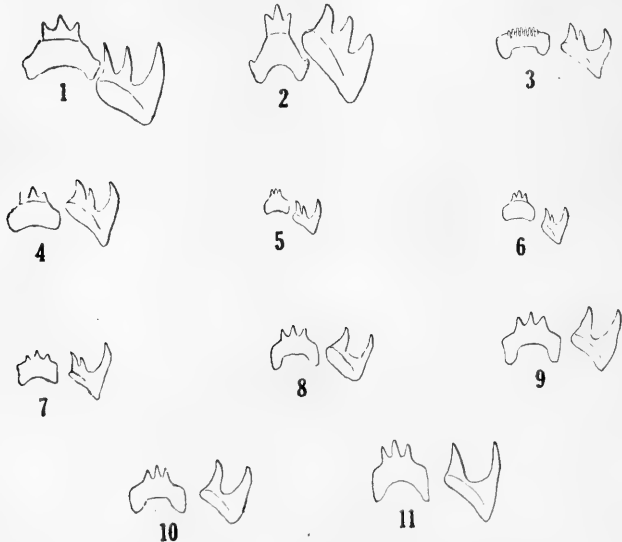
⁷ Trans. New Zealand Inst., vols. xiv, xv, xvi.

⁸ Deutsch. Südpol. Exped., vol. xiii, 1912, p. 212, pl. xvi, f. 22.

In *cornea* the base is much broader than in *linea*, and less deeply arched below, while the interruptions of the slope of the base, which are mere knobs in *cornea*, are distinct denticles in *linea*. The lateral cusps in *linea* are blunt, and of nearly equal size, in *cornea* they are sharper, the external cusp much the longest. In the rhachidian of *cornea* there is no sign of the two subsidiary front denticles, making five in all, as figured by Troschel. *Striata*, Hutt., if Hutton's figure is correct, is exactly the same type as *linea*.

Group 2.—Rhachidian tooth with eight small denticles, nearly equal in size, base broadly oblong, rounded above, arched below, sides slightly prolonged into wings; laterals tricuspid, simple, curved inward, the two inner cusps close together, suggesting the subdivision of a single cusp.

To this type belongs *ferrea*, Reeve.



The general form of radula with a close similarity to that of Group (b) of the Cape *Cominella* (*delalandii*, Kien., *lagenaria*, Lam., *limbosa*, Lam., *porcata*, Gmel.), as described *antea*, p. 229.

Group 3.—Rhachidian tooth tricuspid on a simple base, base usually rounded at the top, scarcely arched below; laterals tricuspid, simple, the two inner cusps close together, representing a single subdivided cusp.

The New Zealand species (1) *flavescens*, Hutt., (2) *littorinoides*, Reeve, (3) *vittata*, Quoy, the Tasmanian (4) *clarkei*, T.-Woods, and the Cape (5) *queketti*, Smith, belong to this type.

The radula of *queketti*, however, with its square base, angled at the top and arched below, is scarcely distinguishable from those

of the so-called Cape *Cominella*, *elongata*, Dunk., and *tigrina*, Kien. It has further the characteristic that the interior cusp of the lateral is serrated all along the inner edge.

Group 4.—Rhachidian tooth tricuspid on a rather narrow base, base strongly arched below, and more or less prolonged into wings; laterals bicuspid, simple, outer cusp the longer and narrower. To this type belong the Magellanic species *antarctica*, Smith, *fuscata*, Brug., *fuscata*, Brug., var. *curta*, Prest., and *innocens*, Smith. There is strong reason to suspect that Preston's var. *curta* of *fuscata*, Brug.,¹ is a distinct species from *fuscata*; the three rhachidian cusps are differently shaped, and set at a different angle.² It appears from von Martens' description³ of the radula of his *E. chlorotica* that that species also belongs to this group, and here too must be classified the West American *E. dira*, Reeve, which possesses a tricuspid rhachidian, set on a base which is rounded above, and deeply arched below, sides produced into wings; laterals bicuspid,⁴ simple.

A comparison of the radulæ of Group 4 with those of the *Cominella* of New Zealand (*antea*, p. 228) will suggest the conclusion that the Magellanic Euthrias are in fact Cominellas, and should be classified as such. It is noticeable that, in the Falklands at least, "Euthria" occurs on muddy shores, and Mr. Iredale tells me that in New Zealand and on Norfolk Island *Cominella* is always found associated with mud.

EXPLANATION OF FIGURES.

1. *Euthria cornea*, L.: Naples.
2. " *linea*, Mart.: New Zealand.
3. " *ferrea*, Reeve: Japan.
4. " *littorinoides*, Reeve: Auckland Island, New Zealand.
5. " *vittata*, Quoy: New Zealand.
6. " *clarkei*, T.-Woods: South Australia.
7. " *queketti*, Smith: South Africa.
8. " *antarctica*, Smith: Cape Horn.
9. " *fuscata*, Brug.: Chile.
10. " *fuscata*, Brug., var. *curta*, Prest.: Falkland Islands.
11. " *dira*, Reeve: Vancouver.

THE GENERIC POSITION OF THE GENUS *NORTHIA*, GRAY.

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 13th April, 1917.

THE genus *Northia* was constituted by Gray (Proc. Zool. Soc. Lond., 1847, p. 140) for his *Nassa northiæ*. In his "List of the Genera of

¹ Ann. Mag. Nat. Hist., ser. VIII, vol. xi, 1913, p. 218 (not figured).

² There can be no doubt of the identification, as Gwatkin had his specimens from Preston.

³ "Mittelplatte der Radula mit 3 Zähnen, wovon der mittlere länger, Seitenplatte mit zwei starken einwärts gekrümmten Zähnen, wovon der äussere länger, aber schmaler": Sitzungsber. Naturf. Fr. Berlin, 1878, p. 22.

⁴ One specimen shows the remarkable variation of a normal bicuspid lateral on one side, while the inner tooth of the lateral on the other side is in every case deeply cloven, making the tooth tricuspid.

Recent Mollusca, their Synonyms and Types" (*l.c.*, pp. 129-219), he placed *Northia* (misspelt *Northea* in the index) in the *Nassina*, next after *Desmoulea*.

Nassa northiæ is figured in Griffith & Pidgeon's edition of Cuvier's "Animal Kingdom", vol. xii, 1834, pl. xxx, f. 2. Gray's name does not appear, and the species therefore properly belongs to the authors of the book. There is no description in the text. The specimen figured is manifestly immature, and is probably the shell in Gray's own collection in the Natural History Museum, on the tablet of which is written, in Gray's own hand, "Northia?"

Kiener (Iconog., livr. vi, Dec. 1834, p. 23, pl. ix, f. 28) figures the species as *Buccinum serratum* of Dufresne, which is in all probability a manuscript name.

Deshayes (in his edition of Lamarck's Anim. sans Vert., vol. x, 1844, p. 192, No. 69) alters the name to *Buccinum pristis, serrata* being preoccupied by Brocchi (*Subapp. Foss.*, 1814, pl. v, f. 4) for a fossil *Nassa*.

H. & A. Adams (Genera, vol. i, 1853, p. 111, pl. xii, f. 1) place *Northia* in the subfam. *Nassinæ* between the genera *Cominella* and *Truncaria*.

Chenu (Manuel, 1859, p. 159, f. 172) places *Northia* as a sub-genus of *Buccinum*, with *Cominella* and *Amphissa*.



Tryon (Manual, vol. iv, 1882, p. 5) places *Northia* first among the genera of *Nassidæ*, immediately before *Truncaria*, adding, however (p. 8), that he thinks he would have placed it in the *Terebridæ* had it not been already assigned to the *Nassidæ*, or to any other family.

P. Fischer (*Man. de Conch.*, 1884, p. 636) places *Northia* in the *Nassidæ*, as a sub-genus of *Dorsanum* (= *Pseudostrombus*), which comes between *Canidia* and *Buccinanops* (= *Bullia*).

Dall (Proc. U.S. Nat. Mus., vol. xxxvii, 1909, p. 215) places the genus *Northia* in the family *Alectrionidæ*, as the *Nassidæ* must now be called, between *Alectrion* and *Buccinanops*.

Thus the general consent of authorities places *Northia* in or near the *Alectrionidæ*, a position which the shape of the shell, with its handsomely toothed outer lip, might appear to warrant. But an examination of the radula gives reason for modifying the current view.

As will be seen by an examination of the accompanying figure, the laterals are bicuspid and simple, while the base of the rhachidian tooth is narrow and arched, with the side produced below into wings. Both these points are characteristic of *Alectrion*, and of other genera as well, but here the resemblance ceases, while the

significant feature of an *Alectrion* radula, the numerous small denticles of the rhachidian, smaller at the sides than in the middle, is absent altogether.

In its place we find on the rhachidian tooth three large strong denticles, the central denticle rather the largest, base narrow, sides squarish, strongly winged. The laterals are bicuspid, simple, exterior cusp longer and thinner than the interior cusp, which is strong and remarkably broad.

This combination of a bicuspid lateral, having the inner cusp the broader and stouter, with a tricuspid rhachidian, having cusps nearly equal in size, set on a narrow base with sides prolonged into wings, is characteristic of a section of the genus *Phos*, to which *Northia* stands undoubtedly in very close relationship. Compare the figures of the radulæ of *Phos senticosum*, Lam., and *Phos cancellatum*, Quoy, given in Troschel, *Das Gebiss der Schnecken*, vol. ii, pl. viii, f. 1, 2. A very sharp subdivision of the species hitherto united under *Phos* is indicated by an examination of the rhachidian tooth, for, besides *senticosum*, Lam., and *cancellatum*, Quoy, *roseatum*, Hinds, and *varians*, Sowb., possess the tricuspid rhachidian (and so also does *tasmanicum*,¹ Ten.-Woods), while *gaudens*, Hinds, *nodicostatum*, A. Ad., and *pallidum*, Hinds, have a rhachidian with more numerous denticles, of an *Alectrion* type.

So far as the radula is concerned, *Northia* and *Phos* stand in somewhat close relationship to the *Cominellæ* of New Zealand and Australia, and, to a less degree, to certain Australo-Neozelanian species of *Euthria*. All these four genera are much more closely related to *Buccinum* than they are to *Alectrion*, and should be grouped accordingly.

The shape of the operculum of *Northia* confirms the view that the genus is related to the Photidæ and not to the Alectrionidæ. As given in the figure of H. & A. Adams' "Genera", pl. xii, 1a, 1b, it is rather thick, long, and narrow, narrowing towards the nucleus, which is terminal and slightly hooked. That of *Phos* is similar, though not quite so thick, with a sub-terminal nucleus. Adams' figure of *Northia* is not quite correct; specimens do not show a marked notch close to the terminal nucleus.

It should be noted that the two other species (*albopunctata*, Ad. & Reeve, and *rissoides*, Reeve) classified as *Northia* by the Adams and by Tryon, have no claim to that position. Still less is *Pleurotoma* (*Daphnella*) *boholensis*, Reeve, a *Northia*, as suggested by Couturier (Journ. de Conch., tom. iv, 1907, p. 130).

¹ J. C. Verco, Trans. Roy. Soc. S. Austr., vol. xx, 1896, p. 228, pl. viii, f. 6.

MOLLUSCAN NOTES. III.¹

By HUGH C. FULTON.

Read 15th April, 1917.

No. 10.—ON THE PRIORITY OF *MUREX ADUNCUS*, SOW., OVER *MUREX FALCATUS*, SOW.

IN most monographs, if not all, *Murex aduncus*, Sow., is placed as a synonym or else as a variety of *M. falcatus*, Sow., "Proc. Zool. Soc.," 1840, but Mr. H. O. N. Shaw has shown us in the "Proc. Mal. Soc. Lond.," vol. viii, p. 335, that part 62 of Sowerby's Conchological Illustrations, in which *M. aduncus* was published, appeared June 30th, 1834, and has therefore about six years priority over *M. falcatus*.

No. 11.—ON THE TYPE-SPECIMEN OF *PARTULA NEWCOMBIANUM*, Hartmann.

Among the shells in the Layard Collection (acquired by Sowerby and Fulton, November, 1911) a specimen of the above species was found bearing on the back of its tablet "type"; this find is important since in Pilsbry's monograph of *Partula*, "Manual of Conchology," ser. II, vol. xx, 1909, p. 306, it is stated that "Dr. Hartmann has recorded the loss of the type of this species by shipwreck on its return voyage to Mr. Garrett at Tahiti"; a quotation is also given from a letter of Dr. Hartmann's, "I received this shell from Mr. Layard through Mr. A. Garrett."

The specimen agrees perfectly with the description and dimensions given by Dr. Hartmann, and it is probable that the shell was returned direct to Mr. Layard and not through Mr. Garrett, and therefore did not get lost as was supposed.

No. 12.—*CYPRÆA MILIARIS*, Gmel., var. *DIVERSA*, Kenyon.

This variety, which links up *miliaris*, Gmel., with *eburnea*, Barnes, has received several names as follows:—

1901. *Cypræa miliaris*, var. *diversa*, Kenyon, Journ. of Conch., vol. x, p. 184.
 1909. " " " *nivea*, Preston, Nautilus, vol. xxii, p. 121.
 1913. " " " *intermedia*, Maxwell Smith, Nautilus, vol. xxvii, p. 70.

I have seen a specimen of this variety almost white, with orange-coloured interior and the characteristic spots of *miliaris* just discernible.

No. 13.—ON *MUREX SPINICOSTA*, Kiener.

Kiener in his "Icon. Coq. Viv." gives Valenciennes as the authority for this species, with a reference to "Coquilles marins bivalves et

¹ For Nos. I and II see these Proceedings, vol. xi, p. 236 and 324.

univalves de l'Amérique équinoxiale recueillies pendant le voyage de MM. Humbert et Bonpland, 1831", but on referring to that work I have been unable to find any description or figure of *spinicosta* therein; the species should therefore be credited to Kiener.

1843. *Murex spinicosta*, Kiener, Icon. Coq. Viv., p. 49, p. xli, f. 1.
 1845. ,, *spinicostata*, Reeve, Conch. Icon., sp. 18, pl. iv, f. 18.
 1879. ,, *spinicostatus*, Sow., Thes. Conch., vol. iv, p. 35,
 pl. xix, f. 171.
 1880. ,, *spinicostata*, Tryon, Man. Conch., vol. ii, p. 107,
 pl. xxiii, f. 207; p. xxviii, f. 251.

I have received examples of this species from Florida.

No. 14.—ON *EULOTA* (*EUHADRA*) *QUÆSITA*, Desh., and *LUHUANA*, Sow.

If one compares these two species with the aid of a mirror it becomes obvious that they are but dextral and sinistral forms of one species.

I have an original specimen of *E. perryi*, Jay, which proves to be the same as *quæsita*, Desh.

The synonymy is therefore:—

1839. *Helix luhwana*, Sow., Zool. Capt. Beechey's Voyage, p. 143,
 pl. xxxv, f. 4.
 1851. ,, *quæsita*, Desh., Fér. Hist., i, p. 179, No. 239, pl. x B,
 f. 10-12.
 1856. ,, *perryi*, Jay, Narr. Perry's Exped., ii, p. 294, pl. v, f. 7-9.

No. 15.—ON *ARIOPHANTA* (*HEMIPLECTA*) *INCLINATA*, Pfr.

In the Ann. Mag. Nat. Hist., vol. iv, 1889, p. 199, pl. xiii, f. 16, Mr. E. A. Smith figured a specimen from Aignan Island, Louisiade Archipelago, that he thought might be the unfigured *Nanina inclinata*, Pfr. He noted that the Aignan I. specimens exhibited excessively fine spiral striæ on their upper surface, and thought that Pfeiffer might have overlooked that character. Having some specimens from the Louisiade Is. that I considered were probably the true *inclinata*, I sent one to Mr. Gill, Curator of the Hancock Museum, Newcastle-on-Tyne, asking him to be good enough to compare it with the type of *inclinata* in the Angas Collection. Mr. Gill asked Mr. Oliver, a conchologist of Newcastle, to make the comparison, and he most kindly did so, and reports that the specimen sent him agrees in all material respects with the type, which, as in my specimen also, has no spiral striæ. I intend placing in our national collection the specimen compared by Mr. Oliver.

No. 16.—ON THE TYPE-SPECIMENS IN THE COLLECTION OF THE LATE
 J. S. GIBBONS, M.B.

In the "Journal of Conchology" the following papers, giving descriptions of new species collected by Dr. Gibbons, appeared—

1877. J. W. Taylor, "Descriptions of new species of Land Shells from the East Coast of Africa": vol. i, pp. 251-5, pl. ii, f. 1-3, and pp. 280-2, pl. iii, f. 1-5.

1878. J. S. Gibbons, M.B., (a) "Notes on some Land Shells of Curaçao, W.I., with descriptions of two new species"; (b) "Descriptions of two new species of Land Shells and remarks on others, collected on the East African Coast": vol. ii, pp. 135-45, pl. i, f. 1-5.
1880. J. W. Taylor, "Descriptions of new species of Land Shells from the East Coast of Africa": vol. iii, pp. 142-4.

In April, 1910, the collection formed by Dr. Gibbons was acquired by Messrs. Sowerby & Fulton, and the type-specimens found therein were deposited in the British Museum. The following types were, however, missing:—

- Zonites* (?) *ventrosa*, Taylor, vol. i, p. 252, pl. ii, f. 2.
Buliminus costatus, Taylor, vol. i, p. 281, pl. iii, f. 2.
B. cinereus, Taylor, vol. i, p. 282, pl. iii, f. 5.
Subulina intermedia, Taylor, vol. i, p. 282, pl. iii, f. 4.
Succinea gyrata, Gibbons, vol. ii, p. 136, pl. i, f. 2.
Helix dubia, Taylor, vol. iii, p. 142.
Bulinus bawriensis, Taylor, vol. iii, p. 142.
B. zanguebaricus, Taylor, vol. iii, p. 143.
Pupa turricula, Taylor, vol. iii, p. 143.
P. (Ennea) sexdentata, Taylor, vol. iii, p. 144.

The five last-mentioned species were supposed to have been figured on pl. i, vol. iii, but that plate contains entirely different matter. I would point out that the names *Helix dubia* and *Ennea sexdentata* were preoccupied by Clessin and Martens.

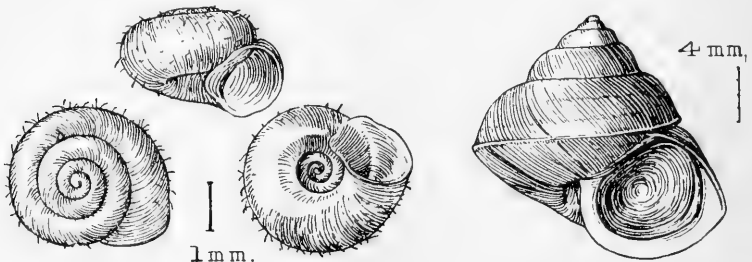
In a letter to me Mr. J. W. Taylor confirms the omission of figures of the five species in question, and does not know what happened with regard to the type-specimens.

DESCRIPTION OF A NEW SPECIES OF COLOMBIAN *TRICHODISCINA* (*T. CRINITA*).

By HUGH C. FULTON.

Read 13th April, 1917.

SHELL rather widely umbilicate, depressed globose, thin, semi-transparent, covered with a horn-brown periostracum with close-set



Trichodiscina crinita, n.sp.

Vivipara occulta, n.sp.

oblique microscopic striæ, or growth - lines, and a number of irregularly disposed hairs; spire flat; whorls 4, convex, slowly increasing in width, last half-whorl slightly descending; aperture somewhat oblique, subcircular; peristome simple, not thickened.

Maj. diam. 3.5, alt. 2 mm.

Hab.—Cartagena, Colombia (Dr. J. S. Gibbons).

Like a miniature *Chloritis*, and resembling nothing known to me from the West Indian region.

DESCRIPTION OF A NEW SPECIES OF SIAMESE VIVIPARA
(*V. OCCULTA*).

By HUGH C. FULTON.

Read 13th April, 1917.

SHELL trochiform, rather thin, very narrowly umbilicated, covered with a chocolate-brown periostracum, which when cleaned is slightly polished, the under side is a trifle lighter in colour and is sometimes of a greenish-brown tint; whorls (remaining) 4, the younger shell having one and a half more, inconspicuously oblique striated, last whorl scarcely descending, sharply carinate, partly malleated, microscopically spirally striated on under side; aperture very oblique, interior bluish-white with an ill-defined brown spiral band at upper part; peristome slightly expanded at the columellar and basal portions, but thin and acute at right margin, margins connected by a rather thin bluish-white callus; umbilicus almost covered; operculum normal.

Alt. (including peristome) 19, diam. maj. 20 mm.

Hab.—Siam (Carl Bock, ex Damon Coll.).

This shell has been distributed as *V. trochoides*, Marts. (= *umbilicata*, Rve., non Lea), but reference to the figures of that species is sufficient to confirm its distinctness. *V. occulta* is figured in the Conch. Cab. (Neue Folge) by Kobelt in his monograph of the genus, on pl. xliv, figs. 10-14. My suspicion that Martens had made a mistake in the measurements of *trochoides* is confirmed by Morelet in the Journ. de Conch., vol. xvii, p. 197.

PRESIDENTIAL ADDRESS.

By J. R. LE BROCKTON TOMLIN, M.A., F.E.S., etc.

Delivered 9th February, 1917.

A SYSTEMATIC LIST OF THE MARGINELLIDÆ.

IN the List which follows I have endeavoured to put together all the specific and varietal names which have been applied by authors to actual or supposed members of the family of the Marginellidæ. My only regret is that, so far, time has not allowed me to include the fossil forms. From the point of view of synonymy this is a serious omission, which I trust to be able to repair later on. Meanwhile, where the name of a recent species is preoccupied by a fossil one, I believe that I have always noted the fact. In forming such a list I have had an excellent model to follow in that of the Columbelloidæ, by S. Pace, in vol. v of these Proceedings.

I have found, just as he did, that there are many names which have never been included in monographs of the group with which I am dealing, many type-specimens which cannot be traced, even several which are stated to be in our national collection. I have come across the usual crop of those tiresome and useless weeds—*nomina nuda*. It is very curious to note how gradually and insidiously these pests creep into literature, and how in many cases a false reference is copied from one writer to another until it acquires quite a traditional and respectable position. The length of time during which one of these upstarts will maintain its false status is extraordinary, and is incidentally a useful piece of evidence to show how little pains successive copyists take to verify the references which they employ. If I have in a few cases below cited a name 'ex So-and-so MS.', it is only in deference to the custom which obtains at present. A point with regard to specific names which is much overlooked, especially by certain living authors who have a passion for varietal names, is that under the present code these names are on precisely the same footing as the specific names in their genus. Consequently, and I may say fortunately, the inevitable multiplication of "var. *major*", "var. *minor*", "var. *alba*", and the like has the very opposite effect to that intended by their sponsors, and 99 per cent of them come into literature stillborn.

I take the family Marginellidæ as defined in Dr. Paul Fischer's *Manuel de Conchyliologie*, with the exception of the genus *Microvoluta*, placed by him doubtfully in this family, but now believed to belong to the Volutidæ or possibly to the Mitridæ. I unhesitatingly reject from the family von Martens' sub-genus *Marginellona*, formed in 1903 for the reception of a species dredged by the German Deep-sea Expedition. Only a single, much broken live specimen was procured, but there is enough to show that the structure of the columella is totally different from any known form of Marginellid. Von Martens admits that the shell characters are Volutoid, but considers that the

radula is nearer to that of *Marginella*. I retain the two species of *Pachyathron*, owing to the continued uncertainty as to their affinities. It will be found that I have throughout erred rather on the side of inclusion than of exclusion, and I am convinced that this is the correct attitude in drawing up a list of this kind. Thus it has seemed convenient to include all the species placed by Bolten in the genus *Pterygia*, and all that I find at any time to have been attributed to *Volvaria*. Much confusion arose over this genus owing to Lamarck, who, after erecting it in 1801 for the Tertiary fossil *V. bulloides*, introduced into it in 1822 several species of Marginellids. The fossil has punctured striæ as in *Actæon* and the form of a *Bullinella*, and there can be little doubt that Roissy and D'Orbigny were right in placing it among the Tectibranchs. It might possibly have been more consistent similarly to list everything that has been credited to *Voluta*, but this would have added very largely to my task, and hardly seemed necessary in view of the very small number of Marginellidæ known at the period when *Voluta* had so comprehensive a use.

The author of the list of Columbellidæ already referred to did not profess, except in a few cases, to deal with the identification or synonymy of the names he catalogued, though he seems to have contemplated undertaking such a task in a succeeding paper. This is a question with which I have endeavoured to deal, nor have I been content to accept blindly the dicta of previous writers, but have in most cases formed an unbiassed opinion by the comparison of authentic specimens.

The order followed in cataloguing each item is as follows: after the specific name and that of the author comes the genus (in brackets) to which the name was attributed in the original description; then the date of publication as exactly as possible, and the reference to the original description, such references being invariably quoted from the actual work or serial and not from reprints or separata with altered and misleading pagination. The type locality follows and the location of type or types when I have been able to ascertain it. It should be inferred that omission of locality implies a similar omission on the part of the describer, except in cases where a specific name has been proposed to replace another on the score of pre-occupation. It is then obvious that the type locality and type-specimen relating to the preoccupied name pertain alike to its successor, but to economize space they have not been mentioned again. Names are all copied exactly as spelt by their authors, and as far as I remember there are only three cases of obvious typographical error where emendation has been permissible, viz. *levigata*, Braz., *aureocincta*, Stearns, and *scintilla*, Jous. Where "(var.)" is appended to a name, it signifies that that name was a varietal one in the first instance. Misspellings are troublesome and numerous though comparatively unimportant; it will, however, be found that most of them are noticed below, though such are not cited when incidentally occurring in the text of a work. Petit de la Saussaye, Paetel, and Weinkauff are far the worst offenders in this way, the

last writer's "excellent synonymic catalogue"—to use Tryon's encomium—showing seventeen cases of such erroneous names.

I cannot trace the family name Marginellidæ further back than 1853, when it was used by H. & A. Adams with much the same limits as Fischer gave it, except that they included *Erato*, which is now said to have the animal and radula of a *Trivia* and has gone to the neighbourhood of the Cypræidæ. Redfield claimed to have used it in 1851, but this was only in a privately printed catalogue of his collection. An excellent historical survey is given by Jousseume of the earlier classification of the group. The following is a list of the sectional names that have been proposed for recent species, but I have no intention of pronouncing on their value:—

- BALANETTA, JOUSS., 1875. Rev. Mag. Zool., 1875, p. 168. Type, *baylii*, Jouss.
- BULLATA, JOUSS., 1875. l.c., p. 167. Type, *bullata*, Born.
- CANALISPIRA, JOUSS., 1875. l.c., p. 168. Type, *olivellæformis*, Jouss.
- CLOSLIA, GRAY, 1857. Guide Syst. Distr. Moll. Brit. Mus., pt. i, p. 36. Type, *sarda*, Kien.
- CRYPTOSPIRA, HINDS, 1844. Proc. Zool. Soc. Lond., 1844, p. 76. Type, *quinqueplicata*, Lam.
- CYSTISCUS, STIMPSON, 1865. Amer. Journ. Conch., i, 55. Type, *capensis*, Stimpson.
- EGOENA, JOUSS., 1875. l.c., p. 167. Type, *egouen*, Jouss. (= *amygdala*, Kien.).
- ERATOIDEA, WEINKAUFF, 1880. Jahrb. Malak. Ges., 1880, p. 42. Type, *margarita*, Kien.
- FABA, FISCHER, 1883. Manuel, p. 602. Type, *faba*, L.
- GIBBERULA, SWAINSON, 1840. Treat. Malac., p. 323. Type, *zonata*, Sow. (= *oryza*, Lam.).
- GIBBERULINA, MONTEROSATO, 1884. Nomencl. Gen. e Spec., p. 139. A name unnecessarily substituted for BULLATA, on the grounds that the latter is not a substantive, and that the resultant *Bullata bullata* is contrary to every rule of nomenclature.
- GLABELLA, SWAINSON, 1840. l.c., p. 324. Type, *prunum*, Gmel.
- GRANULA, JOUSS., 1875. l.c., p. 167. First species, *bensoeni*, Rve.
- HYALINA, SCHUMACHER, 1817. Essai Nouv. Syst., p. 234. Type, *pellucida*, Schum.
- MARGINELLA, LAM., 1799. Mém. Soc. Hist. Nat. Paris, an vii, p. 70. Type, *glabella*, L.
- MARGINELLARIUS, DUMÉRIl, 1806. Zool. Anal., p. 338. New name for *Marginella*, Lam.
- MARGINELLONA, MARTENS, 1903. Wiss. Erg. Deutsch. Tief-See-Exp., vii, Lief. 1, p. 108. Type, *gigas*, Martens.
- MARGINELLOPSIS, BAVAY, 1911. Bull. Mus. Hist. Nat. Paris, 1911, No. 4, p. 240. Type, *serrei*, Bavay.
- NEOVOLVARIA, FISCHER, 1883. Manuel, p. 602. Example, *pallida*, L.
- PERSICULA, SCHUMACHER, 1817. l.c., p. 235. Type, *variabilis*, Schum. (= *persicula*, L.).
- PHÆNOSPIRA, HINDS. l.c., p. 72. Example, *nodata*, Hinds.

- PORCELLANA, Gray, 1857. Guide Syst. Distr. Moll. Brit. Mus., pt. i, p. 36. First species, *glabella*, L.
- PRUNUM, H. & A. Adams, 1853. Gen. Rec. Moll., i, 191. First species, *albina*, Gask. (= *turbinata*, Sow.).
- RABICEA, Gray, 1857. Guide Syst. Distr. Moll. Brit. Mus., pt. i, p. 37. Type, *interrupta*, Lam.
- SERRATA, JOUSS., 1875. l.c., p. 167. Type, *serrata*, Gask.
- VOLUTELLA, Swainson, 1820. Zool. Ill., ser. II, i, pl. xlv. Type, *bullata*, Lam. = *bullata*, Born (pars), *angustata*, Sow. (pars).
- VOLVARINA, Hinds, 1844. Proc. Zool. Soc. Lond., 1844, p. 75. Type, *nitida*, Hinds (= *mitrella*, Risso).
- PACHYBATHRON, Gaskoin, 1853. Ann. Mag. Nat. Hist., ser. II, xi, 356. First species, *cassidiforme*, Gask.
- PSEUDOMARGINELLA, Maltzan, 1880. Nachrichtenbl. Malak. Ges., 1880, p. 106. Type, *adansoni*, Maltzan.

Though one may select small groups with certain well-marked characteristics, yet they easily grade into one another when the multitude of species is examined seriatim, and so far the number whose soft parts and radulæ are known is very small. Professor Gwatkin told me last year that he only had the radulæ of seventeen species, and that it was an extremely hard one to extract. He added, "the radula is as anomalous as *Gadinia*. I can think of nothing like it. The nearest is *Olivella* and some of Troschel's figures of *Turricula* and *Ancilla*. The side teeth are obsolete—an interesting converse of *Columbella*, etc., where the centrals are degraded."

Bolten placed all his species of *Marginella*, with some Volutes and others, in a genus *Pterygia*. Dall has recently designated *P. nucella*, Bolten, = *Voluta dactylus*, L., as the type of this genus (Bull. U.S. Nat. Mus., No. 90, p. 51), whereby it becomes equivalent and of course anterior to *Cylindromitra*, Fischer. *Pseudomarginella* was founded on specimens collected at Goree, whose animals were furnished with an unguiculate operculum, while two were said to have a Buccinoid and one a Purpuroid radula. The shells of these forms, as admitted by the authors and as figured, were absolutely indistinguishable from typical *M. glabella*, L. The existence of operculate and non-operculate specimens in the same species is not impossible, though I believe this is the only case of operculate Marginellids on record, but the statements made by von Maltzan and Carrière as to the radulæ have always been received with incredulity, and it is much to be regretted that in the period of thirty-six years that has now elapsed no further evidence has been forthcoming.

The most noticeable characteristic of a Marginellid shell is the strong plaits on the lower part of the columella. The usual number of plaits is four, but some species have only two, whilst in other cases they run to nine or ten, as in *cornea*, Lam., and a nearly related species, *robusta*, Sow., figured in the fourth volume of our Proceedings, has even more. On breaking open the shells of various species, it will be found that these plaits revolve round the columella the whole way up, not decreasing at all in strength, but only to the

number of four as a rule. Where there are more than four in the aperture, the extra ones appear as hardly more than tubercles or continue within only for a very short distance. The only species that I have examined which have more than four throughout are *ventricosa*, Fischer, and its very near relative *loebbeckiana*, Wkff. These have five. Young specimens are sometimes found to have a larger number of plaits than adults of the same species. The plaits vary in the angle of their setting on the columella, and it is obvious that in the *Persicula* group, which has no spire, they will be practically at right angles to the axis.

One very curious fact about this family which has often been commented on is the comparatively large number of cases of sinistrorsity which it supplies. This teratological feature is so excessively rare amongst recent marine Gastropods that I know of only thirty-seven or thirty-eight species in which it is on record, and of these nineteen or 50 per cent are Marginellids. Among fossil Mollusca three species out of the nine so recorded belong to this family.

The Marginellidæ are almost exclusively natives of warm or tropical seas, living as a rule on sand in a few fathoms of water. Occasionally they occur between tidemarks, and I have found the Mediterranean *M. clandestina*, Broc., living at low water amongst small seaweeds on the coast of Sicily. Certain species have been dredged at considerable depths by the *Challenger*, *Blake*, *Travailleur* & *Talisman*, etc. With very few exceptions the known species occur between the 40th North and South parallels of latitude, and though they are of general occurrence in these warmer waters, yet certain regions are noteworthy as producing an unusual number of species, namely, the West African coast, the Caribbean region, Australia, and the Cape district. Curiously enough, the first three of these, as at present known, have each about seventy-four or seventy-five species. Probably Australia will add to this total in the future much more largely than either of the others. On the West African coast the Marginellids form quite an appreciable fraction of the molluscan fauna; the Gravel Expedition in 1909-10 dredged thirty-four out of a total of 519 species, or $6\frac{1}{2}$ per cent. The northern and southern limits of the west coast fauna are rather sharply defined, the former being somewhere about the Tropic of Cancer, the latter in the neighbourhood of Mossamedes. A small parcel recently received from Walfisch Bay consists entirely of a species either identical with, or at most a variety of *M. capensis*, Krauss. The 300 miles of coast from Mossamedes to Capetown seems singularly little known, but its fauna will, I think, prove to belong to the Cape. Three species of *Marginella* are known from St. Helena, one from Ascension, and forty-three from the Cape. Four or five only occur on the East African coast, while the Mascarenes have fourteen. Fifty-six species are scattered from the Red Sea eastwards to the China Sea, and seventeen are recorded from various stations in the Pacific. As already stated, Australian waters at present account for seventy-five, and New Zealand has ten endemic species. On the Pacific coast of

America thirteen or fourteen are known from California to Peru, half a dozen come from the Magellan-Falklands area, and perhaps a dozen species are known along the east coast south of the Amazon. The richness of the Caribbean region has already been mentioned, and a very small number thence struggle north as far as Cape Hatteras.

The Mediterranean has some nine or ten. I should perhaps mention that Thiele reports a single immature specimen (*M. hyalina*, Thiele) as dredged by the German South Polar Expedition of 1901-3. Possibly additional material would justify a change in its systematic position.

The Reference List that follows contains some 950 names.

I should like to express my thanks to some at least of the many friends who have so readily helped me—especially to Dr. Dall, Dr. Pilsbry, Dr. May, R. B. Newton, B. B. Woodward, C. Hedley, F. B. Loomis, of Amherst, Mass., W. F. Clapp, of Cambridge, Mass., G. B. Sowerby, F. H. Gatliff, and most of all to T. Iredale, who has always placed his admirably accurate knowledge and advice ungrudgingly at my disposal.

N.B.—Names relegated to synonymy are printed in italics.

- ABBREVIATA, C. B. Adams (*Marginella*), Jan. 1850. Contrib. to Conch., p. 56. *Loc.*—Jamaica. *Type.*—Amherst College Museum, Mass. (one example, *vide* F. B. Loomis; cf. Adams, l.c., p. 68).
- abbreviata*, Petit, ex C. B. Adams (*Marginella*), 1851. Journ. de Conch., ii, 54. Error for ABBREVIATA, C. B. Ad.
- ABYSSICOLA, Locard (*Gibberula*), 1897. Exp. Sci. Travailleux et Talisman, i, 130, pl. iv, f. 22-5. *Loc.*—North of Spain, 392 and 1094 m. *Type.*—Mus. d'Hist. Nat. de Paris.
- abyssicola*, Schepman (*Marginella*), Sept. 1911. Prosobranchia of the Siboga Exp., pt. iv, p. 260, pl. xviii, f. 8a, b. *Loc.*—Banda Sea, 1158 m. (St. 211), one specimen. *Type.*—Zool. Mus. Amsterdam. = SCHEPMANI, Tomlin.
- ABYSSORUM, Tomlin (*Marginella*), April 1, 1916. Journ. Conch., xv, 43. New name for *M. seminula*, Dall, *nee* Gould.
- adamsoni*, Weinkauff, ex Kiener (*Marginella*), 1880. Jahrb. Malak. Ges., 1880, p. 44. Error for ADANSONI, Kiener.
- ADANSONI, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 5, pl. vii, f. 27. *Loc.*—Goree.
- ADANSONI, Maltzan (*Pseudomarginella*), 1880. Nachrichtsbl. Malak. Ges., Nov.—Dec. 1880, p. 106. *Loc.*—Goree.
- affinis*, Beck. A MS. name (?) quoted by Redfield in Amer. Journ. Conch., vi, 221, as = ORYZA, Lam.
- AFFINIS, Reeve (*Marginella*), Jan. 1865. Conch. Icon, xv, pl. xxiv, f. 136. *Loc.*—St. Thomas, West Indies (Mus. Cuming). *Type.*—In Brit. Mus. are three examples on a tablet marked "M. C., S. Thomas"; the left-hand one of these is evidently the figured type.
- AGAPETA, Watson (*Marginella* (*Glabella*)), 1886. Challenger Rept. Gasteropoda, p. 266, pl. xvi, f. 9. *Loc.*—Port Jackson, 35 f. (St. 163B). *Type.*—Brit. Mus.

- AGGER, Watson (*Marginella* (*Granula*)), 1886. *Challenger* Rept. Gasteropoda, p. 271, pl. xvi, f. 6. *Loc.*—Off Culebra Is., 390 f. (St. 24). *Types.*—Brit. Mus. (two).
- alabaster*, Reeve (*Marginella*), Jan. 1865. *Conch. Icon.*, xv, pl. xxi, f. 107. *Loc.*—? (Mus. Cuming). *Types.*—Brit. Mus. (two). = FAUNA, Sow.
- alba*, Brown (*Volvaria*), 1827. *Illus. Conch. Gt. Brit. and Ireland*, pl. xxxviii, f. 43, 44. *Loc.*—Greenock (Stewart Ker). = *Bullinella alba* (Br.).
- alba*, C. B. Adams (*Marginella*), Jan. 1850. *Contrib. to Conch.*, p. 56. *Loc.*—Jamaica. *Types.*—Amherst College Mus., Mass. (two *vide* F. B. Loomis; cf. Adams, l.c., p. 68). = CATENATA, Mont.
- alba*, Dunker (var.), 1869. *See guttula*, Rve.
- alba*, Fleming (*Volvaria*), ex Kanmacher (*Voluta*). Quoted by Fleming, *Hist. Brit. Animals* (1828), p. 333, as Montagu's and Turton's *Voluta alba*, which was originally described by Kanmacher in G. Adams' *Essays on the Microscope*, 2nd ed. (1798), p. 639, pl. xiv, f. 27. Not a Marginellid.
- alba*, Pallary (var.), 1902. *See ORYZA*, Lam.
- alba*, Scacchi (var.), 1836. *See MILIARIA*, L.
- alba*, Scacchi (var.), 1836. *See triticea*, Lam.
- alba*, Tomlin & Shackelford (var.), Oct. 1, 1914. *See triticea*, Lam.
- ALBANYANA, Gaskoin (*Marginella*), 1853. *Ann. Mag. Nat. Hist.*, ser. II, xi, 358. *Loc.*—Albany, East Africa (Mus. Gaskoin). Should probably read "South Africa"; never since identified.
- ALBESCENS, Hutton (*Marginella*), 1873. *Cat. Mar. Moll. N.Z.*, p. 19. *Loc.*—Stewart Is., Chatham Is., etc. *Type.*—Dominion Mus., Wellington, N.Z. Incorrectly recorded as *infans*, Rve., by Hutton in *Trans. New Zealand Inst.*, xvi, 224.
- albida*, Lamarek (var.), 1822. *See triticea*, Lam.
- albida*, Bavay (var.), Dec. 1912. *See PALLATA*, Bavay.
- albida*, Tate (*Marginella*), 1878. *Trans. Proc. Rept. Phil. Soc. Adelaide, S.A.*, for 1877-8, p. 87. *Loc.*—Marino Beach, Holdfast Bay, and Aldinga, St. Vincent's Gulf. = *stanislas*, var., *vide* Tate & May, *Proc. Linn. Soc. New South Wales*, xxvi, pt. iii, p. 363 (1901).
- albilabris*, Conrad (*Marginella*), 1846. *Proc. Acad. Nat. Sci. Philad.*, iii, 26. *Loc.*—Tampa Bay. *Type.*—Not in the Acad. Nat. Sci. Philad., which now holds Conrad's collection. Not a Marginellid. Redfield says "probably a *Melampus*".
- albina*, Bavay (var.), Dec. 1912. *See GRUVELI*, Bavay.
- albina*, Gaskoin (*Marginella*), 1853. *Ann. Mag. Nat. Hist.*, ser. II, xi, 358, pl. xii, f. 7, 8. *Loc.*—N.W. Australia (Mus. Gaskoin, Brit. Mus.). *Types.*—Very probably the tablet of 8 examples now labelled "*turbinata*, Sow., Australia, J. S. Gaskoin", is at any rate a set of paratypes. = TURBINATA, Sow.
- albina*, Monterosato (var.), 1884. *See MITRELLA*, Risso.
- alboincta*, Sowerby (*Marginella*), Nov. 1846. *Proc. Zool. Soc. Lond.*, 1846, p. 96. *Loc.*—? (Mus. Cuming). *Type.*—Brit. Mus. (not adult). = PIPERATA, Hds.

- albolineata*, Jousseau (Volvaria) (pars), 1875. Rev. Mag. Zool., 1875, p. 219. Loc.—Cuba. = GRACILIS, C. B. Adams.
- ALBOLINEATA, Orbigny (*Marginella*), 1842. R. de la Sagra's Hist. Nat. de Cuba, Mollusques, ii, 99, pl. xx, f. 27-9. Loc.—Cuba (Auber). Type.—Coll. Orbigny in Brit. Mus.
- albomaculata*, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas. for 1910, p. 382, pl. xiii, f. 2. Loc.—Frederick Henry Bay (two). Type.—Tas. Mus., Hobart.
- albomaculata*, Schlüter (*Volvaria*), 1838. Kurzgef. Verzeichn. Conch.-Samml., p. 23. "Mart. f. 417-18." = LONGIVARICOSA, Lam.
- ALCHYMISTA, Melvill & Standen (*Marginella (Glabella)*), 1903. Ann. Mag. Nat. Hist., ser. VII, xii, 309, pl. xxii, f. 13. Loc.—Persian Gulf, etc. Type.—Brit. Mus. Recorded in Proc. Zool. Soc. Lond., 1901, p. 425, as *fusiformis*, Hinds. Var. *chrysalchyma*, Melv. & Stand., l.c. Var. *leucalchyma*, Melv. & Stand., l.c.
- ALFREDENSIS, Bartsch (*Marginella*), July 28, 1915. U.S. Nat. Mus. Bulletin 91, Rep. Turton Coll. S. Afr. Moll., p. 41, pl. i, f. 2, pl. x, f. 4. Loc.—Port Alfred. Type.—U.S. Nat. Mus.
- ALGOENSIS, Smith (*Marginella*), 1901. Journ. Conch., x, 114, pl. i, f. 4. Loc.—Algoa Bay. Type.—Brit. Mus. Recorded as *M. savignyi*, Issel, in Sowerby's Mar. Shells S. Afr., p. 20.
- ALLPORTI, Tenison-Woods (*Marginella*), 1876. Papers Proc. Rept. Roy. Soc. Tas. for 1875, p. 28. Loc.—Long Bay, D'Entrecasteaux Channel. Types.—Tasmanian Mus., Hobart (three).
- ALMO, Bartsch (*Marginella*), July 28, 1915. U.S. Nat. Mus. Bulletin 91, Rep. Turton Coll. S. Afr. Moll., p. 41, pl. xxi, f. 1. Loc.—Port Alfred. Type.—U.S. Nat. Mus.
- ALTA, Watson (*Marginella (Glabella)*), 1886. Challenger Rept. Gasteropoda, p. 268, pl. xvi, f. 2. Loc.—Off Raine Is., Cape York, 155 f. (St. 185B). Types.—Brit. Mus. (three).
- ALTERNANS, Pritchard & Gatliff (*Marginella*), Feb. 1899. Proc. Roy. Soc. Victoria, n. ser., xi, pt. ii, p. 180, pl. xx, f. 4. Loc.—Shoreham Bay, Western Port. Type.—Coll. Gatliff.
- ATILABRA, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas. for 1910, p. 383, pl. xiii, f. 3. Loc.—"Type, 80 f. 10 mi. E. of Schouten Is., with about 50 others." Type.—Tas. Mus., Hobart.
- AMABILIS, Redfield (*Marginella*), 1852. Ann. Lyc. Nat. Hist. New York, v, 225. Loc.—"Said to be from coast of Yucatan." Type.—Redfield Coll. in Acad. Nat. Sci. Philad. (No. 30309). Figured by Sowerby in Thes. Conch., f. 102, 114 as *carnea*, Storer.
- amantiaca* (?), Sowerby (*Marginella*), 1825. Tankerville Cat., p. 81. A *nomen nudum*.
- AMAZONA, Bavay (*Marginella*), Dec. 1912. Ann. Inst. Océanogr., tom. v, fasc. 3 (Mission Gruvel), p. 19, pl. i, f. 19, 20. Loc.—Cotonou (one). Type.—Mus. de Paris.
- AMBIGUA, Bavay (*Marginella*), Dec. 1912. Ann. Inst. Océanogr., tom. v, fasc. 3 (Mission Gruvel), p. 22, pl. i, f. 21, 22. Loc.—Rio de Oro (two, M. Taquin). Type.—Mus. de Paris. Var. *concolor*, Bavay, l.c.

- AMELIENSIS, Tomlin (*Marginella*), 1917. See *bivittata*, Bav. (1912).
- AMIANTA, Dall (*Volutella (lacrimula* var. ?)), June, 1899. Bull. Mus. Comp. Zool. Harv., xviii, 143 ("Blake" Rept.). Loc.—North Carolina, 14–52 f. (U.S. Fish Commission). Type.—U.S. Nat. Mus.
- amæna*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 51, No. 655. = *Columbella mercatoria*, L.
- ANGENA, Suter (*Marginella (Glabella)*), 1908. Proc. Malac. Soc. Lond., viii, 184, pl. vii, f. 15. Loc.—Snares Is., 50 f. (Bollons). Type.—Coll. Suter.
- AMPELUSICA, Monterosato (*Volvarina*), Jan. 1, 1906. Nat. Sicil., anno xviii, 1906, No. 6, p. 130. Loc.—Morocco. Type.—Coll. Monterosato. Recorded as *V. fusca*, "Reeve," in Journ. de Conch., xxxvii, 1889, p. 118.
- anna*, Paetel, ex Jousseaume (*Marginella*), 1883. Cat. Conch. Samml., p. 30. Error for *anna*, Jous.
- AMYDROZONA, Melvill (*Marginella (Volvaria)*), 1906. Proc. Malac. Soc. Lond., vii, 76, pl. viii, f. 19. Loc.—Persian Gulf, etc. Type.—Brit. Mus.
- AMYGDALA, Kiener (*Marginella*), 1841. Coq. Viv. *Marginella*, p. 36, pl. xi, f. 1. Loc.—Senegal (coll. du Mus.).
- amygdalum*, Mörch, ex Kiener (*Marginella (Cryptospira)*), 1852. Cat. Conch. Yoldi, fasc. i, p. 120. Error for AMYGDALA, Kien.
- ancilla*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, No. 666. Is a *Voluta*.
- ANGASI, Crosse (*Marginella*), 1870. Journ. de Conch., xviii, 304; xix, 324, pl. xii, f. 3. Loc.—Port Jackson (Brazier). Types.—Collection du Journal (two marked "Type", *fide* Dautzenberg). With reference to inaccuracy of above fig. cf. Hedley in Proc. Linn. Soc. N.S.W., xxxix, pt. iv, p. 726.
- anglica*, Leach (*Marginella*), Oct. 1847. Ann. Mag. Nat. Hist., xx, 269. Loc.—Britain. = *Erato levis*, Don.
- ANGUSTATA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 399, pl. lxxvii, f. 169, 170. Loc.—E. Indies.
- angystroma*, Gaskoin (*Marginella*), Dec. 1849. Proc. Zool. Soc. Lond., 1849, p. 19. A manuscript name withdrawn by Gaskoin (l.c.) as preoccupied by Deshayes for a fossil and replaced by *triplicata*, Gask. = *GUTTULA*, Sow.
- ANNA, Jousseaume (*Marginella*), Oct. 10, 1881. Bull. Soc. Zool. Fr., vi, 186. Loc.—Nossi Bé.
- ANNULATA, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxii, f. 119a, b. Loc.—? (Mus. Cuming). Type.—Brit. Mus.
- annullata*, Weinkauff, ex Reeve (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 75. Error for ANNULATA, Rve.
- ANXIA, Hedley (*Marginella*), Dec. 3, 1909. Proc. Linn. Soc. New South Wales, xxxiv, pt. iii, p. 452, pl. xliii, f. 86, 87. Loc.—Weary Bay, Hope Is., 8 f. Type.—Australian Mus., Sydney.
- APHANOSPIRA, Tomlin (*Marginella*), Oct. 1, 1913. Journ. of Conch., xiv, 101, text-fig. Loc.—Port Shepstone (Burnup). Type.—Brit. Mus.

- APICINA*, Menke (*Marginella*), 1828. Syn. Meth. Moll., p. 88. *Loc.*—“Patriam ignoro.” Jousseaume’s *virginea* is a white var. of this.
- aquægutta*, Jousseaume (*Granula*), 1875. Rev. Mag. Zool., 1875, p. 247. *Loc.*—Sandwich (*sic!*). New name for *M. oryza*, Pease, *nec* Lamarck. = *DEBILIS*, Pease.
- arabicus*, Meuschen (*Murex*), 1787. Mus. Gevers., p. 328, No. 777. Author non-binomial. = *GLABELLA*, L.
- arenaria*, “Yoldi,” Mörch (*Glabella*), 1852. Catal. Conch. Yoldi, fasc. i, p. 119. *Loc.*—Senegal. *Type.*—Founded on Sow. Thes. Conch. Marg., pl. lxxiv, f. 13. = *DENTICULATA*, Link.
- aselina*, Weinkauff, ex Jousseaume (*Marginella*), 1880. Jahrb. Malak. Ges., 1880, p. 53. Error for *ASELLINA*, JOUSS.
- ASELLINA*, Jousseaume (*Gibberula*), 1875. Rev. Mag. Zool., 1875, p. 243, pl. vii, f. 6. *Loc.*—Mauritius.
- asphari*, Theobald (*Marginella*), 1860. Catal. Rec. Shells Mus. As. Soc. Bengal, p. 30. *Loc.*—Penang. A *nomen nudum*.
- aspheri*, Paetel, ex Theobald (*Volvaria*), 1887. Cat. Conch. Samml., p. 199. Error for *asphari*, Theob.
- ATOMUS*, Smith (*Marginella* (*Volvaria*)), Aug. 1890. Proc. Zool. Soc. Lond., 1890, p. 267, pl. xxiii, f. 12. *Loc.*—St. Helena (Turton). *Types.*—Four in Brit. Mus., but not so marked.
- attenuata*, Monterosato (var.), 1884. See *MILIARIA*, L.
- attenuata*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxii, f. 116a, b. *Loc.*—Sydney (Strange in Mus. Cuming). *Types.*—Brit. Mus. (four). = *MITRELLA*, Risso (cf. Hedley in Proc. Linn. Soc. N.S.W., xxxviii, pt. ii, p. 303).
- attenuata*, Weinkauff (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 126, pl. xxiv, f. 5, 6. = *TRANSLUCIDA*, Sow.
- AURANTIA*, Lamarck (*Marginella*), 1822. Anim. sans Vert., vii, 358. *Loc.*—? (“mon cabinet”).
- aurantiaca*, DeFrance, ex Lamarck (*Marginella*), 1823. Dict. Sci. Nat., p. 143. *Loc.*—UNKNOWN. Error for *AURANTIA*, Lam.
- AURATA*, Bavay (*Marginella*), Dec. 1912. Ann. Inst. Océanogr., tom. v, fasc. 3 (Mission Gruvel), p. 26, pl. i, f. 33, 34. *Loc.*—Mossamedes, 15–20 m. *Type.*—Mus. de Paris.
- AUREOCINCTA*, Stearns (*Marginella* (*Glabella*)), 1873 (?). Proc. Bost. Soc. Nat. Hist., xv, 22. *Loc.*—Long Key, Fla. (one living). *Type.*—U.S. Nat. Mus. In the index this name is given correctly, but in the text it is spelt *aurocincta* by a printer’s error, which Martens in Zool. Rec., x, 143 (for 1873), emends to *aureicincta*. I cannot ascertain whether the date is 1872 or 1873. The vol. is stated to be for 1872–3, but the title-page has “printed for the Society 1873”. Var. *immaculata*, Dall, Aug. 1890. Trans. Wagn. Free Inst. Sci. Philad., iii, 53; “pure white.”
- auriculata*, May (*Marginella*), Feb. 24, 1916. Papers Proc. Roy. Soc. Tas., 1915, p. 85, pl. i, f. 6. *Loc.*—40 f. off Thouin Bay, Tas. (31 exx.). *Type.*—Tas. Mus., Hobart.
- auriculata*, Ménard-de-la-Groye (*Marginella*), 1811. Ann. Mus. Hist. Nat. Paris, xvii, 331. *Loc.*—Gulf of Taranto, and fossil at Paris and Bordeaux. = *Ringicula auriculata*, Mén.

- auroecincta*, Stearns. See AUREOCINCTA, Stearns.
- AUSTRALIS, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 75. *Loc.*—N. W. coast of Australia (Mr. Dring, R.N.—Mus. Cuming). *Types.*—Three in Brit. Mus. marked "N. W. Australia, M.C." are presumably types.
- avellana*, Lamarck (*Marginella*), 1822. Anim. sans Vert., vii, 360. *Loc.*—? ("mon cabinet"). = PERSICULA, L.
- AVENA, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 17, pl. vi, f. 24. *Loc.*—West Indies. Var. *southwicki*, Davis, March, 1904. Nautilus, xvii, 128, pl. iv, f. 24. *Loc.*—Hamilton, Bermuda. *Types* (of the var.). "Cotypes have been deposited in the Museums at Washington, Philadelphia (no. 86928), Boston, and Providence." Var. *beyerleana*, Bern. (q.v.).
- avena*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 391, pl. lxxvi, f. 130. *Loc.*—Baclayon, Isle of Bohol (Mus. Cuming). *Types.*—Three in Brit. Mus. labelled "under stones at low water, I. Bohol, H.C.", are presumably types. = PHILIPPINARUM, Redfield.
- avenacea*, Deshayes, ex Kiener (*Marginella*), 1844. Lamarck's Hist. Nat. Anim. sans Vert., 2nd ed., x, 454. *Loc.*—West Indies. Error for AVENA, Kien.
- avenella*, Dall (*Marginella* (*avena* var. ?)), Aug. 25, 1881. Bull. Mus. Comp. Zool. Harv., ix, 73. *Loc.*—Gulf of Mexico in 805, 229, and 152 f.; off Cape St. Antonio, 1002 f. *Type.*—U.S. Nat. Mus. Placed by Dall, eight years later, as a synonym of SUCCINEA, Conrad (see Dall, op. cit., xviii, 139).
- azona*, Menke (*Marginella*), 1849. Zeitschr. f. Malak., 1849, p. 37. *Loc.*—? = CORNEA, Lam.
- azora*, Pactel, ex Menke (*Marginella*), 1887. Catal. Conch. Samml., p. 191. Error for *azona*, Mke.
- BAHIENSIS, Tomlin (*Marginella*), 1917. New name here proposed for *joubini*, Bavay, nec Dautz. & Fischer.
- BAIRSTOWI, Sowerby (*Marginella*), Jan. 1886. Journ. Conch., v, 9. *Loc.*—Port Elizabeth. *Types.*—Probably the six specimens in coll. Bairstow, Oxford Univ. Mus.
- baudinensis*, Smith (*Marginella*), 1899. Proc. Malac. Soc. Lond., iii, 209, f. 2 (text). *Loc.*—Baudin Is. and Holothuria Banks, N. W. Austr., 34–53 f. *Types.*—Brit. Mus. (four). = LÆVIGATA, Braz., *vide* Hedley in Journ. Proc. Roy. Soc. W. Austr., i, 203.
- BAVAYI, Dautzenberg (*Marginella*), 1910. Actes Soc. Linn. Bordeaux, lxiv, 83, pl. i, f. 21, 22. *Loc.*—3½ miles north of Cansado Bay, 9–10 m. *Type.*—Mus. de Paris.
- bayerleana*, Weinkauff, ex Bernardi (*Marginella*), 1879. Conch. Cab. *Marginella*, pp. 26, 27. Error for *beyerleana*, Bern.
- baylei*, Jousseau (*Balanetta*), 1875. Rev. Mag. Zool., 1875, pl. viii, f. 5. Error for BAYLII, Jous.
- BAYLII, Jousseau (*Balanetta*), 1875. Rev. Mag. Zool., 1875, p. 269, pl. viii, f. 5. *Loc.* (?).
- BAZINI, Jousseau (*Volvarina*), 1875. Rev. Mag. Zool., 1875, p. 224, pl. vii, f. 3. *Loc.* (?).

- beddomei*, Petterd (*Marginella*), Jan. 1884. Journ. Conch., iv, 143.
Loc.—South Tasmania. *Type.*—Brit. Mus. = SUBBULBOSA,
 Tate (q.v.).
- belangeri*, Weinkauff, ex Kiener (*Marginella*), 1880. Jahrb. Malak.
 Ges., 1880, p. 57. Error for *bellangeri*, Kiener.
- BELCHERI, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond.,
 1844, p. 73. *Loc.*—Cape Blanco, 12–15 f. (Mus. Belcher).
Types.—Two in Brit. Mus. with loc. as above, and labelled
belcheri, Hds. in Hinds' writing on under side of tablet.
- BELLA, Conrad (*Prunum*), 1868. Amer. Journ. Conch., iv, p. 67,
 pl. vi, f. 4. *Loc.*—Miocene, Day's Point, James River, Va.
 It has since been found living off the North Carolina coast in
 14–50 f. See Dall in U.S. Nat. Mus. Bull. 90, p. 55.
- bellangeri*, Deshayes (*Marginella*), 1844. Lamarck's Hist. Nat. Anim.
 sans Vert., 2nd ed., x, 443 (footnote). = ANGUSTATA, Sow.
- bellangeri*, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 27,
 pl. ix, f. 43. *Loc.* (?). = BULLATA, Born.
- BELLI, Sowerby (*Marginella*), 1846. Thes. Conch., i, 375, pl. lxxiv,
 f. 28, 29. *Loc.* (?). *Type.*—Brit. Mus. (ex coll. Bell).
- bellula*, Martens, ex Reeve (*Marginella*). Error in Zool. Record, ii,
 246 (for 1865), for BULLULA, Rve.
- BENGUELENSIS, Jousseau (Gibberula), 1875. Rev. Mag. Zool.,
 1875, p. 245, pl. viii, f. 8. *Loc.*—Côte de Benguela. Tryon
 erroneously unites it with *exilis*, Gm.
- BENSONI, Reeve (*Marginella*), Jan. 1865. Conch. Icon., pl. xxvii,
 f. 158. *Loc.*—Green Point, Cape of Good Hope (Benson). *Type.*
 —Originally in the Lombe Taylor Coll., now apparently lost.
- BERNARDII, Largilliert (*Marginella*), 1845. Mag. de Zool., ser. II,
 7th year, pl. cxvi. *Loc.* (?).
- beyerleana*, Bernardi (*Marginella*), 1853. Journ. de Conch., iv, 149,
 pl. v, f. 15, 16. *Loc.* (?). *Type.*—Coll. du Journal. = AVENA,
 Kiener, var.
- bianmullata*, Fabricius (*Voluta*), 1826. Kgl. Danske Vidensk. Selskabs
 Skrifter, Bd. ii, p. 57. *Loc.*—Cape of Good Hope. = BILINEATA,
 Krauss (fide Martens, Wiss. Ergebn. deutsch. Tief-See-Exp.,
 Bd. vii, Lief. i, 1903, p. 57).
- bibalteata*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xx,
 f. 99. *Loc.*—West Indies (Mus. Cuming): *Types.*—Brit. Mus.
 (three). = GRACILIS, C. B. Adams.
- BICATENATA, Sowerby (*Marginella*), Dec. 1914. Ann. Mag. Nat. Hist.,
 ser. VIII, xiv, 477, pl. xix, f. 7. *Loc.*—Goree? (Denans).
Type.—Coll. Tomlin.
- bicingulata*, Maltzan (*Marginella*), 1887. Paetel's Catal. Conch.
 Samml., p. 191. *Loc.*—Goree. A *nomen nudum*.
- bifasciata*, Lamarck (*Marginella*), 1822. Anim. sans Vert., vii, 357.
Loc.—Senegal ("mon cabinet"). = DENTICULATA, Link. Var.
pulcherrima, Maltzan. Paetel's Catal. Conch. Samml., p. 191
 (1887), (Goree), without description.
- bifasciata*, B. D. & D. (var.), 1883. See MILIARIA, L.
- bifasciata*, Pallary (var.), 1902. See ORYZA, Lam.

- bifasciata*, Sowerby (*Marginella*), 1825. Tankerville Catal., pl. ii, f. 3, 4. = ADANSONI, Kiener (f. 3), and PSEUDOFABA, Sow. (f. 4).
- BILINEATA, Krauss (var.), 1848. See *zonata*, Kiener. As Kiener's name is preoccupied, *bilineata* will have to be used as the name of the species.
- BINOTATA, Sykes (*Marginella*), 1903. Proc. Malac. Soc. Lond., vi, 316, pl. xvii, f. 5. *Loc.*—Indian Ocean (? Ceylon, Nevill Coll.). *Type.*—Coll. Sykes.
- biplicata*, Krauss (*Marginella*), 1852. Archiv f. Naturgesch., 1852, Bd. i, p. 37. *Loc.*—Cape (Zeyher). *Type.*—Naturalienkabinet, Stuttgart. = PERLA, Marrat.
- biplicata*, Risso (*Marginella*), 1826. Hist. Nat. Europe Mérid., iv, 232. *Loc.*—S. Europe. Not a Marginellid. Probably a young *Tornatella* (Blainville). (?) *Ringicula auriculata*, Mén. (Monterosato).
- biplicata*, Risso (*Volvaria*), 1826. Hist. Nat. Europe Mérid., iv, 233. *Loc.*—S. Europe (régions coralligènes). A lost species.
- biplicata*, Tate & May (*Marginella*), Dec. 1900. Trans. Proc. Rept. Roy. Soc. S. Austral., xxiv, pt. ii, p. 92. *Loc.*—Port Esperance, Tas., 24 f. (two examples). *Type.*—Tas. Mus., Hobart. = DIPLOSTREPTUS, May. Figured in Proc. Linn. Soc. New South Wales for 1901, xxvi, pt. iii, p. 363, pl. xxvii, f. 87.
- bivari-cosa*, Lamarck (*Marginella*), 1822. Anim. sans Vert., vii, 358. *Loc.*—Senegal ("mon cabinet"). = MARGINATA, Born.
- bivittata*, Bavay (var.). See CHUDEAUI, Bavay.
- bivittata*, Bavay (*Marginella*), Dec. 1912. Ann. Inst. Océanogr., v, fasc. 3 (Mission Gruvel), p. 23, pl. i, f. 23, 24. *Loc.*—Bay of Praya Amelia, 15–35 m. *Type.*—Mus. de Paris. = AMELIENSIS, Tomlin, here proposed, as Bavay has preoccupied his own name.
- bizonata*, Weinkauff (*Marginella secalina*, Ph., var.), 1879. Syst. Conch. Cab. *Marginella*, p. 142. New name, without any apparent or stated reason, for CALAMELI, Jous.
- BLANDA, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 76. *Loc.*—Cape Blancó, 12–15 f.
- bobi*, Catlow & Reeve (*Marginella*), 1845. Conch. Nomencl., p. 293. Quoted in synonymy of *M. lineata*, Lam., as of Blainville, who, however, only gives *bobi* as a vernacular name (Man. Malac. et Conch., p. 420). = CINGULATA, Dillw.
- bobi*, G. Fischer (*Marginella*), 1807. Mus. Demidoff, iii, 172. *Type.*—Coll. Paul Demidoff (at date of description). = PERSICULA, L.
- borbonica*, Jousseaume (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 176. *Loc.*—Mauritius, Bourbon. *Type.*—Brit. Mus. New name for *pusilla*, H. Ad. nec Edwards. = PUMILA, Redf.
- BOREALIS, Verrill (*Marginella*), April 12, 1884. Trans. Connect. Acad. Arts and Sci., vi, 165, pl. xxix, f. 4. *Loc.*—Off Norfolk, Va., in 81 and 66·5 f.; Martha's Vineyard, 64·5 to 100 f. Verrill calls this sp. "*roscida* (?), Ravenel" in Proc. U.S. Nat. Mus., iii, 369, and "*carnea*, Storer?" op. cit., v, 17. Probably a northern race of *M. apicina*, Mke. (Dall).
- BÖTTGERI, Maltzan (*Marginella (Gibberula)*), Jan.–Feb. 1884. Nachrichtsbl. Malak. Gesellsch., p. 71. *Loc.*—Goree.

- bouvieri*, Jousseume (*Volvarina*), 1877. Bull. Soc. Zool. Fr., i, p. 268, pl. v, f. 5, 6. *Loc.*—Cape Verdes. = *MEDIOCINCTA*, Smith (cf. Jouss., op. cit., vii, 310).
- BRACHIA, Watson (*Marginella* (*Glabella*)), 1886. *Challenger* Rept. Gasteropoda, p. 268, pl. xvi, f. 4. *Loc.*—Off Raine Is., Cape York, 155 f. (St. 185 B). *Types.*—Brit. Mus. (three).
- BRAZIERI, Smith (*Marginella*), Oct. 1891. Proc. Zool. Soc. Lond., 1891, p. 440, pl. xxxiv, f. 14. *Loc.*—Off Sydney, 410 f. (*Challenger*, St. 164 B). *Types.*—Brit. Mus. (six).
- brocchi*, Locard, ex Scacchi (*Volvaria*), 1886. Cat. Gén. Moll. Fr., p. 98. Quoted in synonymy of *clandestina*, Br.
- brochi*, Scacchi (*Volvaria*), 1836. Catal. Conch. Regn. Neapol., p. 10. A *nomen nudum*, no doubt intended for *brocchi*. According to the authors of the Moll. Mar. Rouss., i, 125, this name is a synonym of *CLANDESTINA*, Br.
- BROCKTONI, Shackelford (*Marginella*), May 7, 1914. Ann. S. Afr. Mus., xiii, pt. iii, 1914, p. 98, two text-figures. *Loc.*—Cape Point, N. 50°, E. 18½ m., 180 f. (two examples). *Type.*—S. African Mus., Cape Town.
- BUCCA, Tomlin (*Marginella*), April 1, 1916. Journ. Conch., xv, 43. New name for *ovulæformis*, Tate & May (nec *ovuliformis*, Orb.) = *ventricosa*, Hedley, nec G. Fischer.
- buccinea*, Scacchi (*Marginella*), ex Brocchi (*Voluta*), 1836. Catal. Conch. Regn. Neapol., p. 9. = *Ringicula buccinea*, Br.
- BULBOSA, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxv, f. 144. *Loc.*—Borneo (Mus. Cuming). *Types.*—Three in Brit. Mus. on a tablet, the left-hand one being apparently the figured type.
- BULBULINA, Locard (*Persicula*), 1897. Exp. Sci. Trav. et Talisman, i, 125, pl. v, f. 1-3. *Loc.*—West of Soudan, 130 m. *Type.*—Mus. de Paris.
- bullæa*, Gistel (*Marginella*), 1848. Naturgesch. Thierreichs, p. 170. *Loc.*—India. Probably = *ANGUSTATA*, Sow.
- BULLATA, Born (*Voluta*), 1778. Index Rer. Nat. Mus. Cæs. Vindob., pt. i, Testacea, p. 205. *Type.*—Formerly in Mus. Cæs., Vienna, but now missing (*fide* Brauer).
- bullata*, Lam. (pars) (*Marginella*), 1822. Anim. sans Vert., vii, 360. *Loc.*—Indian Ocean ("mon cabinet"). Based on Mart. Conch., ii, pl. xlii, f. 424-5. = *ANGUSTATA*, Sow.
- bullæa*, Deshayes (*Marginella*), 1839(?). Le Règne Animal ("Disciples de Cuvier" ed.), x, pl. lii, f. 2, 2a ("M. *bullæa*, Lam."). In this work the text of *Marginella* is dated August 10, 1839, but does not contain this species; to the date of the plates there is no clue. = *ANGUSTATA*, Sow.
- BULLULA, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxv, f. 139a, b. *Loc.*—Borneo (Mus. Cuming). *Type.*—Brit. Mus.
- burchardi*, Dunker (*Marginella*), 1852. Zeitschr. f. Malak., 1852, p. 61. *Loc.*—Unknown. = *SAPOTILLA*, Hds. (cf. Novit. Conch., pl. xi, f. 3, 4), rather than *prunum*, Gm., with which Tryon unites it, and from which Dunker expressly distinguishes it.

- burchardi*, Reeve (*Marginella*), Aug. 1864. Conch. Icon., xv, pl. ii, f. 3a, b. *Loc.*—East Africa, Nicobar Is., Ceylon. *Types.*—Reeve's figures are from Mus. Cuming, but he does not state locality of the originals of these figures. The Brit. Mus. has three labelled "Nicobar, M.C.", which are, I think, collectively the types. = *STRIGATA*, Dillw.
- burghiae*, Weinkauff, ex A. Adams (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 68. Error for *DEBURGHI*, A. Ad.
- BURNUPI, Sowerby (*Marginella*), 1897. Append. Mar. Shells S. Afr., p. 10, pl. vi, f. 35. *Loc.*—Port Elizabeth. *Types.*—Five in Coll. Ponsonby, Brit. Mus. (*vide* Ponsonby).
- CADUCOCINCTA, May (*Marginella*), Feb. 24, 1916. Papers Proc. Roy. Soc. Tas., 1915, p. 88, pl. ii, f. 11. *Loc.*—40 fathoms off Thouin Bay (about 200). *Type.*—Tas. Mus., Hobart.
- CÆLATA, Monterosato (*Marginella*), 1877. Journ. de Conch., xxv, 44, pl. ii, f. 3. *Loc.*—Rade d'Alger (Joly). *Type.*—Coll. Monterosato. Var. *major*, Pallary, 1900, J. de C., xlviii, 261 (Oran coast), without description.
- cærulescens*, Brown (pars) (*Marginella*), 1833. Conch. Text-Book, pl. xi, f. 6. The description on p. 68 may denote Lamarck's *cærulescens*, but the figure shows a totally different shell, perhaps *CURTA*, Sow.
- cærulescens*, Lamarck (*Marginella*), 1822. Anim. sans Vert., vii, 356. *Loc.*—Goree ("mon cabinet"). = *PRUNUM*, Gmel. Sowerby, Thes. i, pl. lxxvii, f. 155, figures "a dwarf variety" which is not this species; Redfield queries it as *storeria*, Couth.
- CALAMELI, Jousseau (*Marginella*), 1872. Rev. Mag. Zool., 1872, p. 202, pl. xviii, f. 3. *Loc.*—Djigeelli, Algeria. Very close to *mitrella*, Risso. Var. *major*, Monterosato, 1884. Nomencl., p. 138 (Palma), without description.
- CALCULUS, Redfield (*Marginella*), Oct. 6, 1870. Amer. Journ. Conch., vi, 172. New name for *M. guttata*, Sow., *nec* Swainson, and for *maculosa*, Reeve, *nec* Kiener (qq.v.).
- CALEDONICA, Jousseau (*Serrata*), 1877. Bull. Soc. Zool. Fr., i, p. 267, pl. v, f. 8-10. *Loc.*—New Caledonia.
- CALIFORNICA, Tomlin (*Marginella*), April, 1916. Nautilus, xxix, 138. *Loc.*—California. *Type.*—Coll. Tomlin.
- callosa*, Marrat (*Marginella*), 1876. Journ. Conch., i, 137. *Loc.*—Red Sea. *Types.*—Liverpool Free Public Mus. (six in Coll. Marrat). = *CARNEOLA*, Petit.
- candida*, Bivona (*Marginella*), April, 1832. Effem. Sci. e Letter. per la Sicilia, ii, 19, tav. iii, f. 4a, b. *Loc.*—Palermo. Plate missing in Brit. Mus. copy and not seen; pagination probably usually quoted from a reprint. = *Ringicula auriculata*, Mén.
- candida*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 382, pl. lxxv, f. 86-7. *Loc.*—? (Brit. Mus.). *Type.*—Probably the single shell in Brit. Mus. on tablet marked "L. Guilding", now labelled *margarita*, Kien. = *MARGARITA*, Kien.
- canella*, Jousseau (*Egouena*), 1875. Rev. Mag. Zool., 1875, p. 202. New name for *oblonga*, Sow., *nec* Sw. = *ROSTRATA*, Redf.

- cannella*, Jousseau (Egouena), 1875. Rev. Mag. Zool., 1875, p. 272.
Given as an emendation of *canella*.
- cantharus*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxi, f. 110a, b. Loc.—? (Mus. Cuming). Types.—Three on a tablet in Brit. Mus., of which the left-hand one appears to be the figured type. = *CAPENSIS*, Krauss.
- CAPENSIS*, Krauss, ex Dunker MS. (*Marginella*), 1848. Südafrik. Moll., p. 125, pl. vi, f. 21. Loc.—Cape.
- capensis*, Stimpson (*Cystiscus*), Feb. 25, 1865. Amer. Journ. Conch., i, 55, pl. viii, f. 2a-d. Loc.—False Bay in 20 f. on Gorgoniae. Type.—Destroyed in the Chicago fire of 1871. = *CYSTISCUS*, Redf.
- caribæa*, Orbigny (*Marginella*), 1842. R. de la Sagra's Hist. Nat. de Cuba, Moll., ii, 97, pl. xx, f. 24-6. Loc.—Cuba and St. Thomas (Sagra, Candé, Auber); Florida (Alphen). Types.—Orbigny Coll. in Brit. Mus. has seven examples "Cuba (Auber)", eight examples "Florida" and "New Orleans" (including one *pellucida*, Pfr.), and one "S. Thomas". = *APICINA*, Mke.
- CARINATA*, Smith (*Marginella*), Oct. 1891. Proc. Zool. Soc. Lond., 1891, p. 440, pl. xxxiv, f. 13. Loc.—Off Sydney, 410 f. (*Challengør*, St. 164E). Types.—Brit. Mus. (four).
- CARNEA*, Storer (*Marginella*), 1837. Bost. Journ. Nat. Hist., i, 465, pl. ix, f. 3, 4. Loc.—Key West. Types.—"Cabinet of the Society [i.e. Boston N.H.S.], my own cabinet and several other collections in this city."
- carnea*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 398, pl. lxxvi, f. 102, 114 (*nec* 103). Loc.—West Indies. = *AMABILIS*, Redf. f. 103 appears to be *carnea*, Storer.
- carneola*, delle Chiaje (*Oliva*), 1841(?). Descr. e Notom. Anim. Invert. Sic. Cit., tom. vi, pl. v, f. 10, 21 (no text). = *MILIARIA*, L., var., *fide* Scacchi, Cat. Conch. Regn. Neapol., p. 10. As the date of Scacchi's Catalogue is 1836, either the date 1841 on the title-page of delle Chiaje's plates is wrong or this species was published previously. I have not, however, succeeded in finding any such reference. It may have been a manuscript name in 1836.
- carneola*, Petit (*Marginella*), 1851. Journ. de Conch., ii, 50, pl. i, f. 14. Loc.—? Types.—Coll. du Journal, which has two marked "Type" (*fide* Dautz.). I rename this species *SARCODES* on account of the prior *carneola*, delle Ch.
- CARTWRIGHTI*, Sowerby (*Marginella*), March 29, 1915. Proc. Malac. Soc. Lond., xi, 213, text-fig. Loc.—Trincomalee. Type.—Coll. Sowerby & Fulton.
- carulescens*, Sowerby, ex Lamarek (*Marginella*), 1825. Tankerville Catal., p. 81. Error for *cærulescens*, Lam.
- carybæa*, Weinkauff, ex Orbigny (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 141. Error for *caribæa*, Orb.
- CASSIDIFORME*, Gaskoin (*Pachybatron*), 1853. Ann. Mag. Nat. Hist., ser. II, xi, 356, pl. xii, f. 1-3. Loc.—St. Vincent (Cab. Gaskoin).
- CASSIS*, Dall (*Marginella*), May 27, 1889. Bull. U.S. Nat. Mus., No. 37, p. 106, pl. xxxv, f. 8, without description, for which see Bull.

- Mus. Comp. Zool. Harv., xviii, 137 (June, 1889). *Loc.*—Gulf of Mexico, 101 f. *Type.*—U.S. Nat. Mus.
- castanea*, Dillwyn (*Voluta*), 1817. Descr. Catal. Rec. Shells, i, 530. *Loc.*—Coasts of Brazil (Martini). Founded on a figure in Martini & Chem., ii, t. xlii, f. 430, which has never been satisfactorily identified. Pfeiffer in his "Kritisches Register" queries it as a var. of *glabella*, L., but I have little doubt that it was meant to represent *aurantia*, Lam.
- CATENATA, Montagu (*Voluta*), 1803. Test. Brit., p. 236, pl. vi, f. 2. *Loc.*—"St. Austle near Fowey" (in error).
- catenata*, Reeve (pars) (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xvi, f. 72 (*nec* 73a, b). *Loc.*—W. Indies. = PULCHERRIMA, Gask.
- catinata*, Brown, ex Montagu (*Marginella*), 1844. Ill. Rec. Conch., p. 4, pl. viii, f. 4. Error for CATENATA, Mont.
- CERNITA, Locard (*Marginella*), 1897. Exp. Sci. Travailleux et Talisman, i, 120, pl. iv, f. 10-12. *Loc.*—St. Vincent, C. Verdes, 20 m. *Type.*—Mus. de Paris.
- cerulescens*, Hanley, ex Lamarck (*Marginella*), 1840. Young Conchologist's Book of Species, p. 119. Error for *cerulescens*, Lam.
- CESSACI, Jousseaume (*Volvarina*), Oct. 10, 1881. Bull. Soc. Zool. Fr., vi, 187. *Loc.*—Iles du Cap Vert. This species was also described as new and with the same name by Rochebrune in Nouv. Arch. du Mus., ser. II, iv, 292, pl. xvii, f. 14a, b (Porto Praya). It is referred to but not described in Bull. Soc. Zool. Fr., 1876, p. 270.
- cessacci*, Paetel, ex Jousseaume (*Volvaria*), 1887. Catal. Conch. Samml., p. 199. Error for CESSACI, JOUSS.
- CHALMERSI, Tomlin & Shackelford (*Marginella*), July 1, 1912. Journ. Conch., xiii, 320, pl. iv, f. 3, 4. *Loc.*—São Thomé Is. *Type.*—Brit. Mus.
- CHAPERI, Jousseaume (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 177, pl. vii, f. 1. *Loc.* (?).
- CHARBARENSIS, Melvill (*Marginella* (*Gibberula*)), 1897. Mem. Proc. Manch. Lit. & Phil. Soc., xli, pt. iii, No. 7, p. 7, pl. vi, f. 16. *Loc.*—Charbar and Persian Gulf. *Type.*—Brit. Mus.
- chemnitzii*, Dillwyn (*Voluta*), 1817. Descr. Catal. Rec. Shells, i, 529. *Loc.*—Coasts of Guinea. Founded on Chem., x, t. 150, f. 1422. = DENTICULATA, Link (founded on same figure).
- chrysalchyma*, Melvill & Standen (var.), 1903. See ALCHYMISTA, M. & S.
- chrysea*, Watson (*Marginella* (*Glabella*)), 1886. Challenger Rept. Gasteropoda, p. 267, pl. xvi, f. 8. *Loc.*—Sea Point, Cape Town. *Type.*—Brit. Mus. = PERLA, Marrat.
- CHRYSOMELINA, Redfield (*Marginella*), Sept. 1848. Ann. Lyc. Nat. Hist. New York, iv, 492, pl. xviii, f. 2. *Loc.*—West Indies (?). *Types.*—Probably two in Redf. Coll., Acad. Nat. Sci. Philad., No. 29129, now labelled "Central America".
- CHUDEAUI, Bavay (*Marginella*), 1910. Actes Soc. Linn. Bordeaux, lxiv, 87, pl. ii, f. 1, 2. *Loc.*—Port Etienne, Cansado Bay, etc. *Type.*—Mus. de Paris. Var. *major*, Bavay, l.c., p. 88. Var. *elongata*, Bavay, l.c., p. 88. Var. *quinquevittata*, Bavay, l.c.,

- p. 89. Var. *trivittata*, Bavay, l.c., p. 89. Var. *bivittata*, Bavay, l.c., p. 89. Var. *univittata*, Bavay, l.c., p. 89.
- CINCTA, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 21, pl. viii, f. 32. *Loc.* (?).
- CINERACEA, Dall (*Marginella*), May 27, 1889. Bull. U.S. Nat. Mus., No. 37, p. 106, pl. xlii, f. 6, without description, for which see Proc. U.S. Nat. Mus., xii, 310 (March 7, 1890). *Loc.*—Cape Fear to Fernandina, 294–781 f. *Type.*—U.S. Nat. Mus.
- CINEREA, Jousseau (*Granula*), 1875. Rev. Mag. Zool., 1875, p. 248. New name for *semen*, Reeve, nec Lea. Cf. Smith in Proc. Zool. Soc. Lond., 1890, p. 266.
- CINGULATA, Dillwyn (*Voluta*), 1817. Deser. Catal. Rec. Shells, i, 525. *Loc.*—Coasts of Cape Verde and Island of Goree.
- cypræola*, Scacchi (*Marginella*), ex Brocchi (*Voluta*), 1836. Catal. Conch. Regn. Neapol., p. 9. Error for *cypræola*, Br. (= *Erato laevis*, Don.).
- CLANDESTINA, Brocchi (*Voluta*), 1814. Conch. Foss. Subapenn., ii, 642, tav. xv, f. 11. *Loc.*—Adriatic. Var. *major* and var. *minor* of Monterosato, 1878, *nomina nuda* in Giorn. Sci. Nat. ed. Econ., xiii, 109 (Enum. e Sin.) and elsewhere. Var. *clandestinella*, Bavay, March 30, 1908, Journ. de Conch., lv, 344. *Loc.*—Martinique. *Type.*—Mus. de Paris. This form was subsequently raised to specific rank by the author in 1913, Bull. Mus. Hist. Nat. Paris, 1913, No. 6, p. 358, f. 1, 2. Var. *contraria*, B. D. & D., 1883, Moll. Mar. Rouss., i, 126. Found at Palermo and Magnisi. *M. sinistrorsum*, Dautzenberg, May 10, 1911, Journ. de Conch., lviii, 209.
- CLANDESTINELLA, Bavay (*Marginella*). See CLANDESTINA, Broc.
- CLEO, Bartsch (*Marginella*), July 28, 1915. Bull. U.S. Nat. Mus., No. 91, p. 39, pl. i, f. 6. *Loc.*—Port Alfred. *Type.*—U.S. Nat. Mus.
- CLERYI, Petit (*Marginella*), 1836. Mag. de Zool., 1836, pl. 73. *Loc.*—Senegal.
- coelata*, Monterosato (*Marginella*), 1878. Giorn. Sci. Nat. ed. Econ., xiii, 109 (Enum. e Sin.). Error for *caelata*, Monterosato.
- coerulescens*, Kiener, ex Lamarck (*Marginella*), 1831. Coq. Viv. *Marginella*, pp. 2, 13. Error for *caerulescens*, Lam.
- COLUMNARIA, Hedley & May (*Marginella*), 1908. Rec. Austral. Mus., vii, No. 2, p. 120, pl. xxiii, f. 19. *Loc.*—7 miles east of Cape Pillar, Tas., 100 f. *Type.*—Australian Mus., Sydney. "Very near *caledonica*, Jous. I am not satisfied of their distinctness" (May).
- COLUMNELLA, Bavay (*Marginella*), Dec., 1912. Ann. Inst. Océanogr., v, fasc. 3 (Mission Gruvel), p. 26, pl. i, f. 31, 32. *Loc.*—Bay of Praya Amelia, 15–35 m. *Type.* Mus. de Paris.
- COMPRESSA, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxiv, f. 130. *Loc.*?—(Mus. Cuming). *Types.*—Three in Brit. Mus. labelled "Borneo, M.C." The left-hand specimen is evidently the figured type.
- concolor*, Bavay (var.), Dec. 1912. See AMBIGUA, Bavay.
- concolor*, Bavay (var.), Dec. 1912. See GRUVELI, Bavay.

- coniformis*, Mörch (*Gibberula*), 1860. Malak. Bl., 1860, p. 86. *Loc.*—Puntarenas. = MÖRCHII, Redf.
- CONNECTANS, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas. for 1910, p. 387, pl. xiv, f. 11. *Loc.*—7 miles east of Cape Pillar, Tas., 100 f. *Type.*—Tas. Mus., Hobart.
- conoidalis*, Chenu (*Marginella*), 1859. Manuel de Conch., i, 197, f. 1046. = PELLUCIDA, Pfr.
- conoidalis*, Kiener (*Marginella*), 1841. Coq. Viv. *Marginella*, p. 37, pl. xii, f. 2. *Loc.*—Mers des Antilles, côtes de la Havane (Coll. du Mus.). = APICINA, Mke.
- conoidea*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 53, No. 671. = *Mitra conulus*, Lam. (*vide* Pfr.).
- CONSANGUINEA, Smith (*Marginella (Volvaria)*), Aug. 1890. Proc. Zool. Soc. Lond., 1890, p. 266, pl. xxiii, f. 11. *Loc.*—St. Helena. *Types.*—Three sets of numerous examples in Brit. Mus., but none marked as types.
- CONSORRINA, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas. for 1910, p. 387, pl. xiv, f. 10. *Loc.*—7 miles east of Cape Pillar, Tas., 100 f. *Type.*—Tas. Mus., Hobart.
- constricta*, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 74. *Loc.*—? (Mus. Cuming). *Types.*—Three in Brit. Mus. labelled "M.C." without locality are presumably types. = HINDSIANA, Petit.
- CONTAMINATA, Gaskoin (*Marginella*), Dec. 14, 1849. Proc. Zool. Soc. Lond., 1849, p. 20. *Loc.*—? (Mus. Cuming and Gaskoin). *Types.*—A tablet in Brit. Mus. with four examples is labelled underneath "Nov. Spec. W. Africa, M.C." The left-hand example corresponds exactly to the measurements as given.
- contraria*, B. D. & D. (var.), 1883. See CLANDESTINA, Br.
- CORALLINA, Bavay (*Marginella (Volvarina)*), June 30, 1910. Journ. de Conch., lviii, 22, pl. i, f. 1, 2. *Loc.*—Iles du Cap Vert. *Type.*—Coll. du Journal.
- CORNEA, Lamarck (*Marginella*), 1822. Anim. sans Vert., vii, 360. *Loc.*—? ("mon cabinet").
- corrusca*, Joussemaume (*Volvarina*), ex Reeve (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 217. Error for CORUSCA, Rve.
- CORUSCA, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxv, f. 143a, b. *Loc.*—Singapore (Mus. Cuming). *Types.*—Brit. Mus. (five).
- cosmia*, Bartsch (*Marginella*), July 28, 1915. Bull. U.S. Nat. Mus., No. 91, p. 37, pl. xxi, f. 2. *Loc.*—Port Alfred. *Type.*—U.S. Nat. Mus. = PUNCTILINEATA, Smith.
- crassa*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, No. 661. = PERSICULA, L. (pars) and MARGINATA, Born (pars).
- crassilabra*, Bory de St. Vincent (*Marginella*), 1827. Tableau Encycl. Méth., Vers, i, 167, iii, pl. 377, f. 7. = STRIGATA, Dillw.
- crassilabrum*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xviii, f. 92. *Loc.*—West Indies (Mus. Taylor). *Type.*—Brit. Mus., now labelled *storeria*, Couth. = STORERIA, Couth.

- crassilabrum*, Sowerby (*Marginella*), Nov. 1846. Proc. Zool. Soc. Lond., 1846, p. 96. *Loc.*—West Indies (Mus. Cuming and Jackson). *Types.*—The Brit. Mus. has two lots, one of three, the other of two, each labelled "West Indies, M.C." = LABROSA, Redf.
- CRATERICULA, Tate & May (*Marginella*), Dec. 1900. Trans. Proc. Rept. Roy. Soc. S. Austral., xxiv, pt. 2, p. 91. *Loc.*—D'Entrecasteaux Channel, Tas., 10 f. (two). *Type.*—Tas. Mus., Hobart. Figured in Proc. Linn. Soc. N.S.W. for 1901, xxvi, pt. iii, p. 363, pl. xxvi, f. 74.
- CROSSEI, Vélain (*Persicula*), 1877. Arch. Zool. Expér., vi, 109, pl. iii, f. 5, 6. *Loc.*—Between St. Paul and Amsterdam Is., 80 m.
- CRUSTATA, Locard (*Marginella*), 1897. Exp. Sci. Travailleur et Talisman, i, 116, pl. iv, f. 7-9. *Loc.*—"820 m. tropiques." *Type.*—Mus. de Paris.
- crystallina*, Dunker (*Volvaria*), Feb. 1874. Mus. Godeffroy Catal., 5, p. 115. *Loc.*—Samoa. A *nomen nudum*.
- CUMINGIANA, Petit (*Marginella*), 1841. Rev. Zool., 1841, p. 185. *Loc.*—West Africa.
- cumingii*, Sowerby, ex Petit (*Marginella*), 1846. Thes. Conch., i, 377, pl. lxxiv, f. 33-5. Error for CUMINGIANA, Petit.
- curta*, Monterosato (var.), 1884. See MITRELLA, Risso.
- CURTA, Sowerby (*Marginella*), July 31, 1832. Proc. Zool. Soc. Lond., 1832, p. 105. *Loc.*—Iquique and Payta.
- cuvieri*, Deshayes (*Marginella*), 1855 (?). *Traité Elém. de Conch.*, pl. cxxiii, f. 8. *Type.*—Probably École des Mines, Paris, judging from Jous. in Rev. Mag. Zool., 1875, p. 251. The *Traité* was published in parts from 1839 to 1857 and left unfinished, and only 132 plates appeared. No text to plate cxxiii was ever issued, and probably the plate is not earlier than 1855. = BULLATA, Born.
- cylindræa*, da Costa (*Bulla*), 1778. Hist. Nat. Test. Brit., p. 31, pl. ii, f. 7. *Loc.*—West coasts of England. Da Costa gives this as Pennant's *Bulla cylindræa* (= *Bullinella c.*), but his figures show it to be the common West Indian *Marginella* known as *pallida*, Don.
- cylindræa*, Pease (*Marginella*), 1868. Amer. Journ. Conch., iii, 280. Error by Pease himself for *cylindrica*, Pse.
- cylindrica*, Brown (*Volvaria*), ex Pennant (*Bulla*), 1827. Illustr. Conch. Gt. Brit. and I., pl. xxxviii, f. 36, 37. Error for *cylindræa*, Pennant.
- cylindrica*, Monterosato (var.), 1884. See MILIARIA, L.
- cylindrica*, Pease (*Marginella*), 1862. Proc. Zool. Soc. Lond., 1862, p. 244. *Loc.*—Kingsmill Is. *Type.*—Acad. Nat. Sci. Philad., one marked "W. H. Pease, Kingsmill Is." (No. 29496). = PEASII, Rve.
- CYLINDRICA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 390, pl. lxxvi, f. 134. *Loc.*—? (Coll. Bell). *Types.*—Brit. Mus. (three), ex coll. Bell.
- cylindræa*, Donovan, ex da Costa (*Bulla*), 1801. Nat. Hist. Brit. Shells, ii, 66. Error for *cylindræa*, da C.

- CYMBALUM, Tate (*Marginella*), 1878. Trans. Proc. Rept. Phil. Soc. Adelaide for 1877-8, p. 86. *Loc.*—Aldinga Bay (ten). *Type.*—Brit. Mus., ex coll. Angas. Figured in Proc. Linn. Soc. N.S.W. for 1901, xxvi, pt. iii, p. 364, pl. xxvi, f. 83.
- cypræacea*, Bory de St. Vincent (*Marginella*), 1827. Tableau Encycl. Méth., Vers, i, 167, iii, pl. 376, f. 6. = CORNEA, Lam.
- CYPRÆOIDES, C. B. Adams (*Erato*), 1845. Proc. Bost. Soc. Nat. Hist., ii, 1. *Loc.*—Jamaica. = PACHYBATHRON CYPRÆOIDES, C. B. Ad.
- cypræoides*, Anton (*Marginella*), 1839. Verzeichn. Conch. Samml., p. 99. Not a *Marginella*, as Anton says "zu *Marginella* gehört sie eigentlich nicht da sie keine wirklichen Spindelfalten hat".
- cypræoides*, Tenison-Woods (*Marginella*), 1878. Papers Proc. Rept. Roy. Soc. Tas. for 1877, p. 122. *Loc.*—Blackman's Bay (Petterd). *Type.*—Tas. Mus., Hobart, one marked "type" by T.-Woods, the name given in MS. on the card being *cypræformis*. = OVULUM, Sow. (see under *tenisoni*, Pritchard).
- cypræola*, Grateloup (*Marginella*), ex Brocchi (*Voluta*), 1833. Actes Soc. Linn. Bordeaux, vi, 300, f. 33, 34. = *Erato lævis*, Don.
- cypræola*, Sowerby (*Marginella*), June 5, 1832. Proc. Zool. Soc. Lond., 1832, p. 57. *Loc.*—Acapulco and St. Elena (Mus. Cuming). *Types.*—Brit. Mus. (six), "S. Elena, W. Colombia under stones, H.C." = *Erato scabriuscula*, Gray.
- CYSTISCUS, Redfield (*Marginella*), 1870. Amer. Journ. Conch., vi, 230. New name for Stimpson's *Cystiscus capensis*, on the ground that it is a *Marginella* and therefore antedated by *M. capensis*, Krss.
- dactyla*, DeFrance (*Marginella*), 1823. Dict. Sci. Nat., xxix, p. 143. Error for DACTYLUS, Lam.
- DACTYLUS, Lamarck (*Marginella*), 1822. Anim. sans Vert., vii, 360. *Loc.*—? ("mon cabinet").
- DAUZENBERGI, Tomlin & Shackleford (*Marginella*), July 1, 1912. Journ. Conch., xiii, 319, pl. iv, f. 1, 2. *Loc.*—São Thomé Is. *Type.*—Brit. Mus.
- davisiana*, Marrat (*Marginella* (*Glabella*)), 1877. Journ. Conch., i, 205. *Loc.*—West Africa ("Cape Blanco" on the boxes in Liverpool Mus.). *Type.*—Liverpool Free Public Mus. = BELLII, Sow.
- DEBILIS, Pease (*Marginella*), 1871. Amer. Journ. Conch., vii, 22. New name for *oryza*, Pse., nec Lam.
- DEBURGHI, A. Adams (*Marginella*), April, 1864. Proc. Zool. Soc. Lond., 1863, p. 509. *Loc.*—Swan River (Mus. Cuming and de Burgh). *Types.*—Probably three in Brit. Mus. marked "Swan River, M.C."
- de burghie*, Reeve, ex A. Adams (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xv, f. 68a, b. Quoted as "Adams MS. in Mus. Cuming". Error for DEBURGHI, A. Ad.
- DEFORMIS, G. & H. Nevill (*Marginella* (*Volvarina*)), June 3, 1874. Journ. Asiat. Soc. Bengal, xliii, pt. ii, No. 1, p. 23; figured op. cit., xlv, pl. viii, f. 12. *Loc.*—Ceylon. *Type.*—Indian Mus. : paratype in Brit. Mus.
- DELESSERTIANA, Récluz (*Marginella*), 1841. Rev. Zool., 1841, p. 183. *Loc.*—Ile de France.

- delessertiana*, Weinkauff (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 126, pl. xxiv, f. 7, 8. *Loc.*—"Réunion and Mauritius (Jousseau): Guadeloupe (Beau)," whence came the figured specimen. *Type.*—Coll. Loebbecke. = *ALBOLINEATA*, Orb.
- DELICIOSA*, Bavay (*Marginella*), Dec. 1912. Ann. Inst. Océanogr., v, fasc. iii (Mission Gruvel), p. 21, pl. i, f. 25, 26. *Loc.*— $3\frac{1}{2}$ miles north of Cansado Point. *Type.*—Mus. de Paris. Var. *efasciata*, Bavay, l.c.
- denansiana*, Ancey (*Marginella (Persicula)*), Nov. 15, 1881. Le Naturaliste, i, 510. *Loc.*—Australia. *Type.*—Coll. Denans. Evidently from the description a colour var. of *DEBURGHI*, A. Ad.
- DENS*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxii, f. 120. *Loc.*—Borneo (Mus. Cuming). *Types.*—Four in Brit. Mus. marked "Borneo, M.C.", are presumably types and tally well with description and figure, except in having 5 to 8 minute columellar plaits. Reeve gives 4 plaits.
- denticulata*, Conrad (*Marginella*), 1830. Journ. Acad. Nat. Sci. Philad., vi, 225, pl. ix, f. 21. *Loc.*—Miocene of Maryland: living on U.S. coast from Cape Hatteras to Florida and Barbados (Dall in Trans. Wagn. Free Inst. Sci. Philad., iii, 51). *Type.*—Probably in the Acad. Nat. Sci. Philad. This name is pre-occupied, and on Dall's showing the next oldest synonym is *EBURNEOLA*, Conr.
- DENTICULATA*, Link (*Pterygia*), 1807. Besch. Nat. Samml. Rostock, pt. ii, p. 93. Based upon Chem. x, t. 150, f. 1422. This name must supersede the more familiar *bifasciata*, Lam.
- denticulata*, Tate (*Marginella*), 1878. Trans. Proc. Rept. Phil. Soc. Adelaide for 1877-8, p. 87. *Loc.*—Wauraltie, Spencer's Gulf (three). Pars = *STRANGEI*, Angas, pars = *SIMSONI*, Tate & May (cf. Proc. Linn. Soc. N.S.W. for 1901, xxvi, pt. iii, pp. 363, 364).
- DENTIENS*, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas. for 1910, p. 384, pl. xiii, f. 6. *Loc.*—7 miles east of Cape Pillar in 100 f. *Type.*—Tas. Mus., Hobart.
- DIADOCHUS*, A. Adams & Reeve (*Marginella*), 1848. Zool. Samarang. Moll., p. 28, pl. vii, f. 4a, b, c. *Loc.*—Str. of Sunda, about 3 f. *Types.*—Two in Brit. Mus., but not so marked.
- diadocus*, Weinkauff, ex A. Adams & Reeve (*Marginella*), 1880. Jahrb. Mal. Ges., 1880, p. 45. Error for *DIADOCHUS*, Ad. & Rve.
- diaphana*, Kiener (*Marginella*), 1841. Coq. Viv. *Marginella*, p. 38, pl. xii, f. 3. *Loc.*—Antilles. = *PELLUCIDA*, Pfr.
- DIFFERENS*, Smith (*Marginella*), 1904. Journ. Malac., xi, 32, pl. ii, f. 19. *Loc.*—Port Alfred. *Type.*—Brit. Mus. Reported by Sowerby from the Cape as *bulbosa*, Rve. (Mar. Shells S. Africa, p. 20).
- digsi*, Marrat (var.), 1877. See *FABA*, L.
- diodochus*, Marrat, ex A. Adams & Reeve (*Marginella (Cryptospira)*), 1877. Journ. Conch., i, 242. Error for *DIADOCHUS*, Ad. & Rve.
- DIPOSTREPIUS*, May (*Marginella*), Feb. 24, 1916. Papers Proc. Roy. Soc. Tas. for 1915, p. 76. New name for *biplicata*, Tate & May,

- non* Risso, *nec* Krauss. This paper was issued separately on Dec. 31, 1915.
- donovani*, Payreaudeau (*Marginella*), 1826. Catal. Ann. et Moll. Corse, p. 167. *Loc.*—Gulf of Ajaccio, etc. = *Erato laevis*, Don.
- doyei*, Mitchell, ex Mab. et Roch. (*Marginella*). Error in Zool. Rec., xxvi, 50 (for 1889), for DOZEI, Mab. et Roch.
- DOZEI, Mabillet et Rochebrune (*Marginella*), 1889. Miss. Sci. Cap Horn, vi, 52, pl. iii, f. 4a, b. *Loc.*—Entre Magellan et les îles Malouines; 120 m.
- DUBIOSA, Dall (*Persicula*), 1871. Amer. Journ. Conch., vii, 103, pl. xv, f. 17. *Loc.*—Acapulco, Mexico (one). *Type.*—U.S. Nat. Mus.
- duchon*, Jousseau (*Persicula*), 1875. Rev. Mag. Zool., 1875, p. 261. *Loc.*—Goree. Occurs as a *nomen nudum* in H. & A. Adams' Genera, i, 193, attributed to Adanson. = INTERRUPTO-LINEATA, Mühlf.
- dulcis*, Smith (*Marginella*), 1904. Journ. Malac., xi, 32, pl. ii, f. 20. *Loc.*—Port Alfred. *Type.*—Brit. Mus. I have no hesitation in identifying this with BENSONI, Rve., though the type of the latter appears to be lost.
- dunckeri*, Paetel, ex Krauss (*Marginella*), 1887. Catal. Conch. Samml., p. 192. Error for *dunckeri*, Krss.
- dunckeri*, Krauss (*Marginella*), 1848. Südafr. Moll., p. 126, pl. vi, f. 23. *Loc.*—Cape. *Type.*—Naturalienkabinet, Stuttgart. = BILINEATA, Krauss.
- eburnea*, Preston (*Marginella*), 1906. Proc. Malac. Soc. Lond., vii, 35, text-fig. *Loc.*—Ceylon? (Coll. H. Nevill). *Type.*—Ubi? paratype in Brit. Mus. = SHACKLEFORDI, Preston.
- EBURNEOLA, Conrad (*Marginella*), 1834. Journ. Acad. Nat. Sci. Philad., vii, 141. *Loc.*—Miocene of Virginia. For recent range see under *denticulata*, Conrad.
- edentula*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, No. 668. A *nomen nudum*.
- efasciata*, Bavay (var.), Dec. 1912. See DELICIOSA, Bavay.
- efasciata*, Monterosato (var.), 1875. See MILITARIA, L.
- effossa*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, No. 658. Not a *Marginella*.
- EFFULGENS, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xx, f. 104. *Loc.*—St. Thomas, W. Indies (Mus. Cuming). *Types.*—Brit. Mus., three labelled "St. Thomas, M.C."
- egouen*, Jousseau (*Egouena*), 1875. Rev. Mag. Zool., 1875, p. 209. *Loc.*—Goree. = AMYGDALA, Kiener.
- ELATA, Watson (*Marginella* (*Glabella*)), 1886. Challenger Rept. Gasteropoda, p. 269, pl. xvi, f. 7. *Loc.*—Off Culebra Is., 390 f. *Type.*—Brit. Mus. Dall suggests that this may prove to be the young of *aureocincta*, Stns. (Mus. Comp. Zool. Harv., xviii, 139).
- ELECTRINA, Sowerby (*Marginella*), 1892. Mar. Shells S. Afr., p. 21, pl. i, f. 22. *Loc.*—Port Elizabeth. *Type.*—Brit. Mus.
- ELECTRUM, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxii, f. 118a, b. *Loc.*—? (Mus. Cuming). *Types.*—Brit. Mus.,

- three on a tablet, of which the middle one appears to be the figured type.
- ELEGANS, Gmelin (*Voluta*), 1791. Syst. Nat., ed. xiii, p. 3448. *Loc.*—? *ellicensis*, Hedley (var.), 1899. See ISSELL, G. & H. Nevill.
- ELLIPTICA, Redfield (*Marginella*), 1870. Amer. Journ. Conch., vi, 232. New name for *elongata*, Pease, *nec* Bell. & Mich.
- elongata*, Bavay (var.), 1910. See CHUDEAUI, Bavay.
- elongata*, Pease (*Volutella*), Apr. 1868. Amer. Journ. Conch., iii, 281, pl. xxiii, f. 23. *Loc.*—Fanning Is. *Type.*—Acad. Nat. Sci. Philad. (No. 29168). = ELLIPTICA, Redf. Hedley remarks that "this species is suspiciously close to *peasii*, Rve."
- encaustica*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxvi, f. 148a, b. *Loc.*—Ceylon (Mus. Cuming). *Type.*—Brit. Mus. = DENS, Rve.
- EPIGRUS, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxvi, f. 151. *Loc.*—Mogador (McAndrew in Mus. Cuming). *Types.*—Presumably the three in Brit. Mus. marked "Mogador, M.C." There is also a set of 8 marked "Mogador, R. McAndrew".
- erminea*, Boltzen (*Pterygia*), 1798. Mus. Bolt., p. 51, No. 656. = FABA, L.
- eucosmia*, Bartsch (*Marginella*), July 28, 1915. Bull. U.S. Nat. Mus., No. 91, p. 37, pl. i, f. 11. *Loc.*—Port Alfred. *Type.*—U.S. Nat. Mus. = PIPERATA, Hds.
- EUMORPHA, Melvill (*Marginella* (*Volvaria*)), 1906. Proc. Malac. Soc. Lond., vii, 76, pl. viii, f. 19. *Loc.*—Persian Gulf, etc. *Type.*—Brit. Mus. Recorded in Proc. Zool. Soc. Lond., 1901, p. 426, as *verdensis*, Smith.
- EVADNE, Dall & Simpson (*Marginella*), 1901. U.S. Fish Commission Bull. for 1900, i, 393, pl. lvii, f. 10. *Loc.*—Mayaguez Harbour, Porto Rico. *Type.*—U.S. Nat. Mus.
- EVANIDA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 388, pl. lxxv, f. 69. *Loc.*—? (Coll. Bell). *Type.*—Brit. Mus. Certainly not = *sauiæ*, Sow., as Weinkauff conjectures. The single example is dead and rather worn and very possibly identical with some other known species.
- EVELEIGHI, Tomlin & Shackelford (*Marginella*), Jan. 1, 1913. Journ. Conch., xiv, 11, pl. i, f. 5, 6. *Loc.*—São Thomé Is. *Type.*—Coll. Tomlin.
- exilis*, delle Chiaje (*Voluta*), 1827. Test. Utr. Sic., iii, pt. ii, p. 50, pl. xlvi, f. 35, 36. *Loc.*—Ad Porticus Herculanenses. = MITRELLA, Risso.
- EXILIS, Gmelin (*Voluta*), 1791. Linn. Syst. Nat., ed. xiii, p. 3444. *Loc.*?—I do not think there can be any reasonable doubt what Gmelin's species is. The name is founded on Martini, ii, t. 42, f. 427, but has often been set aside, on the grounds of uncertainty, in favour of *triticea*, Lam. For vars. see *triticea*, Lam.
- EXTRA, Jousseau (Extra), 1894. Bull. Soc. Philom. Paris, ser. VIII, vi, No. 3, p. 101. *Loc.*—Perim.
- faba*, Chenu (*Marginella*), 1850. Illustr. Conch. *Marginella*, pl. i, f. 22, 22a. = PSEUDOFABA, Sow. This misapprehension of the Linnean

- faba* is quoted by Tryon, Manual, v, 214, from Chenu's Leçons Élém. d'Hist. Nat., f. 720 (1847). In that work, however, Chenu gives only a vernacular name.
- faba*, Dillwyn (*pars*) (*Voluta*), 1817. Descr. Cat. Rec. Shells, i, 528 (variety). = DENTICULATA, Link. Dillwyn's var. is based on Martini, ii, t. 42, f. 431, and Encycl. Méth., t. 377, f. 8.
- FABA, Linné (*Voluta*), 1758. Syst. Nat., ed. x, i, 730. *Loc.*—In Oceano Africano. *Type.*—Coll. Linn., *vide* Hanley. Var. *digsi*, Marrat, 1877, Journ. Conch., i, 242. *Loc.*—West Africa. A *nomen nudum*.
- FALLAX, Smith (*Marginella*), 1903. Proc. Malac. Soc. Lond., v, 365, pl. xv, f. 20. *Loc.*—Port Alfred. *Type.*—Brit. Mus. Recorded by Sowerby as *paxillus*, Rve. (Mar. Shells S. Afr., p. 20).
- fasciata*, Requier (var.), 1848. See MILIARIA, L.
- fasciata*, Martini (*Persicula*). Quoted by Schumacher, Essai Nouv. Syst., p. 235, and others, but being taken from a non-binomial author has no status (= CINGULATA, Dillw.).
- fasciata*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 389, pl. lxxvi, f. 142. *Loc.*—? (Brit. Mus.). I have not, however, been able to find the types, and the identity of this species remains doubtful. I am inclined to think that it = MUSTELINA, Angas. Jousseau unnecessarily renamed it *rubrifasciata*, "Schumacher ayant donné à une autre espèce le nom de *M. fasciata*." This statement is not correct and Schumacher only quotes *Persicula fasciata*, Mart. (q.v.) in synonymy.
- FAUNA, Sowerby (*Marginella*), Nov. 1846. Proc. Zool. Soc. Lond., 1846, p. 96. *Loc.*—"Isle of Curasso" (Mus. Cuming). *Types.*—No trace in Brit. Mus., but possibly the two examples now labelled *alabaster*, Rve., were likewise Sowerby's types of *fauna*.
- FESTIVA, Kiener (*Marginella*), 1841. Coq. Viv. *Marginella*, p. 32, pl. x, f. 4, 4a. *Loc.*—? (Coll. Teissier).
- FIGULA, Murdoch & Suter (*Cryptospira* (*Gibberula*)), 1906. Trans. New Zealand Inst., xxxviii, 291, pl. xxiv, f. 27. *Loc.*—Off Great Barrier Is. in 110 f. *Type.*—Dominion Mus., Wellington, N.Z.
- FISCHERI, Bayay (*Marginella*), 1902. Journ. de Conch., i, 407, pl. viii, f. 10, 11. *Loc.*—? *Type.*—Coll. du Journal.
- flammea*, Link (*Pterygia*), 1807. Besch. Nat. Samml. Rostock, pt. ii, p. 93. = NEBULOSA, Bolten.
- flavicans*, B. D. & D. (var.), 1883. See MILIARIA, L.
- flavida*, Redfield (*Marginella*), 1846. Ann. Lyc. Nat. Hist. New York, iv, 163, pl. x, f. 4a, b. *Loc.*—Cuba, Bahamas. *Type.*—"Cabinet of the Lyceum." The Redfield Coll., Acad. Nat. Sci. Philad., has 35 examples from the Bahamas. = APICINA, Mke. (cf. Redf. in Amer. Journ. Conch., vi, 234).
- FLINDERSI, Pritchard & Gatliff (*Marginella*), Feb. 1899. Proc. Roy. Soc. Victoria, n. ser., xi, pt. ii, p. 180, pl. xx, f. 4. *Loc.*—Shoreham Beach, Western Port. *Type.*—Coll. Gatliff.
- FLOCCATA, Sowerby (*Marginella*), Jan. 1889. Journ. Conch., vi, 8. *Loc.*—Port Elizabeth. *Type.*—Coll. Bairstow in Oxford Univ. Mus.
- fluctuata*, C. B. Adams (*Marginella*), Jan. 1850. Contrib. to Conch.,

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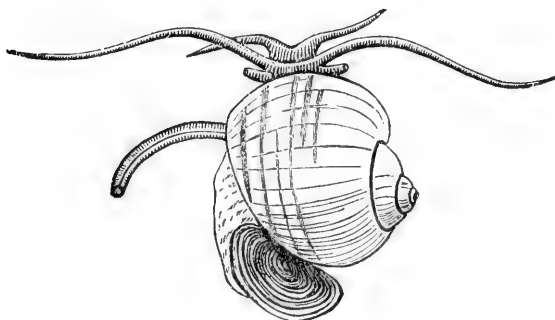
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See page iv of this wrapper.

- p. 56. *Loc.*—Jamaica. *Type.*—Amherst Coll. Mus., Mass. = SAGITTATA, Hds.
- FORMICULA, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 359. *Loc.*—New Holland near Maria Is. ("mon cabinet").
- formiculata*, H. & A. Adams, ex Lamarck (*Marginella (Glabella)*), Oct. 1853. Gen. Rec. Moll., i, 191. Error for FORMICULA, Lam.
- fossilis*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, no. 662. A nomen nudum.
- fraterculus*, Smith (*Marginella*), March 27, 1915. Brit. Ant. Exp. (1910), Zool., ii, no. 4, p. 95, pl. ii, f. 13. *Loc.*—Off Rio de Janeiro, 40 f. *Type.*—Brit. Mus. = MARTINI, Pet.
- FREYCINETI, May (*Marginella*), Feb. 24, 1916. Papers Proc. Roy. Soc. Tas. for 1915, p. 86, pl. ii, f. 9. *Loc.*—40 f. off Thouin Bay, Freycinet Peninsula, etc. *Type.*—Tas. Mus., Hobart.
- FRUMENTUM, Sowerby (*Marginella*), June 5, 1832. Proc. Zool. Soc. Lond., 1832, p. 57. *Loc.*—St. Elena and Salango, 8–10 f. (Mus. Cuming). *Types.*—The Brit. Mus. has two marked "M.C." and three marked "W. Indies, M.C.", one of which may very well be the shell figured in the Thes. Conch., where the correct locality of "W. Indies" is given; Sowerby's original locality is wrong. The balance of probability seems in favour of the set of three being types.
- FULGENS, Dunker (*Volvaria*), 1871. Malak. Bl., 1871, p. 153. *Loc.*—Upolu. In Mus. Godeffroy Catal. 5, p. 115 (Feb. 1874) this is quoted as "= *M. guttula*, Rve., sec. Dunker". *M. guttula*, Rve., is West Indian, and if the locality "Upolu" is correct this synonymy cannot be possible.
- fulgura*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, no. 665a. = *Voluta fulminata*, Lam. (*vide* Pfr.).
- fulgurata*, Hedley (*Marginella*), 1911. Rep. Moll. *Endeavour*, 1909–10, p. 110, pl. xix, f. 30–3. *Loc.*—Australia, W. to Cape Lewin and N. along W. Austral. coast to tropics. *Type.*—Austral. Mus., Sydney. = PULCHELLA, Kien., *vide* Hedley in Journ. Proc. Roy. Soc. W. Austral., i, 204.
- FULMINATA, Kiener (*Marginella*), 1841. Coq. Viv. *Marginella*, p. 33, pl. xii, f. 1. *Loc.*—Bahia (Coll. Largillier).
- fulva*, Bavay (var.), 1913. See SERREI, Bavay.
- fulvofasciata*, Scacchi (var.), 1836. See MILIARIA, L.
- fusca*, Pallary (var.), 1902. See ORYZA, Lam.
- fusca*, Sowerby (*Marginella*), Nov. 1846. Proc. Zool. Soc. Lond., 1846, p. 95. *Loc.*—West Indies (Mus. Cuming). *Types.*—Brit. Mus. (three). = EXILIS, Gmel.
- FUSIFORMIS, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 75. *Loc.*—Str. of Malacca, 17 f. (Belcher). *Type.*—Brit. Mus., bearing a label in Hinds' writing.
- fusiformis*, Reeve (*Marginella*) (pars), Jan. 1865. Conch. Icon., xv, pl. xvii, f. 79. The shell here figured has evidently nothing to do with *fusiformis*, Hds., and has been renamed UNILINEATA, JOUSS., and has been renamed UNILINEATA, JOUSS., but has the band lower down. I cannot find any shell in the British Museum which could be the original of Reeve's figure.

- FUSINA, Dall (*Marginella*), Aug. 25, 1881. Bull. Mus. Comp. Zool. Harv., ix, 72. *Loc.*—Yucatan Str., 640 f. *Type.*—U.S. Nat. Mus. Figured in Bull. U.S. Nat. Mus., no. 37, pl. xix, f. 4.
- FUSULA, Murdoch & Suter (*Marginella*), 1906. Trans. New Zealand Inst., xxxviii, p. 289, pl. xxiii, f. 23, 24. *Loc.*—Off Gt. Barrier Is. in 110 f. *Type.*—Dominion Mus., Wellington, N.Z.
- GABRIELI, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas. for 1910, p. 386, pl. xiii, f. 9. *Loc.*—7 miles east of Cape Pillar in 100 f. *Type.*—Tas. Mus., Hobart.
- gambiensis*, Redfield (*Marginella*), Jan. 1, 1851. Catal. Coll. Marginellidæ. A nomen nudum. = AMYGDALA, Kien. (*vide* Redf.).
- GATLIFFI, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas. for 1910, p. 385, pl. xiii, f. 8. *Loc.*—3 miles east of Schouten Is., 40 f. *Type.*—Tas. Mus., Hobart.
- GEMINATA, Hedley (*Marginella*), May 6, 1912. Rec. Austral. Mus., viii, 145, pl. xlii, f. 28. *Loc.*—"Many localities from Cape Byron in the north to Tasmania and from 25 to 250 f.: characteristic of the continental shelf." *Type.*—Austral. Mus., Sydney.
- GEMMA, A. Adams (*Marginella*), 1855. Proc. Zool. Soc. Lond., 1855, p. 122. *Loc.*—East Africa (Mus. Cuming). *Type.*—Brit. Mus.
- GEMMULA, Bavay (*Marginella*), Dec. 1912. Ann. Inst. Océanogr., v, fasc. 3 (Mission Gruvel), p. 20, pl. i, f. 17, 18. *Loc.*—Not given. *Type.*—Mus. de Paris.
- GENNESI, H. Fischer (*Marginella*), 1901. Journ. de Conch., xlix, 99, pl. iv, f. 10. *Loc.*—Djibouti (one). *Type.*—Coll. du Journal.
- GEORGIANA, May (*Marginella*), Feb. 24, 1916. Papers Proc. Roy. Soc. Tas. for 1915, p. 88, pl. iii, f. 13. *Loc.*—15 f., near George III reef, below Southport, Tas. (four). *Type.*—Tas. Mus., Hobart.
- GERMAINI, Bavay (*Marginella (Volvaria)*), 1913. Bull. Mus. Hist. Nat. Paris, xix, no. 7, p. 483, pl. xx, f. 1, 2. *Loc.*—Bahia. *Type.*—Mus. de Paris.
- GIBBOSA, Jousseume (*Egouena*), 1875. Rev. Mag. Zool., 1875, p. 213, pl. viii, f. 6. *Loc.*—?
- gigas*, Martens (*Marginella (Marginellona)*), 1903. Wiss. Ergebn. deutschen Tief-See-Exp., Band vii, Lief. i, p. 108, pl. v, f. 16. *Loc.*—Sombrero Channel, Nicobars, 805 m. (shell in fragments). According to Martens the radula resembles that of *Marginella*, though the shell characters are more like that of *Voluta*. Judging from the figures I have no hesitation in rejecting this shell from the Marginellidæ altogether.
- GLABELLA, Linné (*Voluta*), 1758. Syst. Nat., 10th ed., i, 730. *Loc.*—In Oceano Africano.
- glabelloides*, Humphreys (*Voluta*). A MS. name quoted in Sow. Thes. Conch., i, 378. = IRRORATA, Mke.
- glabrella*, Bory de St. Vincent ex Linné (*Marginella*), 1827. Tableau Encycl. Méth. Vers, i, 167, iii, pl. 377, f. 6. Error for GLABELLA, L.
- GLANDINA, Vélain (*Persicula*), 1877. Arch. Zool. Expér., vi, 109, pl. iii, f. 3, 4. *Loc.*—St. Paul Is., very rare in compound Ascidiæ.

- glans*, Menke (*Marginella*), 1828. Syn. Meth. Moll., p. 87. *Loc.*—? = PRUNUM, Gmel.
- glauca*, G. Fischer (*Marginella*), 1807. Mus. Demidoff, iii, 172. *Loc.*—La mer des Indes. *Type.*—Coll. Paul Demidoff (at time of description). = BULLATA, Born (pars) and ANGUSTATA, Sow. (pars).
- glauca*, Jousseau (Cryptospira), 1875. Rev. Mag. Zool., 1875, p. 234, pl. viii, f. 1. = LOEBBECKEANA, Wkff.
- GLORIOSA, Jousseau (*Marginella*), 1884. Bull. Soc. Zool. Fr., ix, 176, pl. iv, f. 7. *Loc.*—"Inconnu." Dredged by Gruvel off Cape Blanco and Cansado Point, West Africa.
- goodali*, Weinkauff (*Marginella*), 1880. Jahrb. Malak. Ges., 1880, p. 45. Error for GOODALLI, Sow.
- GOODALLI, Sowerby (*Marginella*), 1825. Tankerville Catal. App., p. 30.
- GRACILIS, C. B. Adams (*Marginella*), 1850. Contrib. to Conch., p. 130. *Loc.*—Jamaica. Jousseau erroneously unites this with ALBOLINEATA, Orb.
- gracilis*, May (*Marginella*), 1911. Papers Proc. Roy. Soc. Tas. for 1910, p. 383, pl. xiii, f. 4. *Loc.*—7 miles east of Cape Pillar, 100 f. *Type.*—Tas. Mus., Hobart. = MAUGEANA, Hedley.
- grana*, H. & A. Adams, ex Philippi (*Marginella (Gibberula)*), Nov. 1853. Gen. Rec. Moll., i, 193. Error for *granum*, Ph.
- granum*, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 17, pl. viii, f. 33. *Loc.*—Sainte Helène (recte St. Elène). = *Erato scabriuscula*, Gray.
- granum*, Philippi (*Marginella*), 1850. Zeitschr. f. Malak., 1850, p. 27. *Loc.*—Aden. Apparently not recognized since. The name is preoccupied.
- GRISEA, Jousseau (*Persicula*), 1875. Rev. Mag. Zool., 1875, p. 268. New name for *obtusata*, Sow. (1870), non Sow. (1846).
- GRUVELI, Bavay (*Marginella*), Dec. 1912. Ann. Inst. Océanogr., v, fasc. 3 (Mission Gruvel), p. 24, pl. i, f. 29, 30. *Loc.*—Conakry, etc. *Type.*—Mus. de Paris. Var. *albina*, Bavay, l.c. Var. *concolor*, Bavay, l.c.
- guanacha*, H. & A. Adams, ex Orbigny (*Marginella (Gibberula)*), Nov. 1853. Gen. Rec. Moll., i, 193. Error for GUANCHA, Orb.
- GUANCHA, Orbigny (*Marginella*), 1839 (not later than). Webb and Berthelot's Moll. Canaries, p. 88, pl. vi, f. 32-4. *Loc.*—Canaries.
- guanomacha*, Paetel, ex Orbigny (*Marginella*), 1887. Catal. Conch. Samml., p. 193. Error for GUANCHA, Orb.
- guillainei*, Paetel ex Petit (*Marginella*), 1887. Catal. Conch. Samml., p. 193. Error for GUILLAINI, Pet.
- GUILLAINI, Petit (*Marginella*), 1851. Journ. de Conch., ii, 50, pl. i, f. 13. *Loc.*—Abd-el-Goury. *Type.*—Coll. du Journal.
- gundlachi*, Dunker (*Marginella*), 1879. Weinkauff in Syst. Conch. Cab. *Marginella*, p. 143. A MS. name quoted in synonymy ex coll. Dunker. = NIVOSA, Hinds.
- guttata*, Dillwyn (*Voluta*), 1817. Descr. Catal. Rec. Shells, i, 526. *Loc.*—Jamaica (Sloane). = LONGIVARICOSA, Lam.
- guttata*, Link (*Marginella*), 1807. Beschr. Nat. Samml. Rostock, pt. 2, p. 93. = PERSICULA, L.

- guttata*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 394, pl. lxxviii, f. 208-10. *Loc.*—St. Vincent's (Mus. Cuming). Sowerby's figures represent two species, f. 208 being what is now known as *CALCULUS*, Redf., and 209, 210 *MACULOSA*, Kien. (cf. Redf. in Amer. Journ. Conch., vi, 173, who, however, did not notice that Sowerby had figured two species). *Types.*—In the Brit. Mus. are three examples labelled above "*swainsoniana*, Pet., St. Vincent's", and below "*guttata*, Swains. = *swainsoniana*, Pet. = *maculosa*, Kien., *vide* Reeve & Sowerby, M.C." This nomenclature is incorrect and confuses *guttata*, Sw., with *guttata*, Sow.; *guttata*, Sw. = *swainsoniana*, Pet. = *phrygia*, Sow. The three shells are probably the originals of Sowerby's f. 209, 210. There are also three labelled above, "*swainsoniana* var., St. Vincent's," and below "*guttata*, Sw., M.C." This again is incorrect and shows the same confusion. These three are *calculus*, Redf., and one of them is probably the original of Sowerby's f. 208.
- guttata*, Sowerby (*Erato*), 1859. Thes. Conch., iii, 82, pl. ccxix, f. 29, 30. *Loc.*—Mauritius. A misquotation of *Erato guttata*, Sow. The figures represent a true *Erato* (cf. Smith in Proc. Malac. Soc. Lond., ix, 21), but the reference in the text is to *guttata*, Sow. (q.v.).
- guttata*, Swainson, (*Marginella*) 1829. Zool. Illustr., ser. II, i, pl. 44, f. 2. *Loc.*—? = *PHRYGIA*, Sow.
- guttata*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xx, f. 101. *Loc.*—? (Mus. Cuming). *Type.*—The Brit. Mus. has two marked "M.C.", of which the left-hand one agrees exactly with the figure and is presumably the type. = *PERICALLES*, Tomlin. Var. *alba*, Dunker, May, 1869, Mus. Godeffroy, catal. 4, p. 81. *Loc.*—Society Is. A *nomen nudum*. This var. "= *Volvarina pallida*, Dkr., sec. Dunker" (op. cit. 5, p. 115, Feb. 1874), and is probably the form subsequently described as *Volvaria pallidula*, Dkr. (q.v.).
- GUTTULA*, Sowerby (*Erato*), 1837. Conch. Illustr. Cypræadæ, p. 16, pl. vii, f. 50. *Loc.*—Mauritius. Cf. Tomlin in Proc. Malac. Soc. Lond., xii, 64.
- HADRIA*, Dall (*Volutella lacrimula* (sic) var. ?), 1883. Proc. U.S. Nat. Mus., vi, 324. *Loc.*—Cedar Keys (Hemphill). *Type.*—U.S. Nat. Mus.
- hematina*, "Menke," Sowerby (*Erato*), 1859. Thes. Conch., iii, 82, pl. ccxix, f. 17, 18. *Loc.*—Porto Rico. Error for *HEMATITA*, Kiener.
- hematita*, Sowerby, ex Kiener (*Marginella*), 1846. Thes. Conch., i, 380. Error for *HEMATITA*, Kiener.
- hematitea*, Martens, ex Kiener (*Marginella*). Error in Zool. Rec., ii, 246 (for 1865) for *HEMATITA*, Kiener.
- hematitia*, H. & A. Adams, ex Kiener (*Marginella* (*Glabella*)), Oct. 1853. Gen. Rec. Moll., i, 191. Error for *HEMATITA*, Kiener.
- hahni*, Mabille (*Marginella*), March, 1884. Bull. Soc. Malac. Fr., i, 132. *Loc.*—Between Magellan and the Falklands, 120 m. Figured in Miss. Sci. Cap Horn, vi, pl. iii, f. 3a, b. = *WARRENI* Marrat (cf. Bavay in Journ. of Conch., xiv, 98).

- hainesii*, Petit (*Marginella*), 1851. Journ. de Conch., ii, 260, pl. viii, f. 5, 6. *Loc.*—? *Types.*—Coll. du Journal (two). = VENTRICOSA, G. Fischer.
- HALLI, Pritchard & Gatliff (*Marginella*), Feb. 1899. Proc. Roy. Soc. Victoria, n. ser., xi, pt. 2, p. 179, pl. xx, f. 1. *Loc.*—Shoreham Beach, Western Port Bay. *Type.*—Coll. Gatliff.
- HARPÆFORMIS, Sowerby, ex Beck MS. (*Marginella*), 1846. Thes. Conch., i, 374, pl. lxxiv, f. 7, 8. *Loc.*—Senegal. *Types.*—Impossible to trace as Sowerby does not mention the source of his specimens. Very possibly the four in Brit. Mus. marked "Senegal, M.C." are the types. This species is very close to FABA, L.
- harpæformis*, Petit, ex Sowerby (*Marginella*), 1851. Journ. de Conch., ii, 51. Error for HARPÆFORMIS, Sow.
- haynesi*, Weinkauff, ex Petit (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, pp. 71, 158, pl. xv, f. 6, 7. Error for *hainesii*, Pet.
- HEBESCENS, Murdoch & Suter (*Marginella*), 1906. Trans. New Zealand Inst., 1905 (1906), xxxviii, 290, pl. xxiii, f. 25, 26. *Loc.*—Off Great Barrier Is., 110 f. *Type.*—Dominion Mus., Wellington, N.Z.
- HEDLEYI, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas., 1910, p. 381, pl. xiii, f. 1. *Loc.*—7 miles east of Cape Pillar, 100 f. *Type.*—Tas. Mus., Hobart.
- HELMATINA, Rang (*Marginella*), 1832. Mag. de Zool., 1832, pl. v. *Loc.*—African coast from the R. Gambia to the Bisagots.
- HEMATITA, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 11, pl. vii, f. 31. *Loc.*—Sicily (by error).
- herminea*, Jousseume (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 180. New name for *intermedia*, Sow., non Mke. = ORNATA, Redfield.
- HESPERIA, Sykes (*Marginella*), 1903. Proc. Malac. Soc. Lond., vi, 316, pl. xvii, f. 7. *Loc.*—Cape St. Vincent in 292 f. (Porcupine Exp., 1870, st. 24). *Type.*—Coll. Sykes.
- HETEROZONA, Jousseume (*Volvarina*), 1875. Rev. Mag. Zool., 1875, p. 225, pl. vii, f. 4. *Loc.*—?
- hindsii*, Pilsbry, ex Petit (*Marginella*), 1896. Proc. Acad. Nat. Sci. Philad., 1896, p. 21. Error for HINDSIANA, Pet.
- HINDSIANA, Petit (*Marginella*), 1851. Journ. de Conch., ii, 54. New name for *constricta*, Hds., non Conrad.
- hondurasensis*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xix, f. 97a, b. *Loc.*—Honduras (Mus. Cuming). *Type.*—Brit. Mus. = PULCHRA, Gray.
- hondurensis*, Weinkauff, ex Reeve (*Marginella*), 1878. Syst. Conch. Cab. *Marginella*, p. 12. Error for *hondurasensis*, Rve.
- HYALINA, Thiele (*Marginella*), 1913. Deutsche Südpolar Exp., 1901–3, Band xiii, p. 213, pl. xiii, f. 26. *Loc.*—Antarctic (one, immature).
- ignota*, Jousseume (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 176. New name for *neglecta*, Reeve, pl. xxv, f. 138, because Jousseume considers that shell different from *neglecta*, Sow. Sowerby figured a banded shell, as *neglecta* is when fresh,

- whereas Reeve figured one of the two bleached examples in the Brit. Mus. = *NEGLECTA*, Sow.
- IMBRICATA*, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 76. *Loc.*—Acapulco (Col. Moffat in Mus. Cuming). *Types.*—Three in Brit. Mus. labelled "Col. Moffat, M.C.", with "Maracaibo" added in a later hand.
- immaculata*, Dall (var.), Aug. 1890. See *AUREOCINCTA*, Stns.
- IMMERSA*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxi, f. 109. *Loc.*—? ("New Caledonia" on tablet in Brit. Mus.). *Type.*—Brit. Mus. (ex Mus. Taylor). There is a smaller one on same tablet ex Mus. Cuming.
- IMPERATRIX*, Sykes (*Marginella*), 1903. Proc. Malac. Soc. Lond., vi, 315, pl. xvii, f. 1, 2. *Loc.*—West Africa (Keppel). *Type.*—Coll. Sykes.
- IMPUDICA*, P. Fischer (*Marginella*), 1883. Journ. de Conch., xxxi, 392. *Loc.*—Côtes du Sahara, 800–1139 m. Var. *subturrata*, P. Fischer, l.c. (cf. *jousseaumei*, *Loc.*).
- INÆQUIDENS*, May (*Marginella*), Apr. 1913. Papers Proc. Roy. Soc. Tas. for 1912, p. 44, pl. ii, f. 1. *Loc.*—7 miles east of Cape Pillar, 100 f. *Type.*—Tas. Mus., Hobart.
- inconspicua*, G. & H. Nevill (*Marginella* (*Volvarina*)), June 3, 1874. Journ. Asiatic Soc. Bengal, xliii, pt. 2, no. 1, p. 23. *Loc.*—Mauritius. *Type.*—Indian Mus. = *NEVILLI*, Jous.
- INCONSPICUA*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 387, pl. lxxv, f. 80. *Loc.*—? (Coll. Bell). *Type.*—Brit. Mus. cf. Hedley in Proc. Linn. Soc. New S. Wales, xxxix (1914), pt. 4, p. 726, pl. lxxxii, f. 64.
- INDISCRETA*, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas. for 1910, p. 388, pl. xiv, f. 12. *Loc.*—7 miles east of Cape Pillar, 100 f. *Type.*—Tas. Mus., Hobart.
- infans*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxvi, f. 150a, b. *Loc.*—Singapore (Mus. Cuming). *Type.*—Brit. Mus. has a tablet of four, of which the left-hand one is probably the figured type. = *CORUSCA*, Rve.
- infelix*, Jousseau (*Cryptospira*), 1875. Rev. Mag. Zool., 1875, p. 238. New name for *simplex*, Rve., non Edwards (1852). = *OLIVELLA*, Rve.
- inflexa*, Monterosato (var.), 1884. See *MITRELLA*, Risso.
- inflexa*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 389, pl. lxxvi, f. 132. *Loc.*—? (Coll. Bell). *Type.*—Brit. Mus. = *MITRELLA*, Risso, and not *FUSIFORMIS*, Hds. as Tryon surmises.
- INGLORIA*, Smith (*Marginella*), Dec. 1910. Ann. Natal Mus., ii, pt. ii, p. 191, pl. vii, f. 5, 5a. *Loc.*—Kowie (H. Burnup). *Type.*—Brit. Mus.
- INTERMEDIA*, Menke (*Volvaria*), 1828. Syn. Meth. Moll., p. 88. *Loc.*—Unknown.
- intermedia*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 381, pl. lxxiv, f. 6, and pl. lxxvi, f. 90. *Loc.*—? (Coll. Sowerby). *Types.*—Uncertain. There are three in the Brit. Mus. marked "Australia, M.C.", and the middle one of these might well be the specimen

- figured by Sowerby. In any case it is only a bleached form of *ORNATA*, Redf.
- interrupta*, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 362. *Loc.*—? ("mon cabinet"). = *INTERRUPTOLINEATA*, Megerle. The Redfield Coll. at Philadelphia contains seven examples (no. 29115) of a var. labelled *solidissima*, Redf., but I cannot find that it has ever been described.
- interruptelineata*, Redfield, ex Megerle (*Marginella*), 1870. Amer. Journ. Conch., vi, 238. Error for *INTERRUPTOLINEATA*, Megerle.
- INTERRUPTOLINEATA*, Megerle (*Voluta*), 1816. Ges. Naturforsch. Freunde zu Berlin Mag., 8th Jahrg., 1st Quartal, 1814, p. 6, t. i, f. 6a, b. *Loc.*—Die Südsee. This volume bears the date 1818 on the title-page. Sherborn gives 1816 as the date of issue of the 1st Quartal.
- IOTA*, Hedley (*Marginella*), 1899. Mem. Austral. Mus., iii, pt. vii, p. 469, f. 41. *Loc.*—Funafuti (three). *Type.*—Austral. Mus., Sydney.
- IRRORATA*, Menke (*Marginella*), 1828. Syn. Meth. Moll., p. 88. *Loc.*—Unknown.
- irrotata*, Weinkauff, ex Menke (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 58. Error for *IRRORATA*, Mke.
- ISSELI*, G. & H. Nevill (*Marginella*), 1875. Journ. Asiat. Soc. Bengal, xlv, pt. ii, no. 2, p. 95. *Loc.*—Near Suez (Issel); abundant off coast of Persia in 25 f. (W. T. Blanford). New name for *pygmaea*, Issel, non Sowerby. Var. *ellicensis*, Hedley, 1899, Mem. Austral. Mus., iii, pt. ix, p. 560, f. 78. *Loc.*—Funafuti. *Type.*—Austral. Mus., Sydney. This variety very probably deserves specific rank.
- JANEIROENSIS*, Smith (*Marginella*), March 27, 1915. Brit. Ant. Exp. (1910), Zool. ii, no. 4, p. 95, pl. ii, f. 14. *Loc.*—Off Rio de Janeiro, 40 f. *Type.*—Brit. Mus.
- JEWETTII*, Carpenter (*Marginella*), Jan. 7, 1857. Proc. Zool. Soc. Lond., 1856, p. 207. *Loc.*—Sta. Barbara, rarissime (Col. Jewett), Mus. Gould. *Type.*—U.S. Nat. Mus.
- JOHNSTONI*, Petterd (*Marginella*), Jan. 1884. Journ. Conch., iv, 143. *Loc.*—North and East Tasmania.
- joubini*, Bavay (*Marginella*), 1913. Bull. Mus. Hist. Nat. Paris, xix, no. 7, p. 482, pl. xx, f. 3, 4. *Loc.*—Bahia (one). *Type.*—Mus. de Paris. = *BAHIENSIS*, Tomlin.
- JOUBINI*, Dautzenberg & H. Fischer (*Marginella* (*Volvarina*)), 1906. Rés. Camp. Sci. (Monaco), 1906, fasc. xxxii, p. 18, pl. i, f. 17. *Loc.*—Not given. *Type.*—Mus. de Monaco.
- jousseaumei*, Locard (*Marginella*), 1897. Exp. Sci. Trav. et Talisman, i, 111, pl. iii, f. 25-8. *Loc.*—Four stations near the Canaries. *Type.*—Mus. de Paris. = *IMPUDICA*, P. Fischer, var. *subturrita*, P.F., which Locard says deserves specific rank.
- JOUSSEAUMI*, Rochebrune (*Gibberula*), 1881. Nouv. Arch. Mus. Paris, ser. II, iv, 293, pl. xvii, f. 15a, b. *Loc.*—Porto Praya, St. Vincent. *Type.*—Mus. de Paris.
- keenei*, Weinkauff, ex Marrat (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 133. Error for *KEENII*, Marrat.

- KEENII, Marrat (*Marginella*), 1871. Ann. Mag. Nat. Hist., ser. iv, vii, 141, pl. xi, f. 13. *Loc.*—South Africa. *Types.*—Coll. Marrat in Liverpool Free Public Mus., five specimens now labelled "Port Elizabeth".
- KEMBLENSIS, Hedley (*Marginella*), 1903. Mem. Austral. Mus., iv, pt. vi, p. 365, f. 88. *Loc.*—63–75 f. off Port Kembla ("Thetis"). *Type.*—Austral. Mus., Sydney.
- KEPPELI, Sykes (*Marginella*), 1903. Proc. Malac. Soc. Lond., vi, 315, pl. xvii, f. 3. *Loc.*—West Africa (Keppel). *Type.*—Coll. Sykes. = TYERMANI, Marrat.
- KEROCHUTA, Shackelford (*Marginella*), May 7, 1914. Ann. S. Afr. Mus., xiii, pt. iii, p. 97, two text-figures. *Loc.*—Cape Point, 135 f. *Type.*—South African Mus., Cape Town.
- KIENEREANA, Weinkauff, ex Petit (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, pp. 55, 158. Error for KIENERIANA, Pet.
- KIENERIANA, Petit (*Marginella*), 1838. Mag. de Zool., 1838, pl. cxii. *Loc.*—La Guayra (Coll. Petit).
- LABIATA, Kiener (*Marginella*), 1841. Coq. Viv. *Marginella*, p. 35, pl. xi, f. 2. *Loc.*—Les mers de l'Inde (Coll. du Mus.), by error.
- LABROSA, Redfield (*Marginella*), 1870. Amer. Journ. Conch., vi, 239. New name for *crassilabrum*, Sow., non *crassilabra*, Conr. (Aug. 1833), nec *crassilabra*, Lea (Nov. 1833).
- LACHRIMULA, Gould (*Marginella* (*Gibberula*)), Feb. 1862. Proc. Bost. Soc. Nat. Hist., viii, 281. *Loc.*—Off coast of Georgia in 400 f.
- lachryma*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxvii, f. 159. *Loc.*—Borneo (Mus. Cuming). *Type.*—The Brit. Mus. has two marked "Borneo, M.C.", of which the left-hand one is evidently the figured type. Both of these shells are very immature and evidently synonymous with DENS, Rve. Var. *zonalis*, Dunker, May, 1869, Mus. Godeffroy Catal., iv, p. 81. *Loc.*—Viti Is. A nomen nudum.
- lacrimula*, Dall, ex Gould (*Volutella*), June, 1889. Bull. Mus. Comp. Zool. Harv., xviii, 142, 143. Error for LACHRIMULA, Gld.
- lacryma*, Weinkauff, ex Reeve (*Marginella*), 1880. Jahrb. Malak. Ges., 1880, p. 53. Error for *lachryma*, Rve.
- lactea*, Hutton (*Erato*), 1880. Man. New Zealand Moll., p. 63. *Loc.*—Auckland to Cook Str., N.Z. *Type.*—Dominion Mus., Wellington, N.Z. = MUSCARIA, Lam. (cf. Smith in Proc. Malac. Soc. Lond., ix, 22).
- LACTEA, Kiener (*Marginella*), 1841. Coq. Viv. *Marginella*, p. 42, pl. xiii, f. 3. *Loc.*—? (Coll. du Mus.).
- lactea*, Petterd (*Erato*). MS. name quoted in Proc. Linn. Soc. New S. Wales for 1901, xxvi, pt. iii, p. 364. = BUCCA, Tomlin.
- lactea*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xvii, f. 81, 135. *Loc.*—West Indies (Mus. Cuming). *Type.*—The original of f. 135 (ex Coll. Lombe Taylor) is in the British Museum, but there is no trace of the Mus. Cuming shell (f. 81) which was the actual type. = SUBTRIPPLICATA, Orb.
- lactea*, Swainson (*Marginella*), 1840. Treat. Malac., p. 324. Based on Sowerby's Gen. Rec. & Foss. Sh., pl. 256, f. 3. = MARGINATA, Born.
- LÆTA, Jousseume (*Egouena*), 1875. Rev. Mag. Zool., 1875, p. 207,

- pl. viii, f. 2. *Loc.*—Senegal. Considered a var. of *OLIVÆFORMIS*, Kien. by Dautzenberg and others.
- lævigata*, Brazier (Hedley em.) (*Marginella* (*Prunum*)), 1877. Proc. Linn. Soc. New S. Wales, i, 225. *Loc.*—Darnley Is., Torres Str., in 10, 20, and 30 f., and Katow, New Guinea, in 7 f. *Type.*—Coll. Macleay in Sydney Univ. Mus. Probably by a printer's error, Brazier names this species *lævigata*. Hedley emended it to *lævigata* in Rec. Austral. Mus., iv (1901), p. 123, pl. xvi, f. 5.—= *VALIDA*, Watson.
- lævilabris*, Jousseume (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 184. *Loc.*—? *Type.*—Coll. Jousseume. = *FABA*, L.
- lævis*, Deshayes, ex Donovan (*Marginella*), 1844. Lamarck's Hist. Nat. Anim. sans Vert., 2nd ed., x, 452. = *Erato lævis* (Don.).
- lævis*, Martini (*Cucumis*), 1817. Quoted by Schumacher, Essai Nouv. Syst., p. 235, in synonymy of *M. glabella*, L., but has of course no standing. The figure in Martini referred to by Schumacher represents *NEBULOSA*, Bolton.
- langleyi*, Sowerby (var.), 1892. See *MOZAICA*, Sow.
- LANTZI*, Jousseume (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 178, pl. vii, f. 5. *Loc.*—Bourbon.
- largillieri*, Jousseume, ex Kiener (*Closia*), 1875. Rev. Mag. Zool., 1875, p. 255. Error for *LARGILLIERI*, Kiener.
- LARGILLIERI*, Kiener (*Marginella*), 1841. Coq. Viv. *Marginella*, p. 43, pl. xi, f. 3. *Loc.*—Bahia (Coll. Largillier).
- l'argillieri*, Paetel, ex Kiener (*Marginella*), 1883. Catal. Conch. Samml., p. 31. Error for *LARGILLIERI*, Kiener.
- l'argillierti*, Paetel, ex Kiener (*Marginella*), 1887. Catal. Conch. Samml., p. 194. Error for *LARGILLIERI*, Kiener.
- largillerti*, Petit, ex Kiener (*Marginella*), 1851. Journ. de Conch., ii, 52. Error for *LARGILLIERI*, Kiener.
- LATERITIA*, Melvill & Sykes (*Marginella* (*Glabella*)), 1903. Proc. Malac. Soc. Lond., v, 410, text-fig. *Loc.*—Andaman Is. *Type.*—Coll. Sykes.
- lavalleana*, H. & A. Adams, ex Orbigny (*Marginella* (*Volvarina*)), 1853. Gen. Rec. Moll., i, 195. Error for *LAVALLEEANA*, Orb.
- LAVALLEEANA*, Orbigny (*Marginella*), 1842. R. de la Sagra's Hist. Nat. de Cuba, Moll., ii, 101, pl. xx, f. 36-8. *Loc.*—Jamaica and Martinique. *Types.*—Coll. Orbigny in Brit. Mus. (five). This name is practically always misspelt by authors. It was derived from the Marquis de Lavallée.
- lavellana*, Paetel, ex Orbigny (*Marginella*), 1883. Catal. Conch. Samml., p. 31. Error for *LAVALLEEANA*, Orb.
- lavelleana*, Petit, ex Orbigny (*Marginella*), 1851. Journ. de Conch., ii, 56. Error for *LAVALLEEANA*, Orb.
- lavigata*, Brazier. See *LÆVIGATA*, Brazier.
- leai*, Jousseume (*Egouena*), 1875. Rev. Mag. Zool., 1875, p. 200. New name for *crassilabrum*, Sow., non *crassilabra*, Conrad (Aug. 1833), nec *crassilabra*, Lea (Nov. 1833). = *LABROSA*, Redfield.
- lefebvrei*, Weinkauff, ex Bernardi (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, pp. 99, 158. Error for *LEFEVREI*, Bern.

- LEFEVREI, Bernardi (*Marginella*), 1853. Journ. de Conch., iv, 360, pl. xii, f. 11, 12. *Loc.*—?
- LEPIDA, Gould (*Marginella (Glabella)*), 1861. Proc. Bost. Soc. Nat. Hist., vii, 1859-61, p. 384. *Loc.*—China seas.
- LEPTA, Bartsch (*Marginella*), July 28, 1915. Bull. U.S. Nat. Mus., no. 91, p. 40, pl. xxi, f. 3. *Loc.*—Port Alfred. *Type.*—U.S. Nat. Mus.
- leptopus*, Carrière (*Pseudomarginella*), 1880. Zool. Anz., 1880, p. 639. New name for *Ps. adansonii*, Maltzan, non *M. adansonii*, Kiener. This change seems unnecessary. If Maltzan's species stands his genus will probably stand too. = *Ps. ADANSONI*, Maltzan.
- leucalchyma*, Melvill & Standen (var.), 1903. See ALCHYMISTA, M. & S.
- lienardi*, Jousseume (*Serrata*), 1875. Rev. Mag. Zool., 1875, p. 230. *Loc.*—Mauritius, Bourbon. New name for *triticea*, Sow., non Lam., and based on Thes. Conch., i, pl. lxxvi, f. 119, 120. Sowerby's locality was "Mediterranean", and his shell was undoubtedly MITRELLA, Risso. Jousseume has evidently confused it with *sordida*, Reeve, which he particularly mentions that he had not seen. = MITRELLA, Risso.
- LIFOUANA, Crosse (*Marginella*), 1871. Journ. de Conch., xix, 205. *Loc.*—Lifou. *Type.*—Coll. du Journal. Figured l.c., xx, pl. ii, f. 2.
- LILACINA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 402, pl. lxxviii, f. 176, 177. *Loc.*—? (Coll. Bell). *Type.*—Brit. Mus.
- LILIPUTANA, Maltzan (*Marginella (Gibberula)*), Jan.-Feb. 1884. Nachr. Malak. Ges., 1884, p. 71. *Loc.*—Goree, to 15 m.
- LIMATULA, Conrad (*Marginella*), 1834. Journ. Acad. Nat. Sci. Philad., vii, 140. *Loc.*—Miocene, N. & S. Carolina. Abundant living, 25-100 f. off Carolina coast (Dall).
- LIMBATA, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 357. *Loc.*—? ("mon cabinet").
- lineata*, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 361. *Loc.*—Senegal ("mon cabinet"). = CINGULATA, Dillwyn.
- lineata*, Sowerby (var.), 1889. See PIPERATA, Hds.
- lineatolabrum*, Gaskoin (*Marginella*), Dec. 14, 1849. Proc. Zool. Soc. Lond., 1849, p. 20. *Loc.*—? (Mus. Cuming, one example). *Type.*—In the Brit. Mus. are two on one tablet marked "M.C." without habitat. One of these is presumably the type. Both are very worn, but I have no hesitation in assigning them to PIPERATA, Hds. Whether a form from the Cape which has recently been widely circulated as *lineatolabrum*, Gask., is also a var. of PIPERATA, Hds., or distinct, requires further consideration.
- LINEOLATA, Sowerby (*Marginella*), Jan. 1886. Journ. Conch., v, 9. *Loc.*—Port Elizabeth. *Type.*—Coll. Bairstow in Oxford Univ. Mus., the middle specimen on tablet. This example corresponds well in its measurements, but is not marked type.
- litturata*, Petit, ex Menke (*Marginella*), 1851. Journ. de Conch., ii, 52. Error for LITURATA, Mke.
- LITURATA, Menke (*Marginella*), 1843. Moll. Nov. Holl. Spec., p. 28. *Loc.*—Ad litus occidentale. This species has never subsequently

been recognized. As its author compares it with *limbata*, Lam., and *helmatina*, Rang, and it is larger than the latter, it may not be an Australian shell at all.

- livida*, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 73. *Loc.*—Cuba (Mus. Grüner). = *APICINA*, Mke.
- livida*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xx, f. 100. *Loc.*—? (Mus. Taylor). = *AVENA*, Kiener.
- LODDERÆ, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas., 1910, p. 384, pl. xiii, f. 5. *Loc.*—7 miles east of Cape Pillar, 100 f. (three). *Type.*—Tas. Mus., Hobart.
- LOEBBECKEANA, Weinkauff (*Marginella*), 1878. Syst. Conch. Cab. *Marginella*, p. 33, pl. v, f. 9, 12. *Loc.*—Singapore (Cuming); East Africa, Nicobars, Ceylon (Reeve). *Type.*—Coll. Loebbecke. Rather doubtfully distinct from *VENTRICOSA*, G. Fischer. Jousseume described it as *glauca*.
- loebbekeana*, Paetel, ex Weinkauff (*Marginella*), 1887. Catal. Conch. Samml., pp. 191, 194. Error for LOEBBECKEANA, Wkff.
- lævis*, Forbes & Hanley, ex Donovan (*Marginella*), 1853. Hist. Brit. Moll., iii, 502, pl. cxiv B, f. 4, 5. Error for *Erato lævis*, Don.
- LONGIVARICOSA, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 358. *Loc.*—Senegal ("mon cabinet").
- loroisi*, Bernardi (*Marginella*), 1855. Journ. de Conch., v, 291, pl. viii, f. 6, 7. *Loc.*—? (Coll. Lorois). = *SAULCYANA*, Pet. I do not agree with Weinkauff or Tryon, who identify this with *storeria*, Couth., and with *marginata*, Born, respectively.
- LOUISÆ, Bavay (*Marginella*), 1913. Bull. Mus. Hist. Nat. Paris, 1913, no. 5, p. 297, text-fig. *Loc.*—Réunion, Loyalty Is., Isle of Pines (New Cal.). *Type.*—Mus. de Paris.
- LUBRICA, Petterd (*Volvaria*), Jan. 1884. Journ. Conch., iv, 143. *Loc.*—Brown's River, Tas., in about 6 f. *Type.*—Mus. Brit.
- LUCANI, Jousseume (*Marginella*), 1884. Bull. Soc. Zool. Fr., ix, 1884, p. 175, pl. iv, f. 8. *Loc.*—Mayumba, West Africa.
- LUCENS, Locard (*Persicula*), 1897. Exp. Sci. Trav. et Talisman, i, 123, pl. iv, f. 16–18. *Loc.*—West of Sahara, 175 m. *Type.*—Mus. de Paris.
- LUCIA, Jousseume (*Gibberula*), 1877 (?). Bull. Soc. Zool. Fr., i, 1876, p. 269, pl. v, f. 11–13. *Loc.*—Sainte Lucie Is., Cape Verdes. Also called *lucæ* in the same paper.
- LUCIDA, Marrat (*Marginella (Gibberula)*), 1877. Journ. Conch., i, 205. *Loc.*—? (Coll. Keen).
- LURIDA, Suter (*Marginella (Glabella)*), 1908. Proc. Malac. Soc. Lond., viii, 183, pl. vii, f. 14. *Loc.*—Foveaux Str. in 15 f. *Type.*—Coll. Suter.
- LUTEA, Jousseume (*Gibberula*), 1884. Bull. Soc. Zool. Fr., 1884, ix, 177, pl. iv, f. 6. *Loc.*—Inconnu.
- lutea*, Sowerby (var.), 1889. See *PIPERATA*, Hds.
- lutescens*, Scacchi (var.), 1836. See *TRITICEA*, Lam.
- lymneoides*, Bory de St. Vincent (*Marginella*), 1827. Tableau Encycl. Méth., Vers, i, 167, iii, pl. 376, f. 7. Is an *Ancilla*.
- lyriformis*, "Kiener," Paetel (*Marginella*), 1887. Catal. Conch.

- Samml., p. 194. Kiener gives no species of this name under *Marginella*.
- MABELLÆ, Melvill & Standen (*Marginella* (*Cryptospira*)), Oct. 1, 1901. Proc. Zool. Soc., 1901, p. 425, pl. xxiii, f. 20. *Loc.*—Arabian Sea, lat. 18° 43' N., long. 71° 43' E. *Type.*—Brit. Mus.
- maculata*, Swainson (*Persicola*), 1840. Treat. Malac., p. 323. "En. M. 377, f. 3." = PERSICULA, L.
- MACULOSA, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 26, pl. ix, f. 39. *Loc.*—?
- maculosa*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xv, f. 65a (not 65b which = *maculosa*, Kien.). *Loc.*—St. Vincent's, West Indies. *Type.*—Originally in Mus. Taylor, now *ubi*? = CALCULUS, Redfield.
- magellanica*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, no. 664. = *Voluta magellanica*, Lam. (*vide* Pfeiffer).
- magna*, Swainson (*Marginella*), 1822. Cat. Sh. Coll. Bligh, Appendix, p. 12 (lot 958). "Mart. x, t. cl, f. 1409–10." = BULLATA, Born.
- major*, Bavay (var.), 1910. See CHUDEAUI, Bavay.
- major*, Monterosato (var.), 1884. See CALAMELI, JousS.
- major*, Monterosato (var.), 1878. See CLANDESTINA, Broc.
- major*, Monterosato (var.), 1884. See MILIARIA, L.
- major*, Pallary (var.), 1900. See CÆLATA, Monts.
- majuscula*, B. D. & D. (var.), 1883. See MILIARIA, L.
- MAJUSCULA, Martens (*Marginella*), 1877. Möbius Beitr. Meeresf. Maur., p. 257, pl. xxii, f. 2. *Loc.*—Cargados Is. (Robillard).
- MALINA, Hedley (*Marginella*), 1915. Proc. Linn. Soc. New S. Wales (1914), xxxix, pt. iv, p. 725, pl. lxxxii, f. 65. *Loc.*—Off Narrabeen, N.S.W., 80 f. *Type.*—Austral. Mus., Sydney.
- MANCELI, Jousseaume (*Closia*), 1875. Rev. Mag. Zool., 1875, p. 256, pl. viii, f. 4. *Loc.*—Mauritius (Mancel in coll. Liénard).
- manoeli*, Paetel, ex Jousseaume (*Marginella*), 1887. Catal. Conch. Samml., p. 194. Error for MANCELI, JousS.
- marceli*, Martens, ex Jousseaume (*Marginella*), 1877. Möbius Beitr. Meeresf. Maur., p. 259. Error for MANCELI, JousS.
- marchii*, Jousseaume (*Cryptospira*), 1875. Rev. Mag. Zool., 1875, p. 235. *Loc.*—Malacca (Marche in coll. Bouvier). = STRIGATA, Dillw.
- MARGARITA, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 26, pl. ix, f. 39. *Loc.*—Les mers des Indes (by error).
- MARGARITULA, Carpenter (*Marginella*), 1857. Catal. Mazatlan Shells, p. 462. *Loc.*—Mazatlan. *Types.*—Seven examples in Mazatlan Coll., Brit. Mus., sp. no. 589, tablet no. 2109.
- marginata*, Bivona (*Volvaria*), Apr. 1832. Effem. Sci. e Lett. per la Sicilia, ii, 19, tav. iii, f. 5a, b (plate missing in Brit. Mus. copy and not seen; pagination usually quoted from a reprint). *Loc.*—Palermo, Termini, and Trapani. = CLANDESTINA, Broc.
- MARGINATA, Born (*Voluta*), 1778. Index Rer. Nat. Mus. Cæs. Vindob., pt. i, Testacea, p. 207. Figured in the Testacea (1780), p. 220, tab. ix, f. 5, 6. *Type.*—Mus. Cæs. at Vienna; original, though

- no labelled examples still exist (*vide* Brauer in Sitzb. R. Akad. Wissensch., 1878, p. 40).
- marginata*, Wood (*Marginella*), 1828. Ind. Test. Suppl., p. 42, pl. iii, *Voluta*, f. 8. = DENTICULATA, Link. In the 1st and 2nd eds., p. 94, no. 62, Wood gives *marginata*, Born, correctly.
- marginella*, Locard, ex Bivona (*Volvaria*), 1886. Cat. Gén. Moll. Fr. (Prodr. Mal. Fr.), p. 98. Error for *marginata*, Biv., quoted in synonymy of CLANDESTINA, Broc.
- marginelloideum*, Gaskoin (*Pachyathron*), 1853. Ann. Mag. Nat. Hist., ser. II, xi, 357, pl. xii, f. 4-6. *Loc.*—West Indies (Mus. Gaskoin). = PACHYBATHRON CYPREOIDES, C. B. Ad.
- marginellus*, Meuschen (*Murex*), 1787. Mus. Gevers., p. 328, no. 778. A non-binomial author. = VENTRICOSA, G. Fischer.
- MARIEI, Crosse (*Marginella*), 1867. Journ. de Conch., xv, 177, pl. v, f. 2. *Loc.*—Port de France, New Cal. *Type.*—Ubi? (*not* in the Coll. du Journal). Erroneously quoted as *marieæ* in the Zool. Rec., 1907, p. 87.
- MAROCANA, Locard (*Marginella*), 1897. Exp. Sci. Trav. et Talisman, i, 114, pl. iii, f. 29-31. *Loc.*—Five stations off West African coast. *Type.*—Mus. de Paris.
- MARTINI, Petit (*Marginella*), 1853. Journ. de Conch., iv, 367, pl. xi, f. 8. *Loc.*—Rio de Janeiro.
- MAUGEANA, Hedley (*Marginella*), 1915. Proc. Linn. Soc. New S. Wales, xxxix (1914), pt. iv, p. 727. New name for *gracilis*, May, non C. B. Ad.
- maxima*, Martini (*Persicula*). Quoted by Mörch in the Yoldi Catal., i, 121, as a synonym of ELEGANS, Gmel., but has no status.
- MAYII, Tate (*Marginella*), Dec. 1900. Trans. Proc. Rep. Roy. Soc. S. Austral., xxiv, pt. ii, p. 93. *Loc.*—Frederick Henry Bay, Tas. *Type.*—Tas. Mus., Hobart.
- MAZAGONICA, Melvill (*Marginella* (*Gibberula*)), 1893. Mem. Proc. Manch. Lit. Phil. Soc., ser. iv, vii, 57, pl. i, f. 10. *Loc.*—Bombay. *Type.*—Brit. Mus.
- media*, Monterosato (var.), 1884. See MILIARIA, L.
- MEDIOCINCTA, Smith (*Marginella* (*Volvarina*)), 1875. Ann. & Mag. Nat. Hist., ser. iv, xvi, 201. *Loc.*—C. Verdes. *Types.*—Brit. Mus. (two).
- MELVILLI, Tomlin & Shackelford (*Marginella*), Jan. 1, 1913. Journ. Conch., xiv, 11, pl. i, f. 1, 2. *Loc.*—São Thomé. *Type.*—Coll. Tomlin.
- metcalfei*, Tryon, ex Angas (*Marginella*), 1883. Man. Conch., v, 27. Error for *metcalfi*, Angas.
- metcalfi*, Angas (*Marginella*), Aug. 1, 1877. Proc. Zool. Soc. Lond., 1877, p. 173, pl. xxvi, f. 9. *Loc.*—Port Jackson. *Type.*—Brit. Mus. = OCHRACEA, Angas.
- metcalvei*, Weinkauff, ex Angas (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 143. Error for *metcalfi*, Angas.
- MEXICANA, Jousseau (*Volvarina*), 1875. Rev. Mag. Zool., 1875, p. 223, pl. viii, f. 9. *Loc.*—Mexico.
- MICANS, Petit (*Marginella*), 1851. Journ. de Conch., ii, 48, pl. i, f. 15, 16. *Loc.*—Abd-el-Goury. *Types.*—Coll. du Journal (two).

- microgonia*, Dall (*Marginella*), May 27, 1889. Bull. U.S. Nat. Mus., no. 37, p. 108. *Loc.*—Fernandina to Cuba, 294 f. *Type.*—U.S. Nat. Mus. A *nomen nudum*.
- microscopia*, Paetel, ex Tapparone-Caneфри (*Marginella*), 1887. Catal. Conch. Samml., p. 200. Error for MICROSCOPICA, T.-C.
- microscopica*, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas., 1910, p. 389, pl. xiv, f. 13. *Loc.*—7 miles east of Cape Pillar in 100 f. *Type.*—Tas. Mus., Hobart. = CYLICHNELLA, May (in litt.).
- MICROSCOPICA, Tapparone-Caneфри (*Marginella* (*Granula*)), 1875. Ann. Mus. Civ. Genova, vii, 1030. *Loc.*—Sorong.
- miliacea*, Kiener, ex Lamarck (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 19, pl. vi, f. 26v. *Loc.*—Mediterranean and Senegal. = ORYZA, Lam. f. 26 represents *miliacea*, Lam.
- miliacea*, Lamarck (*Volvaria*), Aug. 1822. Anim. sans Vert., vii, 364. *Loc.*—? ("mon cabinet"). = MILIARIA, L.
- miliaria*, Dillwyn (*Voluta*), 1817. Descr. Catal. Rec. Shells, i, 524. *Loc.*—Isle of Goree. = ORYZA, Lam.
- MILIARIA, Linné (*Voluta*), 1758. Syst. Nat., 10th ed., i, 730. *Loc.*—Mediterranean. *Type.*—Coll. Linn. (*vide* Hanley).
- var. *flavicans*, B. D. & D., Jan. 1883. Moll. Mar. Rouss., i, 123. *Loc.*—Paulilles. *Nomen nudum* in Requien, Catal. Coq. Corse, p. 84 (1848).
- var. *fasciata*, Req., l.c. *Nomen nudum*.
- var. *attenuata*, Monts., var. *cylindrica*, Monts., and var. *media*, Monts. *Nomina nuda* in Nomencl. Gen. e Spec., p. 138, 1884.
- var. *nana*, B. D. & D., Jan. 1883, l.c. Occurs as a *nomen nudum* by Monterosato in Gior. Sci. Nat. ed Econ., xiii, 109, 1878.
- var. *majuscula*, B. D. & D., Jan. 1883, l.c. Occurs with v. *nana* as a *nomen nudum* by Monterosato. Figured in Journ. de Conch., xlviii, 260, pl. vi, f. 7.
- var. *pallida*, B. D. & D., Jan. 1883, l.c. Occurs as a *nomen nudum* with the two last.
- var. *bifasciata*, B. D. & D. }
 var. *trifasciata*, B. D. & D. } Jan. 1883, l.c.
 var. *quadrifasciata*, B. D. & D. }
- var. *efasciata* and var. *major*, both of Monterosato, 1875, *nomina nuda* in Atti Accad. Palermo, Nuova Serie, v, 45.
- var. *secretata*, Monterosato, 1889 (q.v.).
- m. *contraria*, Monterosato, Atti Accad. Palermo, Nuova Serie, v, 45.
- var. *fulvofasciata*, var. *alba* and var. *minor*, all of Scacchi, 1836, *nomina nuda* in Catal. Conch. Regn. Neapol., p. 10. The var. *fulvofasciata* is given as equivalent to *Oliva carneola*, d. Ch. (q.v.).
- miliaria*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxvii, f. 154. *Loc.*—Medn.: Guancha, Madeira (McAndrew). *Type.*—Originally in Mus. Taylor: now *ubi*? = CLANDESTINA, Broc.
- minima*, Petterd (*Marginella*), Jan. 1884. Journ. Conch., iv, 144. *Loc.*—Long Bay, Tas., in about 7 f. *Type.*—Tas. Mus., Hobart. = SIMSONI, Tate & May.

- minima*, Sowerby (*Marginella*), 1846. Thes. Conch., i., 388, pl. lxxviii, f. 220. *Loc.*—St. Vincent's. = LAVALLEEANA, Orb.
- minima*, Renier (*Voluta*), 1807. Tav. Alfab. Conch. Adr., p. 8. "Non descritta né figurata." Referred by B. D. & D. to MILIARIA, L. (Moll. Mar. Rouss., i, 124).
- Brocchi, Conch. Foss. Subapenn., ii, 643, says that he saw shells so labelled in Renier's collection, and that they included several species.
- MINOR, C. B. Adams (*Marginella*), 1852. Ann. Lyc. Nat. Hist. New York, v, 264. *Loc.*—Panama.
- minor*, Dautzenberg (var.), 1910. See OCCULTA, Monts.
- minor*, Jousseau (var.), 1877. See TÆNIATA, Sow.
- minor*, Monterosato (var.), 1878. See CLANDESTINA, Broc.
- minor*, Scacchi (var.), 1836. See MILIARIA, L.
- minor*, Pallary (var.), 1900. See TURGIDULA, Pallary.
- minor*, Tate & May (var.), Dec. 19, 1901. See MUSCARIA, Lam.
- MINUSCULINA, Locard (*Volutella*), 1897. Exp. Sci. Trav. et Talisman, i, 127, pl. xxi, f. 6-8. *Loc.*—West of Morocco, 112 m. *Type.*—Mus. de Paris.
- minuta*, Gray (*Marginella*), April 18, 1826. Narr. Survey Coasts Austral., ii, 489. No figure is given or definite locality. The description seems to me to fit ALLPORTI, T.-W. best, except for the diameter ("two-twelfths of an inch"). The Gray coll. in Brit. Mus. contains no tablet so labelled, and the name is not identifiable with any certainty.
- minuta*, Pfeiffer (*Marginella*), 1840. Arch. f. Naturgesch., Bd. i, p. 259. *Loc.*—Cuba. = LAVALLEEANA, Orb.
- minuta*, Philippi, ex Pfeiffer (*Marginella*), 1844. Enum. Moll. Sicil., ii, 197, pl. xxvii, f. 23. *Loc.*—Sicily; also Antilles (a confusion with *minuta*, Pfr.). = PHILIPPII, Monts.
- minuta*, Reeve (*Erato*), 1865. Conch. Icon., xv, f. 11. *Loc.*—Ticao. Cf. Smith in Proc. Malac. Soc. Lond., ix, 22.
- minutissima*, Tenison-Woods (*Marginella*), 1876. Papers Proc. Rept. Roy. Soc. Tas. for 1875, p. 27. *Loc.*—Long Bay, D'Entrecasteaux Channel. *Type.*—Tas. Mus., Hobart. = PUMILIO, Tate & May.
- mirabilis*, H. Adams (*Marginella* (*Glabella*)), 1869. Proc. Zool. Soc. Lond., 1869, p. 273, pl. xix, f. 6, 6a. *Loc.*—? (Coll. Barclay). *Type.*—At the Barclay sale this shell was bought by J. J. McAndrew. It is now in coll. Melvill. = OBTUSA, Sow.
- MITRELLA, Risso (*Voluta*), 1826. Hist. Nat. Eur. MÉR., iv, 250, pl. x, f. 143. *Loc.*—Régions Coralligènes.
- var. *curta*, Monterosato, 1884. Nomencl. Gen. e Spec., p. 138. *Loc.*—Barbary coast. *Type.*—Coll. Monterosato.
- var. *inflexa*, Monterosato, 1884, l.c. *Loc.*—Palermo and Barbary coast. *Type.*—Coll. Monterosato. It is not apparent whether this name is meant to be the *inflexa* of Sowerby or not.
- var. *pallida*, var. *rufa*, and var. *albina*, all *nomina nuda* of Monterosato (1884), l.c.

There can be no doubt that Monterosato is right in reviving this name of Risso's for the more familiar *secalina*, Ph.

- mixta*, Petterd (*Marginella*), Jan. 1884. Journ. Conch., iv, 143.
Loc.—South and East Tasmania. *Type.*—Unknown (*vide* May).
 = TRIDENTATA, Tate.
- monilis*, Born (pars) (*Voluta*), 1780. Test. Mus. Caes. Vindob.,
 p. 219. *Loc.*—China (Linn.); Senegal (Adanson). = EXILIS,
 Gm. Born confuses it with MONILIS, L.
- monilis*, Gmelin, ex Linné, var. β (*Voluta*), 1791. Syst. Nat., 13th ed.,
 p. 3444. *Loc.*—Senegal. = ORYZA, Lam.
- MONILIS, Linné (*Voluta*), 1758. Syst. Nat., 10th ed., i, 730. *Loc.*—
 China. *Types.*—Coll. Linn. (*cf.* Hanley, Ipsa Conch., p. 217).
- monilis*, Meuschen (*Murex*), 1787. Mus. Gevers., p. 328, no. 773.
 A non-binomial author.
- monilis*, Naccari (*Voluta*). Quoted by Blainville, Faune Fr. Malacoz.,
 pp. 230, 231 (Aug. 1, 1829), as = either his *pallida* or *miliaria*, L.
 Apparently Naccari wrote a catalogue of Adriatic shells, but
 I have not been able to trace any other reference to it.
- monilis*, Wood (*Voluta*), 1818. Index Test., p. 93. = the *Hyalina*
pellucida of Schumacher which is indeterminable. In Wood's
 2nd ed. (1828) figured on pl. xix, f. 53, the figure representing
 the shell afterwards named PULCHELLA by Kiener, who specially
 refers to Wood's name and figure.
- MONTEROSATOI, Locard (*Gibberula*), 1897. Exp. Sci. Travailleur et
 Talisman, i, 131, pl. iv, f. 26-8. *Loc.*—W. of Cape Finistère,
 2,018 m., and Deserta Islands on the shore. *Type.*—Mus. de
 Paris.
- MÖRCHII, Redfield (*Marginella*), 1870. Amer. Journ. Conch., vi, 244.
Loc.—? (though Mörch gives Puntarenas). New name for
coniformis, Mörch, non Sowerby (1850).
- MOSAICA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 381, pl. lxxv,
 f. 58, 59. *Loc.*—? Var. *langleyi*, Sowerby, 1892. Mar. Shells
 S. Africa, p. 19. *Type.*—Coll. Langley (*vide* Sowerby).
- multilineata*, Sowerby (*Marginella*), Nov. 1846. Proc. Zool. Soc.
 Lond., 1846, p. 96. *Loc.*—Belieze (*sic*), Bay of Honduras (Mus.
 Cuming ex Dyson). *Type.*—Brit. Mus. = INTERRUPTOLINEATA,
 Megerle.
- multiplicata*, Tate & May (*Marginella*), Dec. 1900. Trans. Proc.
 Rept. Roy. Soc. S. Austral., xxiv, pt. ii, p. 91. *Loc.*—Tasmania
 (Petterd). *Type.*—Tas. Mus., Hobart. Figured in Proc. Linn.
 Soc. N.S.W. for 1901, xxvi, pt. iii, p. 364, pl. xxvii, f. 88.
 = ALTERNANS, P. & G., *vide* May.
- MULTIZONATA, Krauss (*Marginella*), 1852. Arch. f. Naturgesch.,
 1852, Bd. i, p. 37. *Loc.*—Cape. *Type.*—Naturalienkabinet,
 Stuttgart.
- MUNDA, Smith (*Marginella*), 1904. Journ. Malac., xi, 31, pl. ii, f. 14.
Loc.—Port Alfred. *Type.*—Brit. Mus.
- MURALIS, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond.,
 1844, p. 76. *Loc.*—? (Mus. Cuming). *Types.*—In Brit. Mus. are
 three marked "M.C." without loc., which are probably types.
 There are also three marked "M.C., S. Thomas". I am not at
 all sure that the usual identification with MACULOSA, Kien., is

- correct, and am inclined to think that they are quite distinct species.
- musca*, DeFrance, ex Lamarck (*Marginella*), 1823. Dict. Sci. Nat., p. 143. *Loc.*—Maria Island, New Holland. Error for MUSCARIA, Lam.
- muscaria*, Costa (*Voluta*), 1830 (?). Cat. Sist. e Rag. Test. Sicil., pp. 72, 73. *Loc.*—Gulf of Taranto. Costa mentions it as a species of "Nuova Olanda". = *Erato lævis*, Don.
- MUSCARIA, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 359. *Loc.*—Near Maria Island, New Holland, Péron ("mon cabinet"). Var. *minor*, Tate & May, Dec. 19, 1901. Proc. Linn. Soc. New S. Wales, 1901, xxvi, pt. iii, p. 363. The variety = JOHNSTONI, Pett.
- MUSICA, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 73. *Loc.*—Cape Blanco, 35 f. (Mus. Belcher). *Type.*—Probably in Brit. Mus., one shell labelled "Cape Blanco, Africa, 30 f. sand, Sir E. Belcher, C.B." There is also a tablet of three labelled "Cape Blanco, 12-15 f. sand, R. B. Hinds, Esq."
- MUSTELINA, Angas (*Hyalina (Volvarina)*), June 1, 1871. Proc. Zool. Soc. Lond., 1871, p. 14, pl. i, f. 5. *Loc.*—Dredged off Sow and Pigs Reef, Port Jackson (Brazier). *Types.*—Five examples in Brit. Mus. labelled "Port Jackson, G. F. Angas, Esq.", and presented on July 5, 1871.
- mustellina*, Jousseume, ex Angas (*Volvarina*), 1875. Rev. Mag. Zool., 1875, p. 220. Error for MUSTELINA, Angas.
- NANA, Marrat (*Marginella (Gibberula)*), 1877. Journ. Conch., i, 205. *Loc.*—? *Types.*—Liverpool Free Public Mus. (seven). Figured op. cit., xiv, pl. i, f. 13.
- nana*, B. D. & D. (var.), 1883. See MILIARIA, L.
- narel*, Jousseume (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 185. *Loc.*—Goree. = ADANSONI, Kiener.
- navicella*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xx, f. 103a, b. *Loc.*—? (Mus. Cuming). *Types.*—Three in Brit. Mus. labelled "M.C." and "S. Thomas" (added later). The left-hand example agrees exactly with Reeve's fig. = RUBELLA, C.B. Ad.
- NEBULOSA, Boltzen (*Pterygia*), 1798. Mus. Bolt., p. 51, no. 652. "Gmel., sp. 32: Martini, f. 434, 435." This name must take the place of *pyrum*, as Gronovius' specific names are not now accepted as binomial.
- NEGLECTA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 390, pl. lxxvi, f. 135, 136. *Loc.*—Unknown.
- NEVILLI, Jousseume (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 191. *Loc.*—Mauritius. New name for *inconspicua*, G. and H. Nev., non Sow.
- NEWCOMBI, Reeve (*Marginella*), Aug. 1864. Conch. Icon., xv, pl. v, f. 15a, b. *Loc.*—Lagulhas Bank, Cape of Good Hope (Mus. Cuming). *Types.*—Three in Brit. Mus. marked "Senegal, M.C." above, and "Lagulhas Bank" below tablet. The left-hand example corresponds to f. 15a, and is probably the type.

- nitida*, Hinds (*Marginella (Volvarina)*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 75. *Loc.*—? (Mus. Cuming). Redfield mentions that Cuming sent him a specimen labelled Malta. *Types.*—Probably four in Brit. Mus. labelled "Malta, M.C.", in view of Redfield's statement. = MITRELLA, Risso.
- nitidula*, Dunker (*Volvaria*), Feb. 1874. Mus. Godeffroy Catal. 5, p. 115. *Loc.*—Viti Is. A *nomen nudum*.
- nivea*, C. B. Adams (*Marginella*), Jan. 1850. Contrib. to Conch., p. 56. *Loc.*—Jamaica. *Types.*—Amherst Coll. Mus., Mass., U.S.A. (nine). = NIVOSA, Hds.
- NIVOSA, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 74. *Loc.*—? (Mus. Cuming). *Types.*—Two sets of three, each marked "W. Indies, M.C." in the Brit. Mus. must be collectively the types.
- NODATA, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 73. *Loc.*—Cape Blanco, W. Africa, 12–15 f. (Mus. Belcher). *Types.*—Brit. Mus. (two).
- nubecula*, Sowerby, ex Lamarck (*Marginella*), 1846. Thes. Conch., i, 380. Error for *nuberculata*, Lam.
- nuberculata*, Guérin-Méneville, ex Lamarck (*Marginella*), 1844. Iconogr. Règne Anim., Moll., iii, 33, pl. xvi, f. 15. *Loc.*—Indian Ocean. I refer this to PIPERATA, Hds., rather than to ROSEA, Lam., as Tryon does.
- nuberculata*, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 356. *Loc.*—? ("mon cabinet"). = NEBULOSA, Bolt.
- nubicola*, Swainson (*Glabella*), 1840. Treat. Malac., p. 324. "En. M. 377, f. 2." = NEBULOSA, Bolt.
- nucella*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 53, no. 669. = *Mitra dactylus*, Lam. (*vide* Pfr.).
- NYPHA, Brazier (*Marginella (Persicula)*), Sept. 4, 1894. Proc. Linn. Soc. New S. Wales, ser. II, ix, pt. i, p. 168, pl. xiv, f. 2. *Loc.*—Green Point, Sydney. *Type.*—Austral. Mus., Sydney.
- OBESA, Redfield (*Marginella*), Apr. 1846. Ann. Lyc. Nat. Hist. New York, iv, 164, pl. x, f. 5a, b. *Loc.*—St. Martha, S. America. *Type.*—"Cabinet of the Lyceum." The Redfield Coll. in Acad. Nat. Sci. Philad. contains four specimens from St. Martha (no. 29116).
- obesa*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 397, pl. lxxvi, f. 91, 92. *Loc.*—? (Coll. Bell). *Type.*—Brit. Mus. = PYRULATA, Redf.
- oblonga*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 398, pl. lxxvi, f. 106, 107. = ROSTRATA, Redf.
- OBLONGA, Swainson (*Marginella (Volutella)*), 1829. Zool. Illustr., ser. II, no. 9, pl. xliv, f. 1. *Loc.*—? *Type.*—There is no clue as to type, but it may be noted that of the three in Brit. Mus., marked "M.C." without locality, the middle example agrees excellently with Swainson's figure.
- OBSCURA, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxiv, f. 132. *Loc.*—? (Mus. Taylor). *Type.*—Brit. Mus., on same tablet as three from Aden (Yerbury).

- obtusa*, Monterosato (var.), 1878. See OCCULTA, Monts.
- OBTUSA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 374, pl. lxxiv, f. 11, 12. *Loc.*—? (Coll. Saul). *Type.*—Coll. Saul in Camb. Univ. Mus. of Zoology.
- obtusa*, Sowerby (*Marginella*), 1870. Proc. Zool. Soc. Lond., 1870, p. 254. *Loc.*—? *Type.*—Brit. Mus. = GRISEA, JOUSS.
- OCCULTA, Monterosato (*Marginella*), 1869. Test. Nuovi Mar. Sicil., p. 17, f. 10. *Loc.*—Palermo. *Type.*—Coll. Monterosato.
- var. *obtusa*, Monterosato, 1878. Gior. Sci. Nat. ed. Econ., xiii, 109, and elsewhere. A *nomen nudum*.
- var. *minor*, Dautzenberg, 1910. Actes Soc. Linn. Bordeaux, lxiv, 90. *Loc.*—Cansado Bay, 6–8 m., etc. *Type.*—Mus. de Paris.
- ocellata*, Martini (*Cucumis*). Quoted in the Yoldi Catal., i, 119, as a synonym of GLABELLA, L., from a non-binomial author.
- OCHRACEA, Angas (*Marginella*), June 1, 1871. Proc. Zool. Soc. Lond., 1871, p. 14, pl. i, f. 6. *Loc.*—New South Wales coast. *Types.*—Eleven in Brit. Mus., received 5th July, 1871, and marked "G. F. Angas, Esq., N. S. Wales", are probably types.
- oculum*, Weinkauff, ex Sowerby (*Marginella*), 1880. Jahrb. Malak. Ges., 1880, p. 49. Error for OVULUM, Sow.
- odorici*, Weinkauff, ex Bernardi (*Marginella*), 1880. Jahrb. Malak. Ges., 1880, p. 56. Error for ODORICYI, Bern.
- ODORICYI, Bernardi (*Marginella*), 1852. Journ. de Conch., iii, 59, pl. ii, f. 6, 7. *Loc.*—? *Type.*—Probably in the Dinan Museum, but about twelve years ago, when the museum was moved, many labels were lost and the Curator has failed to find any trace of this species.
- OLIVÆFORMIS, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 12, pl. viii, f. 36. *Loc.*—Senegal.
- OLIVELLA, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxv, f. 140a, b. *Loc.*—Australia (Strange in Mus. Cuming). *Type.*—Two in Brit. Mus. are marked "Australia, M.C.", of which the left-hand shell is probably the type, though not so marked.
- OLIVELLÆFORMIS, Jousseume (*Canalispira*), 1875. Rev. Mag. Zool., 1875, p. 270, pl. vii, f. 8. *Loc.*—?
- olivæformis*, Petit, ex Kiener (*Marginella*), 1851. Journ. de Conch., ii, 54. Error for OLIVÆFORMIS, Kiener.
- onychina*, A. Adams & Reeve (*Marginella*), 1848. Voy. Samarang, Moll., p. 29, pl. x, f. 25. *Loc.*—China Sea. *Types.*—In Brit. Mus. are three now labelled "*bernardii*, Larg., China Seas, M.C.", of which the left-hand specimen is the original of Reeve's figures 38a, b in the Conch. Icon. Presumably these are types. = BERNARDII, Larg.
- oödes*, Melvill (*Marginella (Persicula)*), 1898. Mem. Proc. Manch. Lit. Phil. Soc., xlii, pt. ii, no. 4, p. 16, pl. i, f. 16. *Loc.*—Bushire. *Type.*—Brit. Mus. Recorded in Proc. Zool. Soc. Lond., 1901, p. 426, as *pisum*, Reeve (*vide* Melvill). = ISSELI, G. & H. Nevill.
- opalina*, Stearns (*Marginella (Glabella)*), Jan. 17, 1872. Proc. Boston

- Soc. Nat. Hist., xv, 1872-3, p. 21. *Loc.*—Tampa Bay. *Types.*—U.S. Nat. Mus. ("several," *vide* Dall). = *EBURNEOLA*, Contr.
- ORNATA*, Redfield (*Marginella*), 1870. Amer. Journ. Conch., vi, 246. *Loc.*—East Africa. New name for *vittata*, Reeve (1864), *non* Edwards (1852).
- oryza*, Doublier (*Marginella*), 1853. Prodr. Hist. Nat. Var, p. 120. = *MILIARIA*, L., *vide* Locard, in Cat. Gen. Moll. France, p. 97.
- ORYZA*, Lamarck (*Volvaria*), Aug. 1822. Anim. sans Vert., vii, 364. *Loc.*—Senegal? ("mon cabinet").
- var. *alba*, var. *fusca*, var. *bifasciata*, var. *trifasciata*, all of Pallary (1902), without descriptions. Journ. de Conch., 1, 8.
- oryza*, Pease (*Marginella*), June 1, 1860. Proc. Zool. Soc. Lond., 1860, p. 147. *Loc.*—Sandwich Isles. *Types.*—Four in Brit. Mus. labelled "Sandwich Isles, M.C.", and also "Sydney". = *DEBILIS*, Pse.
- OSTERI*, Jousseaume (*Serrata*), 1875. Rev. Mag. Zool., 1875, p. 232, pl. vii, f. 7. *Loc.*—?
- ovulaeformis*, Tate & May (*Marginella*), Dec. 1900. Trans. Proc. Rept. Roy. Soc. S. Austral., xxiv, 93. *Loc.*—Tasmania (Petterd). *Type.*—Tas. Mus., Hobart ("so far unique; quite distinct; very like *inaequidens*, May, but not the same."—MAY). = *BUCCA*, Tomlin. Figured in Proc. Linn. Soc. New S. Wales for 1901, xxvi, pt. iii, p. 364, pl. xxvii, f. 92.
- OVULIFORMIS*, Orbigny (*Marginella*), 1842. R. de la Sagra's Hist. Nat. de Cuba, Moll., ii, 101, pl. xx, f. 33-5. *Loc.*—Martinique, S. Thomas, Guadeloupe. *Types.*—Coll. Orbigny in Brit. Mus., five, "S. Thomas."
- ovuloidea*, Marrat (*Marginella*). MS. name for *MACULOSA*, Kiener, quoted in Journ. Conch., xiv, 44.
- OVULUM*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 401, pl. lxxviii, f. 188. *Loc.*—Unknown. *Type.*—Brit. Mus. (ex Coll. Bell). For its variation see May in Papers Proc. Roy. Soc. Tas., 1915, p. 82.
- ovum*, Gmelin (*Voluta*), 1791. Syst. Nat., 13th ed., p. 3448. *Loc.*—? = *BULLATA*, Born.
- ovum*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xviii, f. 89a, b. *Loc.*—? (Mus. Cuming). *Type.*—Brit. Mus. = *PAROS*, Jous. This may quite possibly be a var. of *LARGILLIERI*, Kiener.
- PACHIA*, Watson (*Marginella* (*Glabella*)), 1886. "Challenger" Rept. Gasteropoda, p. 265, pl. xvi, f. 5. *Loc.*—Off Raine Is., Cape York, 155 f. *Type.*—Brit. Mus. Very close to *ANGASI*, Braz. (Hedley in Mem. Austral. Mus., iv, pt. vi, p. 368).
- PACHISTA*, Tomlin (*Marginella*), Oct. 1, 1913. Journ. Conch., xiv, 101, text-figs. *Loc.*—East London, Umkomaas, Tongaat. *Type.*—Brit. Mus.
- PACIFICA*, Pease (*Marginella*), 1868. Amer. Journ. Conch., iii, 280, pl. xxiii, f. 20. *Loc.*—Paumotus Is. *Types.*—The Acad. Nat. Sci. Philad. has two examples ex auct. (no. 29415); in the Pease Coll., Mus. Comp. Zool. Cambridge, Mass., is a tray of 136 examples

from the Paumotus (no. 24966), labelled in J. G. Anthony's writing.

PALLATA, Bavay (*Marginella*), Dec. 1912. Ann. Inst. Océanogr., v, fasc. 3 (Mission Gruvel), p. 24, pl. i, f. 27, 28. *Loc.*—Bay of Praya Amelia, 15–35 m.: Mossamedes. *Type.*—Mus. de Paris.

var. *albida*, Bavay, l.c.

var. *pallida*, Bavay, l.c.

pallida, Bavay (var.), Dec. 1912. See PALLATA, Bavay.

pallida, Blainville (*Volvaria*), Aug. 1, 1829. Faune Fr. Malac., p. 229, pl. viii B, f. 5. *Loc.*—English coast of the Channel, Corsica, etc. = MITRELLA, Risso.

pallida, delle Chiaje (*Voluta*), 1827. Test. Utr. Sicil., iii, pt. ii, p. 31, pl. xlvi, f. 34. Identification uncertain.

pallida, Dunker (*Volvaria*), Feb. 1874. Mus. Godeffroy Catal., v, p. 115. *Loc.*—Samoa. Mentioned as “= *guttula*, Rve., var. *alba*, sec. Dunker”. Probably error for PALLIDULA, Dkr. *A nomen nudum.*

pallida, Linné. The status of this name is fully discussed in Hanley's *Ipsa Conch.* Linné, Syst. Nat., 10th ed., p. 727, described a *Bulla pallida* which is indeterminable. In Mus. Lud. Utr., p. 588, is a *Bulla pallida*, referred to the one of the 10th ed., but evidently a different shell; possibly a *Marginella*, but also indeterminable. In the 12th ed. of the Syst. Nat., p. 1189, we have a *Voluta pallida*, referred to the *Bulla pallida* of the Mus. Lud. Utr., and also to List. Conch., t. 714, f. 70a, and Adanson's t. 5, f. 3. The latter author's figure is that of the “simeri”, i.e. *Marg. exilis*, Gm.; the reference in Lister is to three figures, one of which might possibly be guessed to be *Marg. lactea*, Kiener, one is probably *Bullinella cylindracea*, Penn. (“Barnstable”), and the third is hopeless. Under these circumstances we have no choice but to discard the name *pallida*, L. altogether. Many authors have already recognized that the Linnean name is untenable and solve the difficulty by using *pallida* as of Donovan (Nat. Hist. Br. Shells, ii, pl. lxvi, 1801). Donovan figures the West Indian shell well and clearly as *Bulla pallida*, and refers back to the Mus. Lud. Utr., p. 588. But this usage is likewise untenable on account of the unidentifiable *Bulla pallida* of Linné's 10th edition, and as I have not cognizance of a later synonym, I now rename the shell represented by Donovan (l.c.) and by Sowerby, Thes. Conch., i, pl. lxxvi, f. 108, *Marginella* TENUILABRA.

pallida, B. D. & D. (var.), 1883. See MILIARIA, L.

pallida, Monterosato (var.), 1884. See MITRELLA, Risso.

PALLIDULA, Dunker (*Volvaria*), 1871. Malak. Bl., 1871, p. 153. *Loc.*—Upolu. See also under *pallida*, Dkr.

pallidus, Meuschen (*Murex*), 1787. Mus. Gevers., p. 328, no. 774. This author is not strictly binomial, and his names have no status. = NEBULOSA, Bolten.

PAROS, Jousseume (*Closia*), 1875. Rev. Mag. Zool., 1875, p. 255. New name for *Marginella ovum*, Rve. (q.v.), non *Voluta ovum*, Gm.

- parva*, Martini (*Persicula*). Quoted in the Yoldi Cat., i, 122, as a synonym of *LACTEA*, Kiener, but has no status.
- PARVISTRIATA*, Suter (*Marginella (Glabella)*), 1908. Proc. Malac. Soc. Lond., viii, 183, pl. vii, f. 13. *Loc.*—Foveaux Str., 15 f. *Type.*—Coll. Suter.
- PARVULA*, Locard (*Marginella*), 1897. Exp. Sci. Travailleur et Talisman, i, 117, pl. iv, f. 4-6; pl. v, f. 4-6. *Loc.*—West of the Sahara, two stations. *Type.*—Mus. de Paris.
- PARVULINA*, Locard (*Volutella*), 1897. Exp. Sci. Travailleur et Talisman, i, 126, pl. xxi, f. 3-5. *Loc.*—Off Spain, 322 and 1,094 m. *Type.*—Mus. de Paris.
- PATAGONICA*, Martens (*Marginella*), 1881. Sitzungsber. Ges. Naturf. Freunde Berlin, Apr. 1881, p. 64. *Loc.*—East coast of Patagonia, 60 f. Figured in Conch. Mittheil., Bd. ii, Heft 1 and 2, pl. xxiii, f. 4-7, Dec. 1, 1881.
- pauciplicata*, Blainville (*Volvaria*), Aug. 1, 1829. Faune Fr. Malac., p. 233. *Loc.*—Nice. New name for *Volvaria biplicata*, Risso, as Blainville considered that Risso's *Marginella biplicata*, which has precedence by one page, was also a *Volvaria*. The species is unrecognizable.
- PAUMOTENSIS*, Pease (*Marginella*), 1868. Amer. Journ. Conch., iii, 281, pl. xxiii, f. 22. *Loc.*—Paumotus. *Types.*—The Acad. Nat. Sci. Philad. has two specimens ex auct. (no. 29497).
- paxillas*, Paetel, ex Reeve (*Marginella*), 1883. Catal. Conch. Samml., p. 31. Error for *paxillus*, Rve.
- paxillus*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxiv, f. 133. *Loc.*—? (Mus. Taylor). *Type.*—Brit. Mus. = *MITRELLA*, Risso.
- peasei*, Paetel, ex Reeve (*Volvaria*), 1883. Cat. Conch. Samml., p. 200. Error for *PEASII*, Rve.
- PEASII*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxi, f. 108a, b. New name for *cylindrica*, Psc., non Sowerby. The specimen figured by Reeve is probably the left-hand one on the tablet of seven labelled "Kingsmill Is."
- pellicula*, Weinkauff (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 123, pl. xxiii, f. 11, 12. *Loc.*—Natal. A manuscript name of Marrat's, communicated to Weinkauff by Sowerby. Later on (i.e., p. 137) Weinkauff surmises its identity with *LUCIDA*, Marrat, of which *pellicula*, Wkff., is merely the beach-worn form. There are specimens in the Coll. Marrat in Liverpool Free Public Museum.
- pellucida*, Brown (*Volvaria*), 1827. Illustr. Conch. Great Britain and Ireland, pl. xxxviii, f. 45, 46. *Loc.*—Dunbar. = *Tornatina truncatula*, Brug.
- PELLUCIDA*, Pfeiffer (*Marginella*), 1840. Arch. f. Naturgesch., Bd. i, p. 258. *Loc.*—Cuba.
- pellucida*, Schumacher (*Hyalina*), 1817. Essai Nouv. Syst., p. 234. Based on Mart., ii, pl. xlii, f. 426, which is indeterminate.
- pellucida*, Tenison-Woods (*Erato*), Feb. 24, 1879. Papers Proc. Rept. Roy. Soc. Tasmania for 1878, p. 35. *Loc.*—Tasmania. *Type.*—

- Melbourne Mus. (*vide* Pritchard & Gatliff in Proc. Roy. Soc. Vict., xi, 193). = *stanislas*, T.-W.
- pellucida*, Weinkauff (pars) (*Marginella*), 1865. Syst. Conch. Cab. *Marginella*, p. 17, pl. iv, f. 5, 6. Probably = FAUNA, Sow.
- peregrina*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, no. 665. = *Voluta magellanica*, Lam. (*vide* Pfr.).
- PERICALLES, Tomlin (*Marginella*), Nov. 28, 1916. Proc. Malac. Soc. Lond., xii, 64. New name for *guttula*, Rve., non Sowerby.
- PERLA, Marrat (*Marginella*), 1876. Journ. Conch., i, 136. *Loc.*—? *Type.*—Liverpool Free Public Mus. This name supersedes *biplicata*, Krss.—preoccupied.
- PERMINIMA, Sowerby (*Marginella*), 1894. Journ. Conch., vii, 370. *Loc.*—S. Africa. *Type.*—Brit. Mus.
- PERRIERI, Bavay (*Marginella*), 1906. Journ. de Conch., liii, 248, pl. vii, f. 5, 6. *Loc.*—Falkland Is. *Type.*—Mus. de Paris.
- persicula*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, no. 660. = CORNEA, Lam.
- PERSICULA, Linné (*Voluta*), 1758. Syst. Nat., 10th ed., i, 730. *Loc.*—In Oceano Africano. *Types.*—Coll. Linn. (*vide* Hanley).
The var. β of the 12th ed., p. 1189 = CINGULATA, Dillw.
- persicula*, Schroeter, ex Linné, var. C (*Voluta*), 1783. Einleitung, i, 211. = GUTTATA, Dillw.
- perta*, Paetel, ex Marrat (*Marginella*), 1887. Catal. Conch. Samml., p. 200. Error for PERLA, Marrat.
- PETITII, Duval (*Marginella*), 1841. Rev. Zool., 1841, p. 279. *Loc.*—Senegal.
- petterdi*, Beddome (*Marginella*), 1883. Papers Proc. Rept. Roy. Soc. Tas. for 1882, p. 167. *Loc.*—Kelso Bay, Tamar R., 17 f. = OVULUM, Sow. (*vide* Tate & May). *Type.*—Originally in Coll. Beddome. Now *ubi*?
- philippiana*, Paetel, ex Monterosato (*Marginella*), 1887. Catal. Conch. Samml., p. 192. Error for PHILIPPII, Monts.
- PHILIPPII, Monterosato (*Marginella*), 1878. Giorn. Sci. Nat. ed Econ., xiii, 109 (Enum. e Sin.).
“= *M. minuta*, Phil., non L. Pfeiffer ch'è di Cuba.”
- M. contraria*, B. D. & D., 1883. Moll. Mar. Rouss., i, 124. *Loc.*—Palermo.
- PHILIPPINARUM, Redfield (*Marginella*), 1848. Ann. Lyc. Nat. Hist. New York, iv, 492, pl. xviii, f. 3. New name for *avena*, Sow., non Kiener.
- PHYGGIA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 394, pl. lxxviii, f. 218, 219. *Loc.*—? (Coll. Bell). *Type.*—Brit. Mus., on a tablet with three others, now labelled “California”.
- picta*, Dillwyn (*Voluta*), 1817. Descr. Catal. Rec. Shells, i, 529. *Loc.*—Coasts of Brazil (Martini). = NEBULOSA, Bolt.
- PICTURATA, G. & H. Nevill (*Marginella* (*Glabella*)), June 3, 1874. Journ. Asiat. Soc. Bengal, xliii, pt. ii, no. 1, p. 23. *Loc.*—Mauritius. *Type.*—Indian Mus. Figured op. cit., xlv, pl. viii, f. 8, 9.
- PIPERATA, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond.,

- 1844, p. 72. *Loc.*—? (Mus. Cuming). *Types.*—The Brit. Mus. has two series, each of three, from the Cuming Coll., one lot marked "W. Coast of Africa" and the other "E. Africa". It is impossible to say which are types.
- var. *lineata*, Sowerby.
- var. *lutea*, Sowerby.
- var. *strigata*, Sowerby, all (1889) described in Journ. Conch., vi, 8. The var. *strigata*, Sow., is the form subsequently described as M. PUNCTILINEATA, Smith. I consider *albocincta*, Sow., and *eucosmia*, Bartsch, merely as colour varieties of *piperata*.
- piperita*, Sowerby, ex Hinds (*Marginella*), 1846. Thes. Conch., i, 381. Error for PIPERATA, Hds. This erroneous form of the name has been very generally copied, no doubt from the "Thesaurus", and has recently been perpetuated by Bartsch in his Report on the Turton Collection.
- piriformis*, Weinkauff, ex Pease (*Marginella*), 1880. Jahrb. Malak. Ges., 1880, p. 54. Error for *pyriformis*, Pease.
- PISUM, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxvii, f. 156a, b. *Loc.*—Australia (Strange in Mus. Cuming). *Type.*—Brit. Mus. Recorded in error for *oödes*, Melv., in Proc. Zool. Soc. Lond., 1901, p. 426. For distinctions between this and OVULUM, Sow., see Papers Proc. Roy. Soc. Tas. for 1915, p. 82.
- PLATYPUS, Carrière (*Pseudomarginella*), 1880. Zool. Anz., 1880, p. 640. *Loc.*—Goree. Cf. Carrière in Zeitschr. f. Wissensch. Zool., Bd. xxxvii, 1882, p. 99, pl. ix, f. 7, etc.
- PLICATULA, Suter (*Marginella (Glabella)*), Dec. 22, 1909. Subantarctic Is. of New Zealand, i, 29, pl. i, f. 4, 5. *Loc.*—10 miles north of Enderby Is., Auckland Is., 85 f. (one). *Type.*—Canterbury Mus., Christchurch, N.Z.
- plumbea*, Dillwyn (*Voluta*), 1817. Descr. Catal. Rec. Shells, i, 530. *Loc.*—Goree. Quoted ex Solander's MSS. as a synonym of PRUNUM, Gm.
- POLITA, Carpenter (*Marginella*), 1857. Catal. Coll. Mazatlan Shells, p. 462. *Loc.*—Mazatlan. *Types.*—Three examples in Mazatlan Coll. Brit. Mus., sp. no. 588, tablet no. 2108.
- polita*, Pease (*Marginella*), 1868. Amer. Journ. Conch., iii, 280, pl. xxiii, f. 19. *Loc.*—Insl. Tarawa. New name for *cylindrica*, Pease, non Sow. = FEASII, Rve.
- POLYODONTA, Vélain (*Persicula*), 1877. Arch. Zool. Expér., vi, 108, pl. iii, f. 1, 2. *Loc.*—S. Paul Is., Indian Ocean. Occurs as a *nomen nudum*, *Persicula polyodonta*, Vél., in Comptes Rend. Acad. Sci. Paris, lxxxiii, 285, 1876.
- ponsonbyi*, Sowerby (*Marginella*), 1897. Mar. Sh. S. Africa App., p. 10, pl. vi, f. 2. *Loc.*—South Africa. *Type.*—Brit. Mus. (from Port Elizabeth). = CYLINDRICA, Sow.
- PORCELLANA, Gmelin (*Voluta*), 1791. Syst. Nat., 13th ed., p. 3449. *Loc.*—Indian Ocean (by error).
- porcellana*, Perry (*Voluta*), 1811. Conch., pl. xvii, f. 2. *Loc.*—Southern Ocean. *Type.*—Author's Museum. The colouration of the figure is probably fantastic and certainly unrecognizable.

- The description points to *VENTRICOSA*, G. Fischer, and the five strong plaits in the figure are exactly as in *VENTRICOSA*.
- porcellana*, Wood (pars) (*Voluta*), 1818. Index Test., p. 93, no. 58. *Loc.*—Indian Ocean. Ref. to Chem., x, pl. cl, f. 1419–20, and to Enc. Méth., pl. 377, f. 5. The former of these represents *PORCELLANA*, Gm., the latter *PERSICULA*, L. In Wood's 2nd ed. the fig. (pl. xix, f. 58) represents *PERSICULA*.
- poucheti*, Petit (*Marginella*), 1851. Journ. de Conch., ii, 46, pl. i, f. 3. *Loc.*—West Africa. *Type.*—Coll. du Journal. At my request M. Dautzenberg twice searched the Coll. du Journal for this shell, which has long been a stumbling-block, and eventually found an example labelled *poucheti* and bearing the information "Jal Conch. 1851, pl. i, f. 3" in Petit de la Saussaye's own writing. M. Dautzenberg then recollected that this specimen was brought to him by M. H. Fischer to be placed in the collection. He writes: "Cet exemplaire est certainement une individu de petite taille et un peu roulé de *M. glabella*." = *GLABELLA*, L. Recorded in error by Sowerby for *ornata*, Redf., Journ. Conch., v, 9.
- præcallosa*, Higgins (*Marginella*), 1876. Journ. Conch., i, 136. *Loc.*—? *Type.*—Liverpool Free Public Mus. Cf. Tomlin, op. cit., xiv, 44, pl. i, f. 10. = *STRIGATA*, Dillw.
- PRÆTERMISSA*, May (*Marginella*), Feb. 24, 1916. Papers Proc. Roy. Soc. Tas. for 1915, p. 87, pl. ii, f. 12. *Loc.*—Tasmania, probably east coast. *Type.*—Tas. Mus., Hobart.
- PRINCEPS*, Sowerby (*Marginella*), 1901. Proc. Malac. Soc. Lond., iv, 212, pl. xxii, f. 15. *Loc.*—? *Type.*—Brit. Mus.
- PROBLEMATICA*, Gatliff & Gabriel (*Marginella*), Oct. 1916. Proc. Roy. Soc. Victoria, xxix, pt. i, p. 104, pl. vii, f. 1. *Loc.*—Western Port, 8–10 f. *Type.*—Coll. Gabriel.
- procella*, May (*Marginella*), Feb. 24, 1916. Papers Proc. Roy. Soc. Tas. for 1915, p. 87, pl. ii, f. 10. *Loc.*—Storm Bay, 24 f. *Type.*—Tas. Mus., Hobart. = *OLIVELLA*, Rve. (*vide* May).
- PROFUNDA*, Suter (*Cryptospira (Closia)*), 1909. Rec. Canterbury Mus., i, no. 2, p. 128, pl. xii, f. 5. *Loc.*—South-east of Cape Saunders in 100 f. *Type.*—Canterbury Mus., Christchurch, N.Z.
- PRUINOSA*, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 74. *Loc.*—West Indies (Mus. Cuming). *Types.*—Presumably five in Brit. Mus. marked "W. Indies, M.C."
- pruna*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, no. 659. = *PRUNUM*, Gm.
- prunosa*, H. & A. Adams, ex Hinds (*Marginella (Prunum)*), 1853. Gen. Rec. Moll., i, 191. Error for *PRUINOSA*, Hds.
- PRUNUM*, Gmelin (*Voluta*), 1791. Syst. Nat., 13th ed., p. 3446. *Loc.*—Goree.
- PSEUDOFABA*, Sowerby (*Marginella*), Nov. 1846. Proc. Zool. Soc. Lond., 1846, p. 96. *Loc.*—R. Gambia (Mus. Cuming). *Types.*—In the Brit. Mus. are three marked "Senegal, M.C.", of which the right-hand one appears to be the shell figured in the "Thesaurus".

- PSEUSTES, Smith (*Marginella*), 1904. Journ. Malac., xi, 32, pl. ii, f. 21. *Loc.*—Port Alfred. *Types.*—Brit. Mus. (six).
- pudica*, Gaskoin (*Marginella*), Dec. 14, 1849. Proc. Zool. Soc. Lond., 1849, p. 18. *Loc.*—Central America (Mus. Metcalfe, Gaskoin, Cuming). *Types.*—There are specimens in the Brit. Mus. labelled beneath the tablet "M. pudica, Gask. (Mr. Hartvig)" in what I believe is Gaskoin's writing, and from the West Indies. = CHRYSOMELINA, Redf.
- PUELLA, Gould (*Volvarina*), Jan. 25, 1861. Proc. Boston Soc. Nat. Hist., vii, 385. *Loc.*—Simon's Bay in 18 f. *Type.*—U.S. Nat. Mus. Figured in U.S. Nat. Mus. Bull. 91, pl. i, f. 1.
- PULCHELLA, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 27, pl. ix, f. 40. *Loc.*—?
- pulcherima*, Weinkauff, ex Gaskoin (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 139. Error for PULCHERRIMA, Gask.
- PULCHERRIMA, Gaskoin (*Marginella*), Dec. 14, 1849. Proc. Zool. Soc. Lond., 1849, p. 21. *Loc.*—West Indies (Brit. Mus., Mus. Metcalfe, Gaskoin, etc.). *Type.*—In Brit. Mus. are three marked "M.C., S. Thomas", one marked "M.C., Gaskoin", and one marked "not from Cuming's coll." The presumption is that the last-named specimen is type.
- pulcherrima*, Maltzan (var.). See *bifasciata*, Lam.
- PULCHRA, Gray (*Marginella*), 1839. Zool. of Capt. Beechey's Voyage, p. 135, pl. xxxvi, f. 20. *Loc.*—?
- PULVIS, Jousseauime (*Granula*), 1875. Rev. Mag. Zool., 1875, p. 249, pl. vii, f. 2. *Loc.*—Bourbon.
- PUMILA, Redfield (*Marginella*), 1870. Amer. Journ. Conch., vi, 252. New name for *pusilla*, H. Ad. (1867), non Edwards (1852).
- PUMILIO, Tate & May (*Marginella*), Dec. 19, 1901. Proc. Linn. Soc. New S. Wales for 1901, xxvi, pt. iii, p. 363. New name for *minutissima*, T.-Wds. (1876), non Michelin (*ubi*?). Figured in Proc. Linn. Soc. New S. Wales for 1901, xxvi, pt. iii, p. 363, pl. xxvi, f. 79.
- puna*, Paetel, ex Petit (*Marginella*), 1887. Cat. Conch. Samml., p. 196 (Guayaquil). Can this possibly be for *prunum*?
- punctata*, Martini (*Persicula*). Quoted in the Yoldi Cat., i, 121, as a synonym of PERSICULA, L. As a name ex Martini, it of course has no status.
- PUNCTILINEATA, Smith (*Marginella*), 1899. Journ. Conch., ix, 249, pl. v, f. 5. *Loc.*—Umkomaas (Burnup). *Type.*—Brit. Mus. This is Sowerby's *piperata*, var. *strigata*. It will very likely prove to be a small form of PIPERATA, Hds.
- PUNCTULATA, Petit (*Marginella*), 1841. Rev. Zool., 1841, p. 185. *Loc.*—Senegal. This has never been subsequently recognized. Tryon queries its identity with NIVOSA, Hds.
- pura*, Smith (*Marginella*), 1904. Journ. Malac., xi, 31, pl. ii, f. 18. *Loc.*—Port Alfred. *Type.*—Brit. Mus. = ZEYHERI, Krss.
- pusilla*, H. Adams (*Volvaria* (*Volvarina*)), Aug. 1, 1867. Proc. Zool. Soc. Lond., 1867, p. 303, pl. xix, f. 1. *Loc.*—Port Louis. *Type.*—Brit. Mus. = PUMILA, Redf.

- pygmæa*, Garrett (*Volvaria (Volvarina)*), 1873. Proc. Acad. Nat. Sci. Philad., 1873, p. 217, pl. ii, f. 27. *Loc.*—Viti Is. *Types.*—Coll. Acad. Nat. Sci. Philad., three (no. 29342). = SANDWICENSIS, Pse. (cf. Tryon's Man., v, 45).
- pygmæa*, Issel (*Marginella*), 1869. Malac. Mar. Rosso, p. 116; figured in Savigny's Descr. de l'Egypte, pl. vi, f. 26. *Loc.*—Near Suez. = ISSELI, G. & H. Nev.
- PYGMÆA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 386, pl. lxxv, f. 78, 79. *Loc.*—? (Coll. Bell). *Type.*—Brit. Mus., being the larger of two on one tablet; the smaller is labelled "Brisbane, M.C."
- pygmæa*, Petit ex Sowerby (*Marginella*), 1851. Journ. de Conch., ii, 54. Error for PYGMÆA, Sow.
- pyriformis*, Boltzen (*Pterygia*), 1798. Mus. Bolt., p. 53, no. 670. *A nomen nudum.*
- PYRIFORMIS, Carpenter (*Volutella*), 1865. Journ. de Conch., xiii, 148. *Loc.*—San Diego (Cooper); California (Pacific Ry. Exploring Exped.). *Type.*—"Mus. of Smithsonian Inst."
- pyriformis*, Pease (*Marginella*), 1868. Amer. Journ. Conch., iii, 280, pl. xxiii, f. 21. *Loc.*—Paumotus. *Types.*—The Pease Coll. in Mus. Comp. Zool. Cambridge, Mass., has a lot of twelve from the Paumotus, labelled in Pease's writing (no. 24968). The Acad. Nat. Sci. Philad. has two ex auct. (no. 29541). Coll. Weinkauff also had specimens ex auct. = TRANSLATA, Redf.
- PYRULATA, Redfield (*Marginella*), 1848. Ann. Lyc. Nat. Hist. New York, iv, 494. New name for *obesa*, Sow., non Redfield.
- PYRULUM, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxii, f. 117. *Loc.*—S. Thomas, W. Indies (Mus. Cuming). *Type.*—The Brit. Mus. has two marked "St. Thomas, M.C.", of which the right-hand one appears to be the figured type.
- pyrulus*, Meuschen (*Murex*), 1787. Mus. Gevers., p. 328, no. 779. A non-binomial author. = GLABELLA, L.
- pyrum*, Gronovius (*Voluta*), 1781. Zoophylac., p. 298, no. 1318, t. xix or ii, f. 13, 14. *Loc.*—In Oceano Americano. Gronovius' specific names are not accepted as binomials. = NEBULOSA, Bolt. Tryon, Man., v, 18, gives a var. *alba*, Kiener, but Kiener merely mentions that there is a white var. without naming it.
- QUADRIFASCIATA, Marrat (*Marginella*), 1873. Ann. Mag. Nat. Hist., ser. iv, xii, 426. *Loc.*—Kabenda, in 10 f. *Type.*—"Mus. Keen." Very probably a small form of TÆNIATA, Sow.
- quadrifasciata*, B. D. & D. (var.), 1883. See MILIARIA, L.
- QUADRILINEATA, Gaskoin (*Marginella*), Dec. 14, 1849. Proc. Zool. Soc. Lond., 1849, p. 17. *Loc.*—? (Mus. Metcalfe and Gaskoin). "Brought back by the 'Samarang'." *Type.*—Brit. Mus. Described by Reeve, ex Mus. Taylor, as a new species under the same specific name, without reference to Gaskoin.
- quadriplicata*, "Reeve," Dall (*Marginella*), 1885. Quoted by Dall in Bull. U.S. Geol. Survey, no. 24, p. 164, as from Amer. Journ. Conch., v, 93. There is no such species of Reeve's, and Redfield,

- in the reference given, merely quotes the word "quadruplicata" from Kiener's description of his LACTEA.
- quadruplicata*, Risso (*Volvaria*), 1826. Hist. Nat. Eur. MÉR., iv, 233. Loc.—Régions madréporiques. = MITRELLA, Risso, *vide* Blainville, Faune Française Malacoz., p. 229.
- QUADRIPUNCTATA, Locard (*Marginella*), 1897. Exp. Sci. Travailleur et Talisman, i, 119, pl. v, f. 7-9. Loc.—C. Verdes, 105 m. Type.—Mus. de Paris.
- QUILONICA, Melvill (*Marginella (Glabella)*), 1898. Mem. Proc. Manch. Lit. Phil. Soc., xlii, pt. ii, no. 4, p. 15, pl. i, f. 4. Loc.—Quilon, Malabar Coast, 15 f. Type.—Brit. Mus.
- quinqueplicata*, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 356. Loc.—? ("mon cabinet"). = VENTRICOSA, G. Fischer.
- quinquevittata*, Bavay (var.), 1910. See CHUDEAUI, Bavay.
- quniplicata*, Jousseau, ex Lamarck (*Cryptospira*), 1875. Rev. Mag. Zool., 1875, p. 233. Error for *quinqueplicata*, Lam.
- radiata*, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 356. Loc.—? ("mon cabinet"). = *Voluta zebra*, Leach.
- RECONDITA, Monterosato (*Gibberula*), 1884. Nomencl. Gen. Spec., p. 138. Loc.—Malta, Palermo, etc. Type.—Coll. Monterosato. Very near to MILIARIA, L.
- REDFIELDII, Tryon (*Marginella*), 1883. Man. Conch., v, 34, pl. x, f. 99. Loc.—Florida (Pourtalès). Types.—Coll. Redfield in Acad. Nat. Sci. Philad., three (no. 29096).
- REEVEANA, Petit (*Marginella*), 1851. Journ. de Conch., 1851, p. 51. New name for *splendens*, Rve. (1842), non Grat. (1833).
- reevei*, Krauss (*Marginella*), 1852. Arch. f. Naturgesch., 1852, Bd. i, p. 38. Loc.—Cape. Type.—Naturalienkabinet, Stuttgart. = NEGLECTA, Sow.
- regubiensis*, Brown, ex "Adams" (*Volvaria*), 1844. Illustr. Rec. Conch. Gt. Brit. & I., p. 4; quoted in synonymy. Error for *regubiensis*, Kanmacher.
- REGULARIS, Carpenter (*Marginella*), 1865. Ann. Mag. Nat. Hist., ser. III, xv, 398. Loc.—Sta. Barbara (Jewett); coast of California south from Monterey; Catalina Is. (Cooper). Type.—U.S. Nat. Mus.
- regubiensis*, "Adams" (*Volvaria*). Quoted in Brown's Illustr. Conch. Gt. B. and I., 1827, pl. xxxviii, f. 12, and equivalent to *V. retusa*, Brown, *vide* Brown in Illustr. Rec. Conch., 1844, p. 4. The name should be credited to Kanmacher. G. Adams' *Essays on the Microscope*, 2nd ed., 1798, p. 640, pl. xiv, f. 28. Loc.—Reculver, very rare. According to Jeffreys this = Montagu's *Tornatina obtusa*, and should therefore have precedence.
- REPENTINA, Sykes (*Marginella*), 1905. Proc. Malac. Soc. Lond., vi, 316, pl. xvii, f. 6. Loc.—Mayotte. Type.—Coll. Sykes.
- REPLICATA, Melvill (*Marginella (Gibberula)*), 1912. Proc. Malac. Soc. Lond., x, 250, pl. xi, f. 9. Loc.—Persian Gulf, 48 f. Types.—Brit. Mus. (two).
- retusa*, Brown (*Volvaria*), ? ex Mat. & Rack. (*Bulla*). Illustr. Conch.

- Gt. Britain and Ireland, pl. xxxviii, f. 17, 18, 1827. Probably = *Tornatina truncatula*, Brug.
- RETUSA, Locard, ex Monterosato MS. (*Gibberula*), 1897. Exp. Sci. Travailleur et Talisman, i, 128, pl. iv, f. 19-21. *Loc.*—Four stations off Spain and Morocco. *Type.*—Mus. de Paris.
- RINGICULA, Sowerby (*Marginella*), 1900. Proc. Malac. Soc. Lond., iv, 126, pl. xi, f. 3. *Loc.*—Cebú. *Type.*—Brit. Mus.
- ROBUSTA, Sowerby (*Marginella* (*Cryptospira*)), 1904. Proc. Malac. Soc. Lond., vi, 175, text-fig. *Loc.*—Ascension Is. *Type.*—Brit. Mus.
- ROS, Reeve (*Marginella*), Jan. 1865. Conch. Ic., xv, pl. xxvi, f. 147. *Loc.*—? (Mus. Taylor). *Type.*—Brit. Mus.
- roscida*, Redfield (*Marginella*), 1860. Proc. Acad. Nat. Sci. Philad., xii, 174. *Loc.*—Carolina. *Types.*—Coll. Redfield in Acad. Nat. Sci. Philad., two (no. 29086). = LIMATULA, Conrad *vide* Dall in Trans. Wagn. Free Inst. Sci. Philad., iii, 55. Quoted by Verrill as of Ravenel in Proc. U.S. Nat. Mus., iii, 369.
- ROSEA, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 357. *Loc.*—? (“mon cabinet”).
- ROSTRATA, Redfield (*Marginella*), 1870. Amer. Journ. Conch., vi, 246. *Loc.*—West Indies. *Type.*—Coll. Redfield in Acad. Nat. Sci. Philad., one, now labelled Yucatan (no. 29282). Figured by Sowerby, Thes., i, pl. lxxvi, f. 106, 107, as *oblonga*, Sow.
- ruberculata*, Reichenbach, ex Lamarck (*Voluta* s. *Marginella*), 1842. Die Land-, Süßwasser- und See-Conchilien, p. 62, pl. xxxvii, f. 524, 525. Error for *nuberculata*, Lam.
- RUBELLA, C. B. Adams (*Marginella*), 1845. Proc. Boston Nat. Hist. Soc., ii, 1. *Loc.*—Jamaica. *Types.*—Possibly the two examples in Brit. Mus. labelled “*Marginella rubella nobis*: Jamaica, Prof. C. B. Adams”.
- RUBENS, Martens (*Marginella*), April, 1881. Sitzungsber. Ges. Naturf. Fr. Berlin, April, 1881, p. 63. *Loc.*—East coast of Patagonia, 60 f. Figured in Conch. Mittheil., ii, Heft 1 and 2, p. 116, t. xxiii, f. 1-3.
- rubrifasciata*, Jousseume (*Volvarina*), 1875. Rev. Mag. Zool., 1875, p. 221. New name for *fasciata*, Sow., which, however, is not preoccupied by Schumacher's citation of *Persicula fasciata*, Mart. (q.v.). = *fasciata*, Sow.
- rufa*, Monterosato (var.), 1884. See MITRELLA, Risso.
- rufescens*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxi, f. 112. *Loc.*—? (Mus. Cuming). *Types.*—Brit. Mus. (two). = EXILIS, Gm. (not = MITRELLA, Risso, as Jousseume & Tryon surmise and as Weinkauff assumes).
- ruffina*, Swainson (*Glabella*), 1840. Treat. Malac., p. 324. “En. Méth., 377, f. 6.” = GLABELLA, L.
- RUFOLINEATA, Schepman (*Marginella*), Sept. 1911. Prosobr. of the Siboga-Exp., pt. iv, p. 259, pl. xviii, f. 7a, b. *Loc.*—Sulu Archipelago, 275 m. (st. 105), one. *Type.*—Zool. Mus., Amsterdam.
- rufula*, Gaskoin (*Marginella*), 1853. Ann. Mag. Nat. Hist., ser. II, xi, 359. *Loc.*—? (Mus. Gaskoin, ex Belcher). *Type.*—Brit.

- Mus., now labelled "Green Point, C.G.H. dead specimen, gathered by Benson". = *NEGLECTA*, Sow. Erroneously recorded from Pt. Jackson, 25 f. (Brazier), as "*Porcellana rufula*, Gask., MS.", by Angas, Proc. Zool. Soc. Lond., 1877, p. 182.
- SAGITTATA*, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 76. *Loc.*—Brazils (Mus. Cuming). *Types.*—Brit. Mus., three marked "Brazils, M.C."
- sagittata*, Sowerby (pars), (*Marginella*), 1846. Thes. Conch., i, 393, pl. lxxviii, f. 224. = *PULCHERRIMA*, Gask.
- SAHARICA*, Locard (*Persicula*), 1897. Exp. Sci. Travailleuseur et Talisman, i, 122, pl. iv, f. 13-15. *Loc.*—West of Sahara, 140 m. *Type.*—Mus. de Paris.
- salaris*, Jousseume (*Marginella*), 1875. Rev. Mag. Zool., 1875, pl. vii, f. 9. Error for *SCALARIS*, JOUSS.
- SANDWICENSIS*, Pease (*Marginella*), June 1, 1860. Proc. Zool. Soc. Lond., 1860, p. 147. *Loc.*—Sandwich Is. *Types.*—Brit. Mus., three marked "Sandwich Is., M.C." The Acad. Nat. Sci. Philad. has four examples ex auct., and the Pease Coll. in Mus. Comp. Zool. Cambridge, Mass., has twenty-six examples (*Paumotus*) with label in Pease's writing.
- sandwicensis*, Weinkauff, ex Pease (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, pp. 111, 133, pl. xxi, f. 9. Error for *SANDWICENSIS*, Pease. Weinkauff states that Reeve's and Jousseume's *sandwicensis* are not Pease's species of that name, but = *pyriformis*, Pse.
- SAPOTILLA*, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 74. *Loc.*—Panama, 5-13 f. (Mus. Belcher and Cuming). *Types.*—The Brit. Mus. has two series, one of three marked "M.C., Panama, H.C.; M. n.sp.", and another of three, marked "M.C. Panama, 5-13 f. sandy mud, H.C."
- SARCODES*, Tomlin (*Marginella*), 1917. See *carneola*, Petit.
- SARDA*, Kiener (*Marginella*), 1834. Coq. Viv. *Marginella*, p. 30, pl. iv f. 42. *Loc.*—?
- sauleciana*, Paetel, ex Reeve (*Marginella*), 1883. Catal. Conch. Samml., p. 31. = *saulecyana*, Rve.
- SAULCYANA*, Petit (*Marginella*), 1851. Journ. de Conch., ii, 47, pl. i, f. 11. *Loc.*—Côte du Brésil, 35 f. *Type.*—Coll. du Journal.
- saulecyana*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xviii, f. 90a, b. *Loc.*—West Indies (Mus. Cuming). = *CINCTA*, Kiener.
- SAULIAE*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 386, pl. lxxv, f. 68. *Loc.*—? (Coll. Saul). *Type.*—There is now no trace of this shell in the Saul collection (*vide* H. Scott).
- saulioe*, Petit, ex Sowerby (*Marginella*), 1851. Journ. de Conch., ii, 54. Error for *SAULIAE*, Sow.
- SAVIGNYI*, Issel (*Marginella*), 1869. Malac. Mar. Rosso, p. 115; figured in Savigny's Descr. de l'Égypte, Coq., pl. vi, f. 18. *Loc.*—Suez. "Very like *miliaria*, L., but lip not internally crenulate."
- SCALARIS*, Jousseume (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 189, pl. vii, f. 9. *Loc.*—Brazil.
- SCHEPMANI*, Tomlin (*Marginella*), Nov. 28, 1916. Proc. Malac. Soc.

- Lond., xii, 64. New name for *M. abyssicola*, Schepman (1911), non *Gibberula abyssicola*, Locard (1897).
- SCHOUTANICA, May (*Marginella*), April, 1913. Papers Proc. Roy. Soc. Tas. for 1912, p. 45, pl. ii, f. 2. *Loc.*—3 miles east of Schouten Is. in 40 f. *Type.*—Tas. Mus., Hobart.
- scinctella*, Weinkauff, ex Jousseume (*Marginella*), 1880. Jahrb. Malak. Ges., 1880, p. 49. Error for SCINTILLA, Jous. s.
- scinctilla*, Jousseume (*Serrata*), 1875. Rev. Mag. Zool., 1875, p. 230. *Loc.*—? This is evidently a typographical error for SCINTILLA ("a spark"), and is correctly given by Paetel, Catal. Conch. Samml., 1887, p. 197.
- scintella*, Tryon, ex Jousseume (*Marginella*), 1883. Man. Conch., v, 26. Error for SCINTILLA, Jous. s.
- SCRIPTA, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 73. *Loc.*—Straits of Macassar, 11–15 f., coarse sand (Mus. Belcher). *Types.*—The Brit. Mus. has two lots—six examples marked "Str. of Macassar, 11–14 fs., Sir E. Belcher, C.B.", and labelled beneath "*scripta*, Hinds", in Hinds' own writing, and three marked "M.C., 11–15 fs., Str. of Macassar, coarse sand, R. B. Hinds, Esq."
- secalina*, Philippi (*Marginella*), 1844. Enum. Moll. Sicil., ii, 197, pl. xxvii, f. 19. *Loc.*—Sicily. = MITRELLA, Risso.
- secretæ*, Monterosato (*Gibberula*), Apr. 1, 1889. Journ. de Conch., xxxvii, 118. *Loc.*—Tangier, Mogador, Casa Blanca. *Type.*—Coll. Monterosato. = MILIARIA, L., var.
- semen*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxvi, f. 145. *Loc.*—? (Mus. Taylor). *Type.*—Brit. Mus. = CINEREA, Jous. s.
- seminula*, Dall (*Marginella*), Aug. 25, 1881. Bull. Mus. Comp. Zool. Harv., ix, 72. *Loc.*—Yucatan Str., 640 f. *Type.*—U.S. Nat. Mus. = ABYSSORUM, Tomlin.
- SEMINULA, Gould (*Marginella*), Dec. 24, 1860. Proc. Boston Soc. Nat. Hist., vii, 384. *Loc.*—False Bay, Cape of Good Hope.
- serpentina*, Jousseume (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 180. New name for *vittata*, Rve. (1864), non Edwards (1852). = ORNATA, Redf.
- SERRATA, Gaskoin (*Marginella*), Dec. 14, 1849. Proc. Zool. Soc. Lond., 1849, p. 19. *Loc.*—Mauritius. *Type.*—Brit. Mus.
- SERREI, Bavay (*Marginella (Volvaria)*), 1913. Bull. Mus. Hist. Nat. Paris, 1913, no. 6, p. 359, f. 3. *Loc.*—Bahia. *Type.*—Mus. de Paris.
- var. *fulva*, Bavay, 1913, op. cit., no. 7, p. 483.
- SERREI, Bavay (*Marginellopsis*), 1911. Bull. Mus. Hist. Nat. Paris, 1911, no. 4, p. 240, f. 1. *Loc.*—Havana. *Type.*—Mus. de Paris.
- sexplicata*, Weinkauff (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 85, pl. xvi, f. 6, 7. *Loc.*—Japan; also Mazatlan (Dunker). *Type.*—Coll. Loebbecke. Always quoted as of Dunker in Mus. Godeffroy, Catal. 3, but does not occur there. Cf. Index Moll. Mar. Japon., p. 57, and Smith in Ann. Mag. Nat. Hist., ser. VII, xiii, 468. = GRISEA, Jous. s.

- sexplicata*, Risso (*Volvaria*), 1826. Hist. Nat. Eur. MÉR., iv, 234.
Loc.—Régions sablonneuses. An unrecognized species.
- SHACKLEFORDI, Preston (*Marginella*), 1915. Proc. Malac. Soc. Lond., xi, 312. New name for *eburnea*, Preston (1906), *non* Lamarek (1803).
- SHEPSTONENSIS, Smith (*Marginella*), 1906. Ann. Natal Govt. Mus., i, pt. i, p. 31, pl. vii, f. 5. *Loc.*—Pt. Shepstone. *Type.*—Brit. Mus. Hedley unites this with *PULCHELLA*, Kien., in Journ. Proc. Roy. Soc. W. Austral., i, 204.
- SHOPLANDI, Melvill (*Marginella* (*Cryptospira*)), 1897. Mem. Proc. Manch. Lit. Phil. Soc., xli, pt. iii, no. 7, p. 8, pl. vi, f. 15. *Loc.*—Karachi. *Type.*—Brit. Mus.
- SHOREHAMI, Pritchard & Gatliff (*Marginella*), Feb. 1899. Proc. Roy. Soc. Victoria, n.s., xi, pt. ii, p. 179, pl. xx, f. 2. *Loc.*—Shoreham Beach, Western Port Bay. *Type.*—Coll. Gatliff.
- sibilla*, Solander MS. (*Voluta*). Quoted by Dillwyn, Descr. Catal. Rec. Shells, i, 531, as a synonym of *ELEGANS*, Gm.
- siculus*, delle Chiaje (*Conus*), 1841 (?). Descr. e Notom. Anim. Invert. Sic. Cit., i, 120, pl. lxxi, f. 1-3. *Loc.*—Caiola. = *MILIARIA*, L.
- simeri*, Jousseume (*Volvarina*), 1875. Rev. Mag. Zool., 1875, p. 52. *Loc.*—Senegal. = *EXILIS*, Gmel.
- similis*, Sowerby (*Marginella*), Oct. 1846. Proc. Zool. Soc. Lond., 1846, p. 97. *Loc.*—Brazils (Mus. Cuming). *Types.*—Three in Brit. Mus. labelled "M.C., Brazils" are presumably types. = *OBESA*, Redf.
- simplex*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxii, f. 115. *Loc.*—Australia (Strange in Mus. Cuming). *Type.*—Brit. Mus. = *OLIVELLA*, Rve. Preoccupied by *simplex*, Edwards (1852).
- SIMSONI, Tate & May (*Marginella*), Dec. 1900. Trans. Proc. Rep. Roy. Soc. S. Austral., xxiv, pt. ii, p. 92. *Loc.*—Tasmania and S. Australia. Figured in Proc. Linn. Soc. N.S.W. for 1901, xxvi, pt. iii, p. 364, pl. xxvi, f. 78, pl. xxvii, f. 98.
- smithii*, Verrill (*Marginella*), 1885. Trans. Conn. Acad. Arts Sci., vi, 447, 452. New name for *virginiana*, Verrill (1885), *non* Conrad (1868). Dall is certainly right in uniting it with *AUREOCINCTA*, Stearns, Bull. Mus. Comp. Zool. Harv., xviii, 139.
- solidissima*, Redfield MS. (var.). See *interrupta*, Lam.
- SORDIDA, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxiv, f. 137. *Loc.*—? (Mus. Cuming). *Type.*—No doubt the single example in Brit. Mus. marked "M.C." and mounted on the same tablet as four from Mauritius (Robillard). This specimen has four distinct plaits, whereas Reeve's description reads "columella triplicata"—no doubt in error. The figure shows a back view.
- southwicksi*, Davis (var.), 1904. See *arena*, Kiener.
- soverbianum*, Redfield, ex Petit (*Marginella*), 1870. Amer. Journ. Conch., vi, 244. Error for *sowerbianum*, Pet.
- soverbyana*, Redfield, ex Petit (*Marginella*), 1870. Amer. Journ. Conch., vi, 243. Error for *sowerbianum*, Pet.
- sowerbianum*, Petit (*Marginella*), 1851. Journ. de Conch., ii, 53. New

- name for *monilis*, Sowerby, which Petit considered a different species from that of Linné. There seems, however, to be no ground for the differentiation. = *MONILIS*, L.
- sowerbyana*, Tryon, ex Petit (*Marginella*), 1883. Man. Conch., v, 41
Error for *sowerbianum*, Pet.
- SPILOTA*, Mazjök (*Marginella*), 1913. Contrib. Charleston Mus., ii (Catalog Moll. South Carolina), p. 9. Loc.—Sullivan's Is. Type.—Charleston Mus. (Coll. Ravenel).
Occurs as a *nomen nudum*, by Gibbes, in Tuomey's Geology of S. Carolina (1848).
- SPIRIFLANA*, Joussemaume (*Granula*), 1882. Bull. Soc. Zool. Fr., vii, 310. Loc.—On *Euplectella*.
- splendens*, Reeve (*Marginella*), 1842. Conch. Syst., ii, pl. cclxxvii, f. 2, 3. Loc.—Guinea (Mus. Cuming). Type.—There are three in Brit. Mus. marked "M.C., Guinea", of which the largest is evidently the figured type. = *REEVEANA*, Petit. Tryon's argument for retaining the name *splendens* is of course untenable.
- stanislas*, Tenison-Woods (*Marginella*), 1877. Papers Proc. Rept. Roy. Soc. Tas. for 1876, p. 133. Loc.—Blackman's Bay. Types.—Tas. Mus., Hobart (two). = *MUSTELINA*, Angas, var., *vide* Hedley in Mem. Austral. Mus., iv, pt. vi, p. 366, Oct. 8, 1903. Figured in Proc. Linn. Soc. New S. Wales for 1901, xxvi, 362, pl. xxvi, f. 82.
- stanislaus*, Tryon, ex T.-Woods (*Marginella*), 1883. Man. Conch., v, 56. Error for *stanislas*, T.-W.
- STEWARTIANA*, Suter (*Marginella* s.s.), 1908. Proc. Malac. Soc. Lond., viii, 183, pl. vii, f. 12. Loc.—Pt. Pegasus, Stewart Is., 18 f. Type.—Coll. Suter.
- STILLA*, Hedley (*Marginella*), 1903. Mem. Austral. Mus., iv, pt. vi, p. 367, f. 90. Loc.—Pt. Kembla, 63-75 f.; Pt. Stephens, 24 f. Type.—Austral. Mus., Sydney.
- stipon*, Link (*Pterygia*), 1807. Besch. Nat. Samml. Rostock, pt. ii, p. 94. Probably = *ORYZA*, Lam.
- STORERIA*, Couthouy (*Marginella*), 1837. Boston Journ. Nat. Hist., i, 440, pl. ix, f. 1, 2. Loc.—Southern coasts of the Gulf of Mexico. Types.—"Cabinet of Boston Soc. Nat. Hist., that of D. H. Storer, M.D., and my own coll."
- STRANGEI*, Angas (*Marginella*), Aug. 1, 1877. Proc. Zool. Soc. Lond., 1877, p. 172, pl. xxvi, f. 8. Loc.—Sow and Pigs Reef, Pt. Jackson (Brazier). Types.—Brit. Mus. (two). On difference from *SUBBULBOSA*, Tate, see Hedley in Proc. Linn. Soc. New S. Wales, xxvii, 18, 1902.
- striata*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 375, pl. lxxv, f. 81, 82. Loc.—North America; West Indies (Brit. Mus.). Types.—Brit. Mus., three ex coll. Bell. = *SULCATA*, Orb.
- STRIGATA*, Dillwyn (*Voluta*), 1817. Descr. Catal. Rec. Shells, i, 530. Loc.—Coasts of Guinea. This is Gmelin's *V. glabella*, var. θ .
- strigata*, Sowerby (var.), 1889. See *PIPERATA*, Hinds.
- STYRIA*, Dall (*Marginella*), June, 1889. Bull. Mus. Comp. Zool. Harv., xviii, 140. Loc.—Sombrero Is., 54 f.; north of Cuba, 229 f.

- Type*.—U.S. Nat. Mus. Figured in Tr. Wagn. Free Inst. Sci. Philad., iii, 54; pl. v, fig. 1.
- SUAVIS, Souverbie (*Marginella*), 1859. Journ. de Conch., vii, 376. *Loc*.—Art Is. *Type*.—Bordeaux Mus. Figured op. cit., viii, pl. ii, f. 13. Var. *subventricosior*, Souverbie, 1863. Op. cit., xi, 170. *Loc*.—Baie Boisée, N. Caledonia. *Type*.—Bordeaux Mus.
- SUBAURICULATA, May (*Marginella*), Feb. 24, 1916. Papers Proc. Roy. Soc. Tas. for 1915, p. 86, pl. ii, f. 7. *Loc*.—40 f. off Thouin Bay, Tas. *Type*.—Tas. Mus., Hobart.
- SUBBULBOSA, Tate (*Marginella*), 1878. Trans. Proc. Rep. Phil. Soc. Adelaide, S.A., for 1877-8, i, 86. *Loc*.—Wauraltie. *Not* = STRANGEI, Ang. (Tate & May in Proc. Linn. Soc. New S. Wales for 1901, xxvi, 363), *fide* Hedley, *ibid.*, xxvii, pt. i, p. 18.
- subcærulea*, Martini (*Marginella*). Quoted in the Yoldi Catal., i, 120, as an equivalent of PRUNUM, Gm. It has, of course, no status.
- subcylindrica*, Brown (*Volvaria*), 1827. Illustr. Conch. Gt. B. and I., pl. xxxviii, f. 19, 20. *Loc*.—Dunbar. = *Tornatina umbilicata* (Mont.).
- SUBFLAVA, Preston (*Marginella*), 1906. Proc. Malac. Soc. Lond., vii, 35, text-fig. *Loc*.—Ceylon? (coll. H. Nevill). *Type*.—*Ubi*? Paratype in Brit. Mus.
- subterranea*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 51, no. 657. Not a *Marginellid*.
- SUBTRIGONA, Carpenter (*Marginella*), 1865. Ann. Mag. Nat. Hist., ser. III, xv, 397. *Loc*.—Santa Barbara. *Type*.—U.S. Nat. Mus.
- SUBTRIPPLICATA, Orbigny (*Marginella*), 1842. R. de la Sagra's Hist. Nat. de Cuba, Moll., ii, 99, pl. xx, f. 30-2 (*triplicata* on plate). *Loc*.—Cuba (Candé). *Types*.—Coll. Orb. in Brit. Mus., eleven examples labelled S. Barthélemi (Candé). E. A. Smith considered this species = LACTEA, Kiener.
- subventricosior*, Souverbie (var.), 1863. See SUAVIS, Souv.
- SUCCINEA, Conrad (*Marginella*), 1846. Proc. Acad. Nat. Sci. Philad., iii, 26, pl. i, f. 17. *Loc*.—Tampa Bay. *Type*.—Acad. Nat. Sci. Philad. (no. 29224).
- SUEZIENSIS, Issel (*Marginella*), 1869. Malac. Mar. Rosso, p. 115; figured in Savigny's Descr. de l'Égypte, Coq., pl. vi, f. 17. *Loc*.—Suez.
- SULCATA, Orbigny (*Marginella*), 1842. R. de la Sagra's Hist. Nat. de Cuba, Moll., ii, 102, pl. xxi, f. 14-16. *Loc*.—Martinique. *Types*.—Coll. Orbigny in Brit. Mus., five labelled "Martinique".
- sutoris*, Dunker (*Marginella*), 1869. Mus. Godeffroy Catal. 4, May, 1869, p. 81. *Loc*.—South America. A *nomen nudum*.
- swainsoniana*, Petit (*Marginella*), 1851. Journ. de Conch., ii, 55. New name for *gutkata*, Sow. (1829), *non* Dillwyn (1817). = PHRYGIA, Sow.
- TÆNIATA, Sowerby (*Marginella*), Nov. 1846. Proc. Zool. Soc. Lond., 1846, p. 96. *Loc*.—? (Mus. Cuming). *Types*.—Brit. Mus., three, but not so marked.
- var. *minor*, Jousseau, 1877. Bull. Soc. Zool. Fr. for 1876, p. 270. This var. = *verdensis*, Smith.

- TÆNIOLATA*, Mörch (*Volvarina*), 1860. Malak. Bl., 1860, p. 86.
Loc.—"Ins. Los Bocorones ad prof. 30 org., spec. 4 incompleta."
 I am not aware that this has ever again been recognized.
- TANTILLA*, Gould (*Persicula*), 1861. Proc. Boston Soc. Nat. Hist., vii, 384. *Loc.*—China Seas. Another unrecognized species.
- TASMANICA*, Tenison-Woods (*Marginella*), March 21, 1876. Papers Proc. Rept. Roy. Soc. Tas. for 1875, p. 28. *Loc.*—Long Bay.
Type.—Tas. Mus., Hobart.
- TAYLORI*, Shackleford (*Marginella*), Oct. 6, 1916. Ann. S. Afr. Mus., 1916, p. 193, text-figs. 1, 2. *Loc.*—Off Cape S. Blaize in 108 f.
Type.—S. Afr. Mus., Cape Town.
- TENERA*, Menke (*Volvaria*), 1828. Syn. Meth. Moll., p. 88. *Loc.*—Puerto Rico. Unrecognized.
- tenisoni*, Pritchard (*Marginella*), July 5, 1900. Vict. Nat., xvii, no. 3, p. 55. New name for *cypræoides*, T.-W. (1878), *nun* Anton (1839). United to *pisum*, Rve., by Pritchard & Gatliff in Proc. Roy. Soc. Victoria, xviii, pt. ii, p. 46, but cf. May in Papers Proc. Roy. Soc. Tas. for 1915, p. 82, quoting Smith (N.B.—In this reference for Prof. "Bee" read Bell). = *OVULUM*, Sow.
- TENUILABRA*, Tomlin (*Marginella*), 1917. See *pallida*, L.
- TERVERIANA*, Petit (*Marginella*), 1851. Journ. de Conch., ii, pl. ii, f. 2. *Loc.*—Socotra. *Types.*—Coll. du Journal, three.
- terversiana*, H. & A. Adams, ex Petit (*Marginella*), 1853. Gen. Rec. Moll., i, 192. Error for *TERVERIANA*, Pet.
- tessellata*, Lamarck (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 361. *Loc.*—? ("mon cabinet"). = *PORCELLANA*, Gmel.
- tessellata*, Sowerby (pars) (*Marginella*), 1846. Thes. Conch., i, 395, pl. lxxviii, f. 195. *Loc.*—Venezuela. = *CHRYSOMELINA*, Redf.
- tessellata*, Petit, ex Lamarck (*Marginella*), 1851. Journ. de Conch., ii, 55. Error for *tessellata*, Lam.
- THOUINENSIS*, May (*Marginella*), Feb. 24, 1916. Papers Proc. Roy. Soc. Tas. for 1915, p. 86, pl. ii, f. 8. *Loc.*—40 f. off Thouin Bay.
Type.—Tas. Mus., Hobart.
- toeniata*, Petit (*Marginella*), 1851. Journ. de Conch., ii, 54. Error for *TÆNIATA*, Sow.
- tomlini*, Shackleford (*Marginella*), Oct. 6, 1916. Ann. S. Afr. Mus., 1916, p. 193, text-figs. 3, 4. *Loc.*—Off Cape S. Blaize in 105 f.
Type.—S. Afr. Mus., Cape Town. = *BICATENATA*, Sow.
- tornatella*, Savigny (*Marginella*). Quoted by Redfield in Amer. Journ. Conch., vi, 259, from "Moll. de l'Égypte". Ref. to Savigny's Hist. Nat., i, 48, and Hist. Nat. (Planches), ii, Coq., pl. vi, shows that he speaks of one of his figures as a species of *Tornatella*.
- TORTICULA*, Dall (*Marginella*), Aug. 25, 1881. Bull. Mus. Comp. Zool. Harv., ix, 73. *Loc.*—G. of Mexico in 229 f. and 152 f. *Type.*—U.S. Nat. Mus. Figured op. cit., xviii, pl. xix, f. 7.
- TRAILLI*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxi, f. 114. *Loc.*—Malacca (Mus. Cuming). *Type.*—Evidently the right-hand specimen of the two in Brit. Mus.
- transalata*, Paetel, ex Redfield (*Marginella*), 1887. Catal. Conch. Samml., p. 197. Error for *TRANSLATA*, Redf.

- TRANSLATA, Redfield (*Marginella*), 1870. Amer. Journ. Conch., vi, 259.
New name for *pyriformis*, Pse. (1868), non Carpenter (1865).
- TRANSLUCIDA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 376,
pl. lxxv, f. 62, 63. *Loc.*—Australia. Sowerby gives no clue as
to his types.
- triangulosa*, A. Adams (*Marginella*). Paetel, Catal. Conch. Samml.,
p. 197 (1887), quotes this name from "Reeve Icon., f. 26", with
locality Siam. This figure represents *M. pseudofaba*, Sow.
Probably Paetel has made a mistake about the genus.
- TRIBALTEATA, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xx,
f. 102. *Loc.*—? (Mus. Cuming). *Type.*—Brit. Mus., but not
so marked. Tryon is very likely right in uniting this to *EXILIS*,
Gmel.
- TRICINCTA, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond.,
1844, p. 76. *Loc.*—Str. of Macassar, 11 f. (Belcher). *Types.*—The
Brit. Mus. has two series: one of two specimens labelled "Str.
of Macassar, 11 f., Sir E. Belcher, C.B.", and beneath tablet
"*tricincta*, Hds." in Hinds' own writing; the other of three
labelled "M.C., 11 f., coarse mud, Str. Macassar, R. B.
Hinds, Esq."
- TRIDENTATA, Tate (*Marginella*), 1878. Trans. Proc. Rep. Phil. Soc.
Adelaide, S.A., for 1877-8, p. 87. *Loc.*—Aldinga Bay. Figured
in Proc. Linn. Soc. New S. Wales for 1901, xxvi, pt. iii, p. 363,
pl. xxvi, f. 81.
- trifasciata*, B. D. & D. (var.), 1883. See MILIARIA, L.
- trifasciata*, Pallary (var.), 1902. See ORYZA, Lam.
- triplicata*, Gaskoin (*Marginella*), Dec. 14, 1849. Proc. Zool. Soc.
Lond., 1849, p. 19. *Loc.*—Philippines, etc. = *GUTTULA*, Sow.
- triplicata*, Orbigny (*Marginella*), 1841-53. R. de la Sagra's Hist.
Nat. de Cuba, Moll., ii, pl. xx, f. 30-2. Error for *SUBTRIPPLICATA*,
Orb., of the text. There is no clue to the more exact date of
these plates.
- triticea*, Lamarek (*Marginella*), Aug. 1822. Anim. sans Vert., vii, 363.
Loc.—Senegal ("mon cabinet"). = *EXILIS*, Gmel.
var. *albida*, Lam., Aug. 1822, l.c.
var. *alba*, Scacchi.
var. *lutescens*, Scacchi. Both *nomina nuda* in Cat. Conch. Regn.
Neapol., 1836, p. 9.
var. *alba*, Tomlin & Shackelford, Oct. 1, 1914. Journ. Conch.,
xiv, 244. = var. *albida*, Lam.
- triticea*, Payraudeau (*Volvaria*), 1826. Cat. Ann. Moll. Corse, p. 168.
Loc.—Ajaccio, etc. = *MITRELLA*, Risso.
- triticea*, Sowerby (*Marginella*), 1846. Thes. Conch., i, 388, pl. lxxvi,
f. 119-21. *Loc.*—Medn. = *MITRELLA*, Risso (f. 119, 120),
and *DELESSERTIANA*, Récl. (f. 121).
- trivittata*, Bavay (var.), 1910. See CHUDEAUI, Bav.
- truncata*, Brown (*Volvaria*), ex Montagu (*Bulla*), in Illustr. Rec.
Conch. Gt. B. and I., 1844, p. 4, pl. xix, f. 17, 18. = *Tornatina*
truncatula, Brug.
- TURBINATA, Sowerby (*Marginella*), 1846. Thes. Conch., i, 385, pl. lxxv,

- f. 70, 71. *Loc.*—? (Coll. Gaskoin). *Types.*—Probably the tablet of eight in Brit. Mus. labelled "J. S. Gaskoin" and "Australia" in a later hand. See also under *albina*, Gask.
- TURGIDULA**, Pallary (*Gibberula*), 1900. Journ. de Conch., xlviii, 261. *Loc.*—Province of Oran, several localities. Var. *minor*, Pall., l.c. I cannot discover that Monterosato, to whom this species is generally credited, ever described it. It occurs as a *nomen nudum* in Giorn. Sci. Nat. ed Econ. Palermo, xiii, 109, 1878 (Monterosato's Enum. et Sin.).
- turris*, Bolten (*Pterygia*), 1798. Mus. Bolt., p. 52, no. 663. A *nomen nudum*.
- turtoni*, Bartsch (*Marginella*), July 28, 1915. Bull. U.S. Nat. Mus., no. 91, p. 39, pl. i, f. 3. *Loc.*—Pt. Alfred. *Type.*—U.S. Nat. Mus. = *LUCIDA*, Marrat.
- TYERMANI**, Marrat (*Marginella*), 1876. Journ. Conch., i, 136. *Loc.*—Corisco Bay and Cape Palmas. *Type.*—Liverpool Free Public Museum.
- tyermanni*, Weinkauff, ex Marrat (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, p. 135. Error for TYERMANI, Marrat.
- umbilicata*, Brown (*Volaria*), ex Montagu (*Bulla*), in Illustr. Conch. Gt. B. and I., 1827, pl. xxxviii, f. 9. = *Tornatina umbilicata* (Mont.).
- undulata*, Deshayes (*Marginella*), 1844. Lamarck's Hist. Nat. Anim. sans Vert., 2nd ed., x, 451. *Loc.*—Guinea. Name taken from Chemnitz's *Voluta glabella undulata*. = *STRIGATA*, Dillw.
- UNILINEATA**, Jousseau (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 175. New name for *fusiformis*, Rve. (pars) (q.v.).
- uniliteata*, Jousseau (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 175. Error for UNILINEATA, JOUSS.
- univittata*, Bavay (var.), 1910. See CHUDEAUI, Bav.
- VALIDA**, Watson (*Marginella* (*Glabella*)), 1886. "Challenger" Rept. Gasterop., p. 267, pl. xvi, f. 3. *Loc.*—Off Raine Is., Cape York, 155 f. *Types.*—Brit. Mus. (five). = young of *lavigata*, Braz., *fide* Hedley, in Mem. Austral. Mus., iv, pt. vi, p. 366.
- varia*, Sowerby (*Marginella*), Nov. 1846. Proc. Zool. Soc. Lond., 1846, p. 97. *Loc.*—W. Indies: vars. from Belieze (*sic*). Figured in Thes. Conch., i, 390, pl. lxxvi, f. 137-41. Of these f. 137-40 = *AVENA*, Kiener, and f. 141 = *ALBOLINEATA*, Orb. The "vars. from Belieze" are f. 138 and 141. Deshayes' record from Réunion probably refers to *DELESSERTIANA*, Récl.
- variabilis*, Schumacher (*Persicula*), 1817. Essai Nouv. Syst., p. 235. New name for *PERSICULA*, L.
- variolosa*, delle Chiaje (*Oliva*), 1841 (?). Descr. e Notom. Anim. Invert. Sic. Cit., tom. ii, 123; tom. vi, pl. v, f. 9, 12, 20. = *MILIARIA*, L.
- vautieri*, Bernardi (*Marginella*), 1853. Journ. de Conch., iv, 68, pl. ii, f. 13, 14. *Loc.*—? = *IMBRICATA*, Hds.
- VELIEI**, Pilsbry (*Marginella*), 1896. Proc. Acad. Nat. Sci. Philad., 1896, p. 21, text-fig. *Loc.*—Boca Ciega Bay, Fla. *Types.*—Acad. Nat. Sci. Philad., three (no. 67564).

- VENTRICOSA, G. Fischer (*Marginella*), 1807. Mus. Demidoff, iii, 172. *Loc.*—Unknown. *Type.*—Coll. Paul Demidoff, at time of description. This name supersedes the familiar *quinqueplicata*, Lam.
- ventricosa*, Hedley (*Marginella*), 1903. Mem. Austral. Mus., iv, pt. vi, p. 369. New name for *ovulæformis*, Tate & May (1900), non *ovuliformis*, Orb. (1842). = BUCCA, Tomlin.
- VERCOI, May (*Marginella*), May, 1911. Papers Proc. Roy. Soc. Tas. for 1910, p. 385, pl. xiii, f. 7. *Loc.*—7 miles E. of Cape Pillar in 100 f. *Type.*—Tas. Mus., Hobart.
- verdensis*, Smith (*Marginella (Volvarina)*), 1875. Ann. Mag. Nat. Hist., ser. iv, xvi, 200. *Loc.*—C. Verdes. *Types.*—Brit. Mus., three. = TÆNIATA, Sow., var.
- vermiculata*, Jousseauime (*Volvarina*), 1875. Rev. Mag. Zool., 1875, p. 229. New name for *livida*, Rve. (1865), non Hinds (1844). = AVENA, Kiener.
- vermiculata*, Redfield (*Marginella*), Jan. 1851. Catal. Coll. *Marginella*. This name has no status, as it was proposed in a privately printed Catalogue. Redfield withdrew it in Amer. Journ. Conch., vi, 254, his specimen being only a worn example of VENTRICOSA, Fischer. This shell is now no. 29063 in Coll. Redfield, Acad. Nat. Sci. Philad.
- VERREAUXI, Jousseauime (*Bullata*), 1875. Rev. Mag. Zool., 1875, p. 251, pl. viii, f. 3. *Loc.*—Ceylon. Doubtfully distinct from ANGUSTATA, Sow.
- vesiculata*, Martini (*Marginella*). Given in H. & A. Adams' sub-genus *Prunum*, Gen. Rec. Moll., i, 192. Error for *vesiculata*, Mart. (q.v.).
- vesiculata*, Martini (*Marginella*). Quoted in the Yoldi Cat., i, 120, 1852, but has no status. = LONGIVARICOSA, Lam.
- vesiculata*, Arango, ex Martini (*Persicula*), 1878 (?). Anales R. Acad. Cien. Med. Fis. y Nat. Habana, March, 1878, p. 187. Error for *vesiculata*, Mart.
- VEXILLUM, Redfield (*Marginella*), 1852. Ann. Lyc. Nat. Hist. New York, v, 224. *Loc.*—Cape Palmas, W. Africa. *Type.*—Coll. Redfield, Acad. Nat. Sci. Philad. (no. 29040).
- VICTORIÆ, Gatliff & Gabriel (*Marginella*), 1908. Proc. Roy. Soc. Victoria, xxi (N.S.), pt. i, p. 365, pl. xxi, f. 5. *Loc.*—Western Port, dredged; in shell sand, Port Phillip. *Type.*—Coll. Gatliff. Wrongly identified at one time as *rufula*, Gask.
- VIGNALI, Dautzenberg & H. Fischer (*Marginella*), 1896. Mém. Soc. Zool. Fr. for 1896, ix, 433, pl. xv, f. 17. *Loc.*—Azores, 1385 m. ("Princess Alice," 1895, st. 46). *Type.*—Mus. de Monaco.
- vimonti*, Jousseauime (*Marginella*), 1875. Rev. Mag. Zool., 1875, p. 186. *Loc.*—? Founded on Sow., Thes. Conch., i, pl. lxxiv, f. 13. = DENTICULATA, Link. Jousseauime, op. cit., p. 272, withdraws this name as being a synonym of *arenaria*, Mörch.
- virginea*, Jousseauime (*Egouena*), 1875. Rev. Mag. Zool., 1875, p. 194. = APICINA, Mke., var.

- virginiana*, Verrill (*Marginella*), 1885. Trans. Conn. Acad. Arts and Sci., vi, 420. *Loc.*—Cape Hatteras, 15 and 43 f., Chesapeake Bay, 70 f. = *AUREOCINCTA*, Stearns.
- VIRGO*, Schepman (*Marginella*), Sept. 1911. Prosobr. Siboga Exp., pt. iv, p. 259, pl. xviii, f. 6a, b. *Loc.*—Banda Sea, 1158 m., st. 211 (one, immature). *Type.*—Zool. Mus., Amsterdam.
- VITREA*, Hinds (*Marginella*), Sept. 1844. Proc. Zool. Soc. Lond., 1844, p. 75. *Loc.*—W. Africa (Belcher). Figured in Zool. Voy. Sulphur, ii, 45, pl. xiii, f. 18, 19. This species seems lost—there is no trace of it in the Brit. Mus. or in any other collection as far as I know.
- vittata*, Hutton (*Marginella*), 1873. Catal. Mar. Moll. New Zealand, p. 19. *Loc.*—Uncertain. *Types.*—Dominion Mus., Wellington, N.Z. In Trans. New Zealand Inst., xvi, 224, Hutton states that this name is a synonym of *DEBURGHI*, A. Ad., and that it is not a New Zealand species.
- vittata*, Reeve (*Marginella*), Aug. 1864. Conch. Icon., xv, pl. v, f. 17 a-d. *Loc.*—? (Mus. Taylor). *Types.*—The original of f. 17a, b (ex Mrs. Lombe Taylor) is in the Brit. Mus. I cannot trace that of 17c, d. = *ORNATA*, Redf.
- voluta*, Fleming (*Marginella*), ex Montagu (*Cypræa*), 1828. Hist. Brit. An., p. 335. = *Erato levis*, Don.
- volutæformis*, Weinkauff, ex Reeve (*Marginella*), 1879. Syst. Conch. Cab. *Marginella*, pp. 72, 158. Error for *volutiformis*, Rve.
- volutiformis*, Reeve (*Marginella*), Jan. 1865. Conch. Icon., xv, pl. xxiv, f. 131. *Loc.*—? (Mus. Taylor). *Type.*—Brit. Mus. "presented Mrs. T. Lombe Taylor." = *TRANSLUCIDA*, Sow. Cf. Hedley in Proc. Linn. Soc. New S. Wales, 1913, xxxviii, pt. ii, p. 302.
- volva*, Boltzen (*Pterygia*), 1798. Mus. Bolt., p. 52, no. 667. Is a *Voluta*.
- vulgaris*, Boltzen (*Pterygia*), 1798. Mus. Bolt., p. 51, no. 654. = *Columbella mercatoria*, L.
- WALKERI*, Smith (*Marginella*), 1899. Proc. Malac. Soc. Lond., iii, 208, f. 1. *Loc.*—Baudin Island and Holothuria Banks, N.W. Australia, 11-34 f. *Types.*—Brit. Mus. (two). There is also a series of ten from same locality.
- wallacei*, Jousseau (Egouena), 1875. Rev. Mag. Zool., 1875, p. 203, pl. viii, f. 7. *Loc.*—? "probablement les Antilles". Altered by the author, *ibid.*, p. 272, to *wallacii*. = *ROSTRATA*, Redf.
- wallacii*, Jousseau. See *wallacei*, Jous.
- WARRENI*, Marrat (*Marginella*), 1876. Journ. Conch., i, 136. *Loc.*—Lat. 50° 23' 5" N., long. 64° 0' 4" W. *Types.*—Liverpool Free Public Mus. (five). Figured, *l.c.*, xiv, 44, pl. i, f. 9, and on p. 98 Bavay demonstrates that for N. one should read S. and suggests that *hahni*, R. et M., is identical. There can be no doubt that he is correct.
- WATSONI*, Dall (*Marginella*), Aug. 25, 1881. Bull. Mus. Comp. Zool. Harv., ix, 71. *Loc.*—Havana, 480 f.; bed of Gulf Stream, 447 f.; Yucatan Str., 640 f. *Type.*—U.S. Nat. Mus. Figured in Agassiz, Three Cruises of the "Blake", ii, 70, f. 290, and elsewhere.

- WHANI, Pritchard & Gatliff (*Marginella*), Aug. 1900. Proc. Roy. Soc. Victoria, xiii, pt. i, p. 137, pl. xxi, f. 5, 6. *Loc.*—Pt. Fairy; Pt. Phillip. *Type.*—Coll. Gatliff.
- xanthostoma*, Mörch (*Marginella*), 1852. Catal. Conch. Yoldi, i, 120. *Loc.*—Curaçoa. Evidently a typographical error for *xanthostoma*. I agree with Jousseume in referring this to *SAPOTILLA*, Hds., and in doubting the correctness of the locality.
- yucataniana*, Paetel, ex Dall (*Marginella*), 1887. Cat. Conch. Samml., p. 197. Error for *YUCATECANA*, Dall.
- YUCATECANA*, Dall (*Marginella*), Aug. 25, 1881. Bull. Mus. Comp. Zool. Harv., ix, 72. *Loc.*—Yucatan Str., 640 f.; Sand Key, S. Florida, 125 f. *Type.*—U.S. Nat. Mus. Figured, op. cit., xviii, 138, pl. xix, f. 5.
- ZEYHERI*, Krauss (*Marginella*), 1852. Arch. f. Naturgesch., 1852, Bd. i, p. 38. *Loc.*—Cape. *Type.*—Naturalienkabinet, Stuttgart.
- zonalis*, Dunker (var.), 1869. See *lachryma*, Rve.
- zonata*, Kiener (*Marginella*), 1841. Coq. Viv. *Marginella*, p. 41, pl. xiii, f. 4. *Loc.*—? (Coll. du Mus.).
- var. *bilineata*, Krauss, 1848. Südafrik. Moll., p. 126, pl. vi, f. 22. *Loc.*—Cape. *Type.*—Probably in the Naturalienkabinet, Stuttgart. This varietal name must replace *zonata*, Kien., as the name of the species, owing to the prior *zonata*, Sw. I cannot distinguish *dunkeri*, Krss., from this specifically, nor can I understand why Bartsch lists *zonata* and *bilineata* as separate species.
- zonata*, Swainson (*Gibberula*), 1840. Treat. Malac., p. 323. "En. Méth., 374, f. 6." = *ORYZA*, Lam.

LIST OF NEW NAMES PROPOSED IN THE FOREGOING.

- AMELIENSIS, p. 254, under *bivittata*, Bavay.
- BAHIENSIS, p. 252.
- SARCODES, p. 257, under *carneola*, Petit.
- TENUILABRA, p. 287, under *pallida*, Linné.

ADDENDA.

- p. 244. Add to Sections "EXTRA, Jousseume".
- p. 268. *gibberula*, "Sowerby," Arango (*Marginella*), 1880. Contrib. Fauna Malac. Cubana, p. 188, cited in synonymy of *MACULOSA*, Kien., with other names as "doc. Dkr." No such species by Sowerby exists.
- p. 274. *lachrymula*, Tryon, ex Gould (*Marginella*), 1873. Amer. Marine Conch., p. 54. Error for *LACHRIMULA*, Gould.

ORDINARY MEETING.

FRIDAY, 11TH MAY, 1917.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. Scott Kincaid was elected a member of the Society.

The following communications were read:—

1. "Note on Donovan's *Naturalist's Repository*." By Alexander Reynell.2. "On *Cochlicopa* *og*, n.sp., from Aldenham." By E. W. Bowell, M.A., M.R.C.S.

3. "Diagnoses of four undescribed Helicoids from Borneo and Guam (Ladrones)." By G. K. Gude, F.Z.S.

The Rev. Dr. A. H. Cooke exhibited a number of *Macoma balthica*, L., taken from the crop of a Scoter duck, shot in Rye Harbour on February 3rd, 1917, by Mr. H. Whistler. Of these forty-eight were partly digested.Mr. A. Reynell exhibited Henry Denny's copy of Sowerby's *Conchological Illustrations* with letterpress removed and MS. names inserted.

ORDINARY MEETING.

FRIDAY, 8TH JUNE, 1917.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. Edward Francis Wesley and Dr. William Thomas Elliott, F.L.S., F.Z.S., were elected members of the Society.

The following communications were read:—

1. "*Otina otis* (Turton), on the County Down Coast." By A. W. Stelfox.

2. "Descriptions of new Mollusca." By G. B. Sowerby, F.L.S.

3. "New species of Marine Mollusca from Christmas Island, Indian Ocean." By Tom Iredale.

4. "On *Volvaria lubrica*, Petterd." By J. R. Le B. Tomlin, M.A., F.E.S.5. "A Dipterous Fly feeding on *Helicella itala*." By the Rev. E. W. Bowell, M.A., M.R.C.S.Mr. A. S. Kennard exhibited specimens of *Arianta arbustorum* from the Pleistocene of Barnwell.Mr. G. B. Sowerby, F.L.S., exhibited a living specimen of *Thersites jervisensis* from Adelaide, South Australia, received by him five years ago. The animal was moving about briskly.Dr. W. T. Elliott exhibited (1) ova of *Limnæa stagnalis* in three stages of development, deposited by the same mollusk on May 15th, 18th, and 24th respectively, placed in formaline on June 3rd, indicating that this animal does not deposit all the ova at the same time; (2) a small *Limnæa pereger* destroyed by a leech (probably a species of *Glossiphonia*). The animal was observed by him to be attacked near the columellar muscle, and it shortly after evacuated its shell, with the leech attached to it.Mr. R. Bullen Newton read a letter on behalf of Mr. G. C. Crick, received by the latter from Colonel Wilmer, with reference to a specimen of *Crioceras bowerbankii* and its locality.

NOTES.

LARVA OF A DIPTEROUS FLY FEEDING ON *HELICELLA ITALA*. (Read 8th June, 1917.)—Some time since I found a number of dead and moribund *H. itala* on the common by Chipstead Station in Surrey which were apparently being destroyed by some dipterous larvæ. Some of the imagines were bred out, and have kindly been identified by Mr. K. G. Blair of the British Museum as *Sarcophaga nigriventris*, Meade. The causes of death among the mollusca are so little understood that this identification seems worth recording.

E. W. BOWELL.

NOTE ON *CRIOCERAS BOWERBANKII* (J. DE C. SOWERBY). (Read 8th June, 1917.)—A fine example of *Crioceras bowerbankii* was recently unearthed by me from the Lower Greensand deposits (= Aptian) of Walpen Chine, off the southern coast of the Isle of Wight. It reminded me of the type-specimen of this species recently refigured by Mr. Crick in the Proceedings of the Society, which I think must have been obtained from the same locality. The dimensions of my specimen are 17 in. × 15 in., or a little in excess of those of the type.

L. W. WILMER.

ON *VOLVARIA LUBRICA*, PETTERD. (Read 8th June, 1917.)—This species was described by Petterd in the Journ. of Conch., iv, p. 143, 1884, as follows:—

“Shell minute, ovately cylindrical, brownish, smooth, shining, translucent: whorls 3, rounded: aperture narrow, slightly increasing in width towards anterior margin, where there is a single fold forming its reflexed margin: outer lip simple: spire scarcely elevated. Long. 2 mm., lat. $1\frac{1}{2}$ mm.

“Habitat, Brown’s River, dredged in about 6 fathoms.”

It is quoted in Tate & May’s “Revised Census of the Marine Mollusca of Tasmania”, Proc. Linn. Soc. New South Wales, xxvi, 1901, p. 363, as above, without further information, and in a letter dated December 5, 1916, Dr. May says:—“*M. lubrica*, Pett., type lost, and no other specimen known. It may yet be found, but it is to me a rather doubtful species.” The missing type has now been found, among Messrs. Sowerby & Fulton’s stock of Marginellidæ, in a box purchased at the C. E. Beddome sale, and labelled underneath in that collector’s writing. “*Volvaria lubrica*, Pett., Tasmania.” I believe that Beddome when living at Hobart used to purchase specimens from Petterd. The specimen tallies well with the description, is a live shell and has the animal still inside—hence the “brownish” colour, but on cleaning the aperture carefully I found it to be triplicate, the uppermost fold being very faint. Hedley records a similar inaccuracy in the figure of the type-specimen of *M. angasi*, Crs. (Proc. Linn. Soc. New South Wales, xxxix, 1914, p. 726). Petterd’s shell is closely related to *M. angasi*, but the material at my disposal does not lead me to unite them. Mr. Fulton has asked me to place this unique type in the British Museum.

J. R. LE B. TOMLIN.

NOTES ON DONOVAN'S *NATURALIST'S REPOSITORY*.

By A. REYNELL.

Read 11th May, 1917.

THE work under consideration is usually represented as consisting of five volumes, each volume dated 1834 on title-page. As far as the first two volumes are concerned, these were first issued in parts, vol. i in 1822-3 and vol. ii in 1823-4, and the book so far considered complete that Simpkin Marshall printed title-pages, undated, on which it was stated that the work was in two volumes.

Donovan's advertisement, dated from Lambeth, March 1st, 1823, remarks, "The Twelfth Number of this work is now respectfully submitted to the attention of the public. This number, accompanied by the Title Page and Index, renders the first volume complete. The Subscribers, therefore, are now enabled to form a correct idea of the nature and object of the undertaking: and from the style in which it has been so far conducted, to form some conclusion of that in which it is likely for the future to be continued." This advertisement also appears in vol. i of the 1834 edition.

Each plate is dated, both the day of the month and the year being given. Part i, arguing from the advertisement in vol. i, and the date on plate ii,¹ was issued on April 1st, 1822, and the dating on the plates as far as vols. i and ii are concerned is the actual date of issue.

The plates of vols. iii to v are all dated between April 1st, 1824, and December 1st, 1826, the first-mentioned date appearing on the first plate of vol. iii, and the latter on the last plate of vol. v, but we have no evidence at present that vols. iii-v were issued before 1834 beyond the statement that the plates were published on the dates specified "as the Act directs by C. Donovan and Messrs. Simpkin & Marshall".

The title-page to vol. i (earlier edition) reads:—

"The | Naturalist's Repository | or | Monthly Miscellany | Of | Exotic Natural History : | Consisting Of | Elegantly Coloured Plates with appropriate Scientific | and General Descriptions | Of The Most Curious, Scarce, and Beautiful | Productions of Nature | That Have Been Recently Discovered | In Various Parts of The World; | And More Especially Such | Novelties | as from their extreme Rarity remain entirely undescribed, or which have not been | duly noticed by any preceding Naturalists. [*sic*²] | The Whole Composed According to | The Latest Improvements In The Various Departments of | The Science | And Forming Collectively A Truly Valuable | Compendium Of The Most Important Discoveries | Of | Quadrupeds, Birds, Fishes, Insects, Shells | Marine Productions | And Every Other Interesting Object of Natural History, The Produce of Foreign Climates | By E. Donovan, F.L.S. W.S. Etc. | Vol. I. | London: | Printed For The Author, And W. Simpkin and R. Marshall | Stationers' Hall Court, Ludgate Street. | 1823."

¹ Plate i is dated April, 1822, only.

² This misprint occurs in both volumes.

The title-page to the 1834 issue reads:—

“The | Naturalist’s Repository | Or | Miscellany | of | Exotic
Natural History, | Exhibiting | Rare and Beautiful Specimens | of |
Foreign Birds, Insects, Shells, | Quadrupeds, Fishes, and Marine
Productions; | More Especially Such | New Subjects | As Have Not
Been Figured, or Correctly Described; | Forming A | Compendium
Of The Most Interesting Modern Discoveries | In Zoology | By |
E. Donovan, F.L.S. W.S. Etc. | Author of the Natural Histories of
British Birds, Insects, Fishes, Shells, and Quadrupeds; | Insects of
China, India, and New Holland. | In Five Volumes, | With One
Hundred and Eighty Coloured Plates. | Vol. I. | London: | Printed
For the Author, and Simpkin & Marshall. | MDCCLXXXIV.”

The following is the list of species of shells illustrated in the two first volumes.

Vol. I, 1823.

Plate i, April, 1822.

- Fig. i. *Conus ammiralis*, L., v. *amboinensis*, a ex Leverian Coll.
 ” ii. ” ” ” ” ^β ” ”
 ” iii. ” ” ” *cedo nulli*, a Favanne, ex coll., Holland.
 ” iv. ” ” ” ” β ” ”

Plate iv, May 1, 1822.

Voluta scapha, Gmel., v. *nobilis*, ex Leverian Coll.

Plate viii, June 1, 1822.

Buccinum harpa, L., v. *testudo*, Solander MSS., ex Leverian Coll.

Plate xi, July 1, 1822.

Trochus imperialis (*T. imperator*, Gmel.), var. *a roseus*, in B.M., (?) ex
Leverian Mus. via the Duke of Bourbon.

Plate xv, August 1, 1822.

Murex foliatus, Gmel.

Plate xvi, September 1, 1822.

Murex scorpio, L., v. *minor*, ex Leverian Museum.

Plate xxi, October 1, 1822. Plate xxii, November 1, 1822.

Voluta pyrum, L., dextral.

” ” sinistral, ex Leverian Museum.

Plate xxvi, wrongly numbered xxv, December 1, 1822.

Turbo scalaris, L., ex Leverian Museum.

Plate xxviii, January 1, 1823.

Malleus maculatus, n.sp., ex Leverian Museum.

Plate xxxii, February 1, 1823.

Cypræa aurora, Lamareck.

Plate xxxiv, March 1, 1823.

Terebratula sanguinea, Solander MSS., Leach, Zool. Misc., f. 76.

Plate xxxvi, April 1, 1823.

Nerita polita, L., var., ex Leverian Museum.

Vol. II, 1824.

Plate xxxviii, April 1, 1823.

Voluta episcopalis, L.

Plate xli, May 1, 1823.

Trochus conchyliophorus, Gmel.

Plate xliii, June 1, 1823.

Conus aulicus, L.

Plate xlvi, July 1, 1823.

Voluta scapha, Gmel., ex Leverian Museum.

Plate xlix, August 1, 1823.

Helix perversa, Gmel.

Plate li, August 1, 1823. Plate lii, September 1, 1823.

Strombus latissimus, Linn.

Plate lvi, October 1, 1823.

Terebratula cruenta (Solander MSS.).

„ *rubicunda* (Solander MSS.).

Plate lxi, December 1, 1823.

Voluta dufresnii, n.sp.

Plate lxvii, February 1, 1824.

Voluta ferussacii, n.sp.

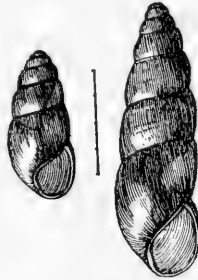
ON AN ABNORMAL SPECIMEN OF *COCHLICOPA LUBRICA*.

By E. W. BOWELL, M.A., M.R.C.S., etc.

Read 11th May, 1917.

WHILE searching in an old hedgebank at Radlett, in the parish of Aldenham, Hertfordshire, on April 22nd, 1917, I came across the remarkable snail which is here described. It was crawling about in a tuft of moss, was quite lively, and showed no difficulty in managing the large shell. Other species present in the immediate vicinity were *Limax agrestis*, *Arion ater*, *A. circumscriptus*, *A. hortensis*, *Pyramidula rotundata*, *Theba cautiana*, *Polita nitidula*, *P. cellaria*, *P. alliaria*, *P. rogersi*, *P. pura*, *Clausilia rugosa*, and *Cochlicopa lubrica*.

This shell differs from a normal *Cochlicopa lubrica* in being 11·1 mm. long and 3·4 mm. in diameter; it has about seven whorls or rather more. The peristome is not thickened or coloured, indicating either growth was not complete, or that for some reason the specimen was constitutionally unable to produce the usual termination for its shell building. At the fourth whorl from the apex the shell shows what looks like a mended crack; if the animal had proceeded to form a peristome soon after reaching this point of development it might have produced a shell of nearly normal size and shape, and the scar may indicate some hesitation in the matter. Comparison of superimposed photographs shows without very much doubt that the apical whorls of the present specimen are as near identical in size and form with those of a normal *lubrica* as can be.



Scale line = 4 mm.

The radula is longer and wider than in *lubrica*, though this enlargement is not in proportion to the magnitude of the shell. The central uncus is longer and there are more admedians, more externals, and more rows. The total number of unci is therefore increased, roughly in proportion to the increased length of the shell.

| | Length of Radula. | | | | Formula. | Total Teeth. |
|--|-------------------|------------|-----------|-----------------------|----------|-----------------|
| | Shell. mm. | Length mm. | Width mm. | Area mm. ² | | |
| Large specimen ... | 11·1 | 1·61 | 0·55 | 0·89 | 16·11 c. | 10·18 × 98 5488 |
| Normal <i>lubrica</i> from } same locality ... | (a) 6·0 | 1·19 | 0·48 | 0·57 | 13·7 c. | 8·13 × 75 3150 |
| | (b) 6·0 | 1·18 | 0·45 | 0·53 | 11·8 c. | 8·12 × 74 2960 |

The body of the snail when extracted from the shell was not found to be disproportionately small, as I have previously found in extra large specimens of *Limnaea*. The anatomy was examined by serial sections; no gross abnormality was found, and the genitalia have the morphology normal to *lubrica*.¹ The genitalia are, however, small (smaller than in normal *lubrica*) and undeveloped, and the hermaphrodite gland is represented by a mass of reticular connective tissue without any trace of eggs, or spermatozoa, or of cells which might be presumed to be their precursors.

Assuming that the present specimen is in fact *C. lubrica*, it is evident it is monstrously large, the bulk being four or five times that of the normal shell. In the absence of definite signs of the termination of growth, it is difficult to be quite precise about the normal size and variability of *lubrica*, but there is a general consensus among the authorities who happen to be available that the normal length is about 6 mm.

To get some measure of the local size variation, the 67 largest specimens which seemed to be adult out of about 150 collected from the rejectamenta of the River Colne were examined; the mean was 5.7×2.4 ,² maximum 6.5×2.6 and 6.4×2.8 , minimum 5.0×2.3 , coefficient of variation 6.3. Taking the mean length as 6 mm., if the coefficient of variation were as much as 10, the greatest normal range would be about 4 to 8 mm., if it were 5 (a more likely figure) about 4.5 to 7.5 mm. In any case it is evident that the present specimen is definitely beyond the range of normal variation.

What appear to be similar monstrous forms have been noticed before. J. W. Taylor describes³ under the name *Azeca elongata* two specimens of *A. tridens* (?) 9×2.5 mm. (as against a normal measurement of about 6.25×2.5) with $9\frac{1}{2}$ instead of 7 whorls, one from North Wales and one from Yorkshire; J. W. Jackson has a holocene *lubrica* (?) 10 mm. long from the talus of a cave at Clapham in Yorkshire.⁴ It is perhaps significant that in each case only a single specimen was found and that all these concern allied forms. I know of no obviously parallel case among other land mollusca, though Mr. Tomlin suggests that the shell he described⁵ as *Vertigo heldi* was a similarly monstrous *V. pygmaea*.

For the present I prefer to regard my specimen as a form of *Cochlicopa lubrica* until more is known as to its nature. It may well be that these sporadic giants represent an attempt or a tendency

¹ See Sternberg's figure in his *Fauna of Denmark: Land Mollusca*. Ihering's figure reproduced by Taylor (*Monograph*, vol. i, 1900, p. 356) is incorrect. Moquin-Tandon's figure (*Histoire*, ii, 1855, pl. xxii, fig. 17) is right, except that he omits the diverticulum on the duct of the spermatheca.

² Mean sizes determined from specimens as collected are generally somewhat less than those in the textbooks, which are presumably taken from picked specimens.

³ *Naturalist*, 1897, p. 75.

⁴ *Journal of Conchology*, vol. xiv, 1914, p. 238.

⁵ *Journal of Conchology*, vol. x, 1903, p. 307.

on the part of *tridens* and *lubrica* to divide into two species with the same sort of relationship as *Ena montana* and *E. obscura*,¹ and the varietal name *og*,² which I would propose for this form, must not be taken as implying that it is residual rather than nascent. On the other hand the absence of definite gigantism in the earlier stages of growth, the apparent break between the normal and abnormal parts and the absence of ova and spermatozoa suggest that it may belong to one of the types of abnormal somatic growth which are known to be associated with irregular developments and sexual cells.

The specimen has been deposited in the collection of the Conchological Society in the Manchester Museum.

¹ The similarities and differences in the radulæ of these two species are just the same as in *og* and *lubrica*.

² "For only Og, King of Bashan, remained of the remnant of giants," Deuteronomy iii, 11.

DIAGNOSES OF FOUR UNDESCRIBED HELICOIDS FROM BORNEO
AND GUAM (LADRONES).

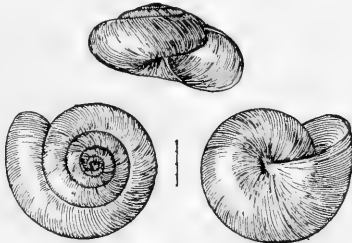
By G. K. GUDE, F.Z.S.

Read 11th May, 1917.

THE shells forming the subject of the present paper, which appear to pertain to undescribed species, were obtained from two sources. Those from Borneo were received from a London dealer as far back as 1904, whilst those from the Ladrones—ex Coll. Quadras—were placed in my hands for identification by our President, Mr. Tomlin, who received them from an American dealer.

EVERETTIA ROBUSTA, n.sp.

Shell perforate, subcovered, depressed, subconoid, pale brown corneous, shining, regularly and faintly ribbed transversely; apex obtuse, suture rather deep; whorls 5, increasing rather rapidly, the last three times as wide as the penultimate; convex above and below, rounded at the periphery; aperture subovate; margins acute, distant, upper and outer evenly rounded, lower slightly curved, columellar obliquely ascending, reflected and overhanging the narrow umbilicus.



Everettia robusta, n.sp.
Scale line = 4 mm.

Diam. maj. 13, min. 11·75, alt. 7 mm.

Hab.—Borneo. Type in my collection.

Allied to *E. aglaja*, Pfr.,¹ but larger and slightly more depressed.

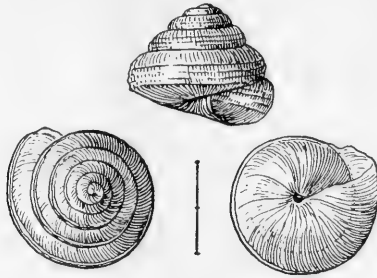
SITALA QUADRICARINATA, n.sp.

Shell umbilicated, depressed-turbinata, thin, pellucid, whitish, slightly shining, microscopically closely striated, decussated below with distant microscopic spirals; apex obtuse, suture rather deep; whorls 6, convex, increasing slowly and regularly, with four revolving filiform keels—two above and two below the periphery—the lowest keel is just above the suture on the penultimate and antepenultimate whorls; aperture rotundate-lunate; margins distant, acute, columellar slightly reflected.

¹ Pfeiffer, Proc. Zool. Soc., 1854, p. 289; Reeve, Conch. Icon., 1854, pl. 199, fig. 1396; Kobelt, Conch. Cab. Helic., v, 1905, p. 1015, pl. 262, figs. 11, 12.

Diam. 3·25, alt. 3 mm.

Hab.—Borneo. Type in my collection.



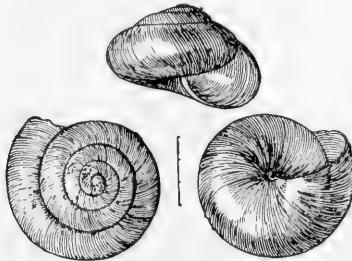
Sitala quadricarinata, n.sp.

Scale line = 2 mm.

This species is allied to *S. tricarinata*, Blf., from India,¹ but it is considerably larger and with four instead of three threadlike keels.

PSEUDHELICARION FASTIGATA, n.sp.

Shell imperforate, subconoid, fuscous, shining, faintly and somewhat irregularly striated, the striæ decussated by excessively minute close spirals; apex obtuse, suture shallow, slightly margined on the last whorl; whorls $4\frac{1}{2}$, increasing slowly, the earlier ones almost flattened, the later ones subconvex, slightly angulated at the periphery, convex below; aperture subovate; margins distant, acute, the upper, outer, and lower regularly curved, columellar thickened and reflected.



Pseudhelicarion fastigata, n.sp.

Scale line = 3 mm.

Diam. maj. 6·5, mid. 6, alt. 4·5 mm.

Hab.—Guam, Ladrões. Type in Mr. Tomlin's collection.

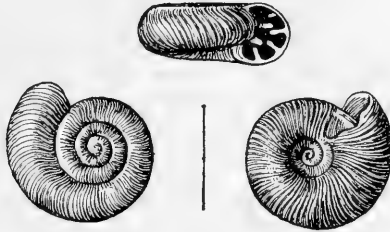
Allied to *P. misella*, Fér.,² but smaller, darker, and less closely coiled, with fewer whorls.

¹ W. T. Blanford, Journ. Asiat. Soc. Bengal, xxx, 1861, p. 355, pl. i, fig. 10; Godwin-Austen, L. & Fr. W. Moll. India, i, 1882, p. 39, pl. x, fig. 10.

² Fér. Tabl. Syst. Limaçons, 1821, p. 50, No. 306. Quoy & Gaimard, in Freycinet, Voyage autour du Monde par L'Uranie et la Physicienne, Zoologie, 1820, p. 473; Pfeiffer, Conch. Cab. Helix, i, 1852, p. 237, pl. xxix, figs. 14-16.

ENDODONTA (THAUMATODON) TOMLINI, n.sp.

Shell widely umbilicated, lenticular, dark brown, strongly and closely ribbed; apex slightly sunken, suture rather shallow; whorls 4, increasing slowly at first, the last two rather suddenly, widened towards the mouth, slightly flattened above, rounded at the periphery and below; aperture oblique rotundate-lunate, with two raised revolving lamellæ on the columellar wall and four teeth on the outer wall, the upper one smaller than the other three; margins acute, the upper curving forward, columellar not reflected.



Endodonta (Thaumatodon) tomlini, n.sp.
Scale line = 2 mm.

Diam. maj. 3·25, min. 3, alt. 1·25 mm.

Hab.—Guam, Ladrones. Type in Mr. Tomlin's collection.

I have much pleasure in associating with this new species the name of our President. It is allied to *E. heptptychia*, Q. & M.,¹ but that species is maculated and has five teeth on the outer wall.

¹ Quadras & Möllendorff, Nachr. Blatt Deutsch. Malak. Gesells., 1894, p. 15.

OTINA OTIS (TURTON) ON THE COUNTY DOWN COAST.

By A. W. STELFOX.

Read 8th June, 1917.

LAST year, at the request of Mr. H. Wallis Kew, I was working the coast in the vicinity of Ballymacormick Point, for the False Scorpion, *Obisium maritimum*. During this successful search I became acquainted with a most interesting association of marine and semi-marine animals, the existence of which I was previously unaware.

This includes, besides the *Obisium*, two beetles of the genera *Aëpus* and *Micralymma*; the Collembolan *Anurida maritima*; various species of mites; *Lasæa rubra* and other marine mollusks; as well as marine annelids, and finally an abundance of *Ovatella bidentata*, which on one occasion was accompanied by *Otina otis*.

The situation of Ballymacormick Point, which lies about a mile east of Bangor, and just outside and south of Belfast Lough, renders this habitat free from any trace of brackish water. Moreover, heavy seas break over the low rocks during rough weather. I was a little surprised, therefore, to find *Ovatella bidentata* in such abundance and in such a purely marine habitat, having associated it in my mind with more estuarine conditions. The exact habitat for this association of animals is at about 6 to 8 feet below mean high water mark, or just at the base of the zone of the alga *Fucus vesiculosus*, and in the uppermost part of the zone of the cirriped *Balanus balanoides*. All live between the layers of the Ordovician slates, which in this locality are tilted almost vertically; jagged edges, with deep crevices between, being everywhere to be seen on the upper surface of the rock. Into these crannies during and after storms are washed broken mollusca, crabs, and many other animals, which have been dashed to pieces on the rocks by the force of the waves. At high tide the air-breathing members of the association are forced to remain in the worm burrows and cavities, which everywhere traverse the fine muddy matrix which has filtered into the cracks between the slaty layers. In these subterranean passages a considerable quantity of air is perforce imprisoned during high tide, thus preventing the sea-water penetrating the burrows and drowning the air-breathers. At low water they are free to come out into the open air and feed on the animal and vegetable material washed into the crevices by the last tide.

It was upon my third visit to the locality that I made the acquaintance of *Otina otis*, a species I had often looked for previously, but in vain. These occurred in a small colony, about a dozen specimens, in one of the crevices; and looked at first like little lumps of brown jelly. A penny coin would have covered the whole group, most of which were very small.

Very few definite records exist for this little-known mollusk, which is probably common and widely distributed along the more rocky parts of our coast, and so far as I am aware it has not been

reported previously from the east coast of Ireland, though long known to live on the island of Arran in Scotland, which lies within sight of Ballymacormick Point on the northern horizon.

The possible absence of this species from the eastern coast of Ireland, might be accounted for by the fact that from Down southward to Wexford there are few localities where a rocky coast occurs, Lambay, Ireland's Eye, Howth, and Bray Head being the chief possible habitats. Along the remaining parts of the east coast, for the most part, blown sand alternates with low cliffs of glacial drift.

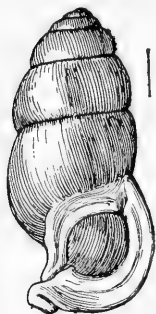
NEW SPECIES OF *PUPINELLA*, *THEODOXUS*, AND *TELLINA*.

By G. B. SOWERBY, F.L.S.

Read 8th June, 1917.

PUPINELLA TORTIROSTRIS, n.sp.

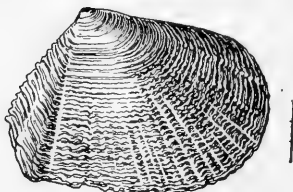
TESTA cylindraceo-conica, pallide fuscescens, solidiuscula, glabra, ad apicem obtuse conica; anfractus 7, convexi, longitudinaliter obscurissime parum oblique striati; anfractus ultimus spiram superans, subplanate convexus; apertura circularis, postice breviter sed profunde canaliculata; canalis anticus complicatus, peculiariter tortuosus; peristoma latiusculum, complanatum, leva, albo-nitens; columella arcuata, callosa. Operculum tenue, multispirale.



Pupinella tortirostris, n.sp.
Scale line = 4 mm.



Theodoxus eudeli, n.sp.
Scale line = 4 mm.



Tellina elaborata, n.sp.
Scale line = 3 mm.

Long. 20, maj. diam. 11 mm.

Hab.—Sudest Island, Lousiade Archipelago.

This species, of which I have only seen three specimens, is remarkable for its very peculiarly twisted anterior rostrum and canal.

THEODOXUS [olim NERITINA] EUDELI, n.sp.

Testa globoso-conica, solidiuscula, pallide lutescens, lineis numerosis nigro-fuscis longitudinaliter ornata; spira obtuse conica; anfractus 2, primus vix conspicuus; anfractus ultimus globosus, postice contractus; apertura semicircularis; peristoma acutum, postice anguste oblique canaliculatum; area columellari albo callosa, margina bituberculata, aliter minuta serrata vel denticulata.

Diam. 8 mm.

Hab.—Phu-Yen (Eudel).

This species, of which I have seen a good number of specimens, although presenting no very remarkable characters, seems quite

distinct from any hitherto described. Perhaps its nearest ally is *T. faba* (Sowerby). The shells were found, labelled as above, in the collection of Captain Eudel, which was sold by auction in Paris in the year 1893.

TELLINA ELABORATA, n.sp.

Testa æquivalvis, subovalis, compressa, alba, concentricè densissima et eximie fimbriata, radiatim inepte sulcata; arca postica bilirata liris latiusculis, dense et acuti lamellatis; umbones acuti, conjuncti, post medium locati margo dorsalis anticus recto declivis, posticus subtruncatus; margo ventralis arcuatus.

Antero-post. 13, umbono-marg. 10 mm.

Hab.—North-West Australia.

A very beautifully sculptured little species, of which I have only seen this single specimen.

MORE MOLLUSCAN NAME-CHANGES, GENERIC AND SPECIFIC.

By TOM IREDALE.

Read 13th April, 1917.

SUMMARY.

- Volema*, Bolten, type *V. paradisiaca*, Bolten, has priority over *Melongena*, Schumacher, but may be used independently.
- Mayena*, gen. nov., proposed for *Biplex australasia*, Perry.
- Turricula*, Schumacher, is the correct name for *Surcula*, H. & A. Adams.
- Gelagna*, Schaufuss, is equal to and antedates *Paralagena*, Dall.
- Partulida*, Schaufuss, should replace *Spiralinella*, Chaster.
- Campanile*, Fischer, has for type the recent species *Cerithium leve*, Quoy & Gaimard, which is here renamed *Campanile symbolicum*, sp. nov.
- Campanilopa*, gen. nov., introduced for the fossil *Cerithium giganteum*, Lam.
- Pleurotomoides*, Bronn, has priority over *Lora*, Gistel, and *Clathurella*, Carpenter, all proposed as alternatives for *Defrancia*, Millet, preoccupied.
- Gabrielona*, gen. nov., proposed for *Phasianella nepeanensis*, Gatliff & Gabriel.
- Orbitestella*, gen. nov., for *Cyclostrema bastowi*, Gatliff.
- Megathura*, Pilsbry, should be used instead of *Macrochasma*, Dall.
- Mitromorpha*, auctt., is not *Mitromorpha*, Carpenter, which was based on *Daphnella* (?) *filosa*, Carpenter.
- Antimitra*, gen. nov., is proposed for *Pleurotoma agrota*, Reeve, with which A. Adams' *Mitromorpha lirata* is congeneric.
- Lovellona*, gen. nov., type *Conus atramentosus*, Reeve.
- Apaturris*, gen. nov., type *Mitramorpha expeditionis*, Oliver.
- Callanaitis*, gen. nov., type *Venus yatei*, Gray, for *Salacia*, Jukes-Browne, preoccupied.
- Anopsia*, Gistel, is available for *Psyche*, Rang, preoccupied, and has priority over *Verrillopsyche*, Cossmann, proposed for *Halopsyche*, Kieferstein, preoccupied, introduced as substitute for Rang's name.
- Hydromyles*, Gistel, should be used for *Euribia*, Rang, preoccupied, as it is older than Kieferstein's name *Theceurybia*, for the same genus.

Once again I offer solutions of some nomenclatural problems for the purpose of criticism, the majority of those which do not invite consideration being withheld. I acknowledge once more such criticism from Dr. Dall and M. Cossmann, but I must complain of each of these writers demurring against my non-acceptance of vernacular names. Each indicates that my rejection of French vernacular names, i.e. "Les Phacoides" and "Les Subémarginules", is an instance of hypercriticism, and that I am wasting time on matters not worth questioning. I have often gone over the International Rules, and have been unable to find any item whereby French vernacular generic names are legalized, and so must continue to reject such whenever they have been wrongly used, notwithstanding the adverse criticism of my two famous friends.

I would recall that Dall himself wrote (Trans. Wagner Free Inst. Science, Philad., vol. iii, pt. ii, Dec. 1892, p. 306), "Deshayes cites 'Tenagode' simply, and such a trivial name in the vernacular has no just claim to recognition." I therefore quote that Blainville wrote "Les C. Chenilles, Les B. Nassoides, Les R. Buccinoides, Les

P. buccinoïdes", etc. The "C." might mean "Cerite" or "Cerithium", the "B." "Buccin", or "Buccinum", but the "R." stood for "Rocher" not "Murex", hence all these names are absolutely French vernaculars. I have only instanced the above, but I have gone over all Blainville's essay, and my contention is unassailable. Cossmann's further claim that *all* French vernaculars should be accepted as equivalent to Latin generic names is contrary to facts and usage, as such have been *almost* consistently ignored, the few instances that have now cropped up being due to the carelessness of recent authors.

VOLEMA, Bolten.

When Dall discussed the Boltenian names (Journ. Conch., vol. xi, 1906, p. 289 et seq.) he indicated this name as needing special study, thus:—

"*Volema* (1. *pyrum*, Gmel.). *Turbinella* pars, Lam., 1799, etc."

Then later

"*Xancus* (t. *Voluta pyrum*, Gmel.). *Turbinella*, Lam., 1799. See above, *Volema*."

Since the name *Xancus* was absolutely equivalent to *Turbinella* it has been used to displace it, and it does not seem wise to disturb that usage. However, since *Volema* has priority it needs settlement. In the same place Dall indicated that *Galeodes*, Bolten, was equivalent to and should displace *Melongena*, but Bolten's choice had been anticipated, so that *Melongena* has been resumed.

Volema, however, has priority over *Melongena*, and the species are often considered as congeneric, so that I think it best to definitely fix *Volema* with a type species. Upon investigation I found that Gray in 1847 did not know Bolten's name, but Mörch in 1852 included it as a sub-genus of *Cassidulus*, Humphrey, citing as equivalent *Pugilina*, Schumacher, and naming under it the species *pugilinus*, Born, and *paradisiacus*, Mart. = *nodosa*, Lam. The latter species has been commonly associated with Bolten's name, and since Bolten included Martini's species under a binomial name *Volema paradisiaca* I here designate that species as type. This will leave *Melongena* to the other species, which I do not consider congeneric. I might state that it is possible that distinct sub-species of *V. paradisiaca*, Bolten, will later be recognized, as the nodose forms seem constant according to locality, and so are the smooth ones. At any rate I have thirty-two specimens collected by Mr. Robin Kemp, near Mombasa, British East Africa, which in every growth stage show perfect constancy, not one of them developing nodulous sculpture after the first three whorls. These are absolutely nodulose, showing that the smooth shell has developed from a nodule-bearing ancestor.

This note serves only to draw attention to the genus name, for I observe that *Volema pyrum*, Bolten, has been indicated by Dall as being equivalent to *Pyruca nodosa*, Lamarck, and it has precedence in Bolten's arrangement. Consequently if it be proved that these are conspecific, the names would be *Volema pyrum*, Bolten = *Pyruca*

nodosa, Lamarck, and var. *paradisiaca*, Bolten = *citrina*, Lamarck (*vide* Dall) = *paradisiaca*, Reeve. I will deal with this later.

MAYENA, gen. nov.

I propose this name for *Biplex australasia*, Perry. In these Proceedings (vol. xi, 1915, p. 284) the late Mr. E. A. Smith, after relating the peregrinations of this species from one genus to another, citing *Biplex*, *Ranella*, *Triton*, *Bursa*, *Gyrineum*, *Apollon*, *Lotorium*, *Argobuccinum*, and *Septa*, and rejecting all these, placed it in *Charonia*. Privately he admitted this was only a tentative location, but conservatively declined to propose for it a new generic name, though not adverse to such a suggestion. Simultaneously Bartsch, dealing with South African shells, classed the South African representative in still another genus, viz. *Eugyrina*. The species have a peculiar facies, and, as can be guessed from the above resumé, do not correlate well with any named group. Since Smith's account we have benefited by the publication in these Proceedings (vol. xii, 1916, pp. 5 et seqq.) of a valuable paper entitled "On the Operculum of *Bursa*", by the Rev. Dr. Cooke. After discussing this point, Dr. Cooke added, "The evidence of the radula . . ." and from this it is easily seen that the radula of the present group is as discordant as the shell characters. "Unlike both *Bursa* and 'Triton' proper" are Cooke's words, and figures are given to prove this statement. Had this evidence been available to Smith his doubt would have been dissipated and he would have certainly proposed a generic term for the species. I state this because I often discussed the matter with him, and now remedy the matter by introducing the above name, in honour of Mr. W. L. May, the Tasmanian conchologist, to whom all students are indebted for many valuable items. Only two species are known, *australasia*, Perry, and *gemmaifera*, Euthyme.

TURRICULA, Schumacher, *vice* SURCULA, H. & A. Adams.

In the consideration of molluscan generic names some extraordinary cases bewilder the student. The present is one of these. *Turricula* was proposed by Schumacher in the *Essai Nouv. Syst. Test.*, 1817, pp. 66, 217, for the species *Turricula flammea* alone, based on Chemn., iv, p. 172, tab. 143, figs. 1336-8. In the *Gen. Rec. Moll.*, vol. i, 1853, p. 88, H. & A. Adams introduced *Surcula* for "*Turricula*, Schum. non Klein". Adams' name has continued in usage ever since, though it was early recognized that Klein's names had no effect upon present-day nomenclatorial use. I noted that there was a *Turricula*, Hermann, which was not nomenclatorially valid, and therefore the first user after Hermann's time had a perfect claim. This proves to be Schumacher, and at the present time I know of no reason why his name should not be resumed *vice* *Surcula*.

GELAGNA, Schaufuss, *vice* PARALAGENA, Dall.

In 1869 a Catalogue of the Paetel Collection was published, and a systematic synopsis given, the whole prepared by Schaufuss. A few of the names were altered by Schaufuss, and most have been

noted and some are in use. I note a couple of omissions which necessitate changes. Thus on p. 3 Schaufuss proposed *Gelagna* for *Lagna*, Klein, as a sub-genus of *Tritonium*, Lm. On pp. 28 and 29 the species referred to this group are *chemnitzii*, Gray, *cingulatum*, Lm., and *clandestinum*, Ch. The last-named has been regarded as the Kleinian species, so I designate it as type of *Gelagna*. Unfortunately this discovery will necessitate the rejection of *Paralagna*, Dall, proposed (Smithson Miscell. Coll., vol. xlvii, 1904) for the same group. Although *clandestinum*, Dillwyn, 1817, ex Chemnitz, has been used for the species name, I note that Hedley preferred *succinctum*, Linn., and followed Dall in placing the species in *Argobuccinum*. I might point out that *clandestinum* had been used by Lamarck in 1816, and that there is apparently also a Boltenian name available. I will treat these items later.

PARTULIDA, Schaufuss, *vice* SPIRALINELLA, Chaster.

On p. 6 of the Paetel Catalogue, Schaufuss proposed the above name for "*Parthenia*, Adams, not Lowe", the latter being also utilized. In the Gen. Rec. Moll., vol. i, 1853, p. 233, H. & A. Adams used *Parthenia* (as of Lowe), giving as members *decussata*, Mont., *excavata*, Phil., *interstincta*, Mont., and *spiralis*, Mont. These writers always gave their species in alphabetical order, so that the first species might not even be typical. We know, however, that they made use, to a great extent, of J. E. Gray's systematic work, and in the Proc. Zool. Soc. Lond., 1847, p. 159, Gray gave as type of "*Parthenia*, Lowe, *Turbo spiralis*, Mont." This was not one of Lowe's species, as Schaufuss recognized, so that I here designate as type of *Partulida*, Schaufuss, the species *Turbo spiralis*, Mont. This course will necessitate the acceptance of Schaufuss's name in place of *Spiralinella*, introduced by Chaster for this species, and accepted with generic rank in the British List.

CAMPANILE, Fischer, and CAMPANILOPA, gen. nov.

The former name was introduced by Fischer in the "Manuel de Conch.", p. 680, June 30, 1884, as of Bayle, with a diagnosis, "S.g. *Campanile*, Bayle, 1884. Coquille très grande, etc. . . . Opercule typique (*C. læve*, Quoy et Gaimard, Australia). . . . Les espèces fossiles de ce groupe sont nombreuses dans l'Éocène (*C. giganteum*, Lamarck) . . ."

The description of the operculum and the direct nomination of *C. læve*, Q. & G., indicates that species as the type. If the fossils differ they must bear another name. Cossmann later named *giganteum* as type, and this was accepted by Bullen Newton, but the latter agrees with me that the living shell has the best claim on the name. As a matter of fact *C. giganteum*, Lamarck, cannot be regarded as congeneric, because it is much more like *Terebralia* in every essential shell-character. As the living shells cover different animals it seems inaccurate to associate the fossils with them, except in direct lineage, and certainly *C. giganteum* cannot be classed in the

recent genus *Terebralia* without causing serious confusion. I therefore propose the new generic name CAMPANILOPA for the species *Cerithium giganteum*, Lamarek (Ann. Mus. Hist. Nat. Paris, vol. iii, March, 1804, p. 439). It does not seem necessary to discuss the relationships of this species since Cossmann has dealt so ably with these in his memorable "Essais".

With regard to the specific name of the sole species of *Campanile*, I again find confusion. In 1834 Quoy & Gaimard introduced a *Cerithium leve* (Voy. Astrol. Zool., vol. iii, pt. i, p. 106, pl. liv, figs. 1-3, West Australia), and at the same time Griffith & Pidgeon figured the shell under the name *Cerithium truncatum*. This was due to a careless slip which was corrected in the Index to *C. leve*, Gray. Thus it would seem a question which name has priority, but there is on record an earlier use of the same name. Mathews and myself in the *Victorian Naturalist*, vol. xxix, 1912, p. 11, noted the introduction of *Cerithium levis* by Perry in the *Arcana*, pt. xv, 1810. I have been unable to discover any synonym of the West Australian shell, and therefore propose for it the name *Campanile symbolicum*. Since Gray apparently proposed his name simultaneously with that of Quoy & Gaimard I select as the shell requiring the new name that specimen in the British Museum which was figured in Griffith & Pidgeon, *Animal Kingdom* (Cuvier), vol. xii, Moll., pl. xiii, fig. 1, with the name on plate *Cerithium truncatum*. In the Index, p. 596, 1834, is written pl. xiii, fig. 1, *Cerithium leve*, Gray, with a note "Erratum in the plate, Del. *truncatum*, lege *leve*", while lower down is "pl. xiv, fig. 4, *Cerithium truncatum*, Lam." While Verco used *Campanile* generally for this shell Hedley has more recently adopted *Ceratoptilus*, Bouvier (Bull. Soc. Philom. Paris, ser. VII, vol. xi, p. 36, 1887), but the latter is later in date and must fall as an absolute synonym of *Campanile*.

PLEUROTOMOIDES, BRONN, *vice* LORA, GISTEL.

In 1912 I noted in these Proceedings (vol. x, p. 225) that *Lora*, Gistel, was proposed in 1848 for *Defrancia*, Millet, preoccupied, and should therefore supersede *Clathurella*, Carpenter, introduced for the same reason. As Gistel named in connexion with his proposal a species not referable to Millet's group a complication might have ensued. It is obviated in one direction by the discovery that prior to Gistel even, a name had been proposed for *Defrancia* of Millet, for Bronn in the *Ital. Tertiär. Gebilde*, 1831, divided the genus *Pleurotoma* into two sub-genera, *Pleurotoma*, s.str., and *Pleurotomoides* for "*Defrancia*, Millet, non Brn." This was confirmed by Bronn in the *Lethæa Geognostica*, vol. ii, 1838, pp. 1062, 1064, where he used *Pleurotomoides* (*Defrancia*). While this item disposes of *Defrancia*, Millet, and its substitutes, it interests palæontologists more than recent molluscan students, since I see no relationship between the fossils grouped by Millet and the recent small species classed under *Clathurella*. Melvill has proposed *Clathurina* (*antea*, p. 185) for a certain recent group, so that we have one name, but Boettger had previously introduced *Paraclathurella*, etc. Hedley is

now engaged upon the Australian forms, and later I hope to develop some points that have cropped up in this connexion. I might here note that Jousseau described in *Le Naturaliste*, 26th year, p. 106, May 1, 1898, a new species *Otitoma otitoma* [sic], adding, "J'ai créée le genre pour . . . Deshayes, dans son catalogue des mollusques de Bourbon, a décrit trois espèces, *Pl. reeveana*, *Pl. clandestina*, *Pl. cyclophora*, auxquels on doit joindre le *Pl. vitrea*, Reeve." The "cyclophora" group needed a name, but *clandestina* might have been called years ago by Melvill "a typical *Clathurella*".

GABRIELONA, gen. nov.

I introduce this name for *Phasianella nepeanensis*. Gatliff & Gabriel (Proc. Roy. Soc. Victoria, n.s., vol. xxi, August, 1908, p. 366, pl. xxi, figs. 9-10), Flinders, Western Port, Victoria. The describers were dubious as to the generic location, and I some time ago sorted out a shell undoubtedly congeneric, from Lord Howe Island. I was fortunate enough to recover live specimens showing the opercular characters. Peculiarly enough the operculum is shelly, though of quite a different nature to that of *Phasianella*, while the animal has been large and leaves a dead fringe round the mouth. I will return to this point at a later opportunity, but here propose the above name since the further account may be much delayed. I have just received, through the generosity of Dr. W. G. Torr, a parcel of shell-sand from Port Lincoln, South Australia, from which I have separated a specimen, apparently *nepeanensis*, G. & G. While the genus may be classed for the present in the family Phasianellidæ, I do not think it has really any close relationship with *Phasianella*. The Lord Howe shells are sub-littoral in habit, so that the Australian shell may be sought for in shallow-water dredgings. The occurrence of the dead shell in shell-sand from South Australia indicates a sub-littoral habit there. The recovery of live specimens and examination of the radula will assist in classifying it, and a Naticoid affinity suggests itself to me judging from the shell characters and the operculum and dead animal of the Lord Howe species.

The genus is named in honour of Mr. C. J. Gabriel, whose energy in connexion with the Victorian Mollusca is well known and appreciated, and whose assistance to myself in many ways I wish to commemorate.

ORBITESTELLA, gen. nov.

I propose this name and designate as type *Cyclostrema bastowi*, Gatliff (Proc. Roy. Soc. Vict., n.s., vol. xix, 1906, p. 3, pl. ii, figs. 8-10, Victoria). I also indicate it as representative of a new family Orbitestellidæ, which is composed of a series of minute marine molluscs with the following characters: Shell thin, pellucid, discoidal, dextral, of few whorls and of peculiar sculpture: widely umbilicate, columella vertical, aperture never variced, irregular in shape, edges thin.

I had hoped to describe the group, giving figures, but at present this is impossible. I have species from various parts of New

Zealand, the Kermadecs, Lord Howe Island, Norfolk Island, New Caledonia, Sydney Harbour, New South Wales, north coast of Tasmania, and Port Lincoln, South Australia, in fact every austral locality from which I have received a parcel of fine shell-sand or fine dredgings. Commonly live shells have been secured when live sand was received. All the species are very minute, and I have about a dozen distinct species, divisible into two groups, and I hope later to thoroughly elaborate the family with good figures.

MEGATHURA, Pilsbry, *vice* MACROCHASMA, Dall.

In the Proc. U.S. Nat. Mus., vol. xlviii, January 19, 1915, Dr. Dall proposed *Macrochasma* as a new generic name (p. 439) for *Fissurella crenulata*, Sowerby, a Pacific coast American shell. Recently dealing with other Fissurellids, I noted that Pilsbry in the Man. Conch., vol. xii, 1891, p. 182, quoted in the synonymy of *Lucapina crenulata*, Sowerby, the name *Megathura californica* of Nuttall MS. Under the present International Laws governing nomenclature as exposed by the International Commission in Opinion 4, the generic name *Megathura* will supersede the later *Macrochasma*, unless invalidated by some previous use of it. It should be noted that no author can possibly protect himself against such occurrences as this, as these MS. names have never been recorded, nor previously legally recognized save in rare cases such as the Leach names.

MITROMORPHA, auctt., *non* Carpenter.

This genus name has been generally accredited to A. Adams, and has been used recently for a number of diverse species, both recent and fossil, of which possibly not one is congeneric with Adams' species. A peculiar confusion has been noted in connection with this name, and I had intended to define the generic terms I would utilize in connection with recent Australian shells, but since I drew up my notes my friend Mr. Charles Hedley has written me that he is dealing completely with this group as regards Australian species, so I withhold my say until my friend's report has appeared. Nevertheless I have certain information which he may not have secured, and which it seems expedient to make known. In the British Assoc. Report for 1863 (published August, 1864), Carpenter included (p. 658) "? *Daphnella* † *filosa*, n.s., small, diamond-shaped, but rounded periphery; spirally threaded. † Generic position . . . doubtful: perhaps they belong to genera not yet eliminated; *filosa* resembling the Eocene forms between *Conus* and *Pleurotoma*." In the Ann. Mag. Nat. Hist. (ser. III, vol. xv, February, 1865, p. 182), Carpenter fully described *Mitromorpha filosa*, recording that it was the ? *Daphnella filosa* of the above entry, and observing, "Mr. A. Adams obtained two similar species from Japan, and as the shells do not rank satisfactorily under any established group, he proposes the above genus for their reception. M. Crosse suggests that *Columbella dormitor*, Sby., may be congeneric."

In the same place two months later (p. 322) A. Adams introduced the genus *Mitromorpha* with only one species, *M. lirata*, nov., but he referred to Carpenter's usage of the name. This species, which has been commonly cited as the type of *Mitromorpha*, is obviously not generic with Carpenter's shell, but I cannot explain how the mistake arose. The Adamsian shell has not yet been figured, but I hope to remedy this later when dealing more completely with the species names. The two species recorded by Carpenter were only classed as varieties by Adams, but they are apparently valid species. Two congeneric species have been figured, namely, *Pleurotoma ægrota*, Reeve (Conch. Icon., sect. *Pleurotoma*, Dec. 1845, pl. xxxi, sp. and fig. 276, Singapore, 7 fathoms) and *Daphnella crenulata*, Pease (Amer. Journ. Conch., vol. iii, Jan. 2, 1868, p. 221, pl. xv, fig. 20, Paumotus), and I therefore propose ANTIMITRA, gen. nov., and name *Pleurotoma ægrota*, Reeve, as type. Adams' *Mitromorpha lirata* is conchologically referable to this genus.

When Pace dealt with Columbelloid shells he considered Carpenter's *D. filosa* as congeneric with *Columbella dormitor*, Sowerby, even as Crosse had suggested, but gave no name to the group. Carpenter's *Mitromorpha* is now available. Pace also added here *Conus atramentosus*, Reeve, and *Conus parvus*, Pease. The former was described (Conch. Icon., sect. *Conus*, Suppt., June, 1849, pl. vii, sp. and fig. 265) from Mindoro, Philippine Islands. I do not consider this congeneric with *Mitromorpha*, and therefore propose LOVELLONA, gen. nov., with this species as type. Several distinct species have been hitherto confused under this name. *Conus parvus* was proposed by Pease (Amer. Journ. Conch., vol. iv, Nov. 3, 1868, p. 126) as a new name for *Conus fusiformis*, Pease (Proc. Zool. Soc. Lond., 1860, p. 398), from the Sandwich Islands. Hedley has recently described *Conus micarius* (Rec. Austr. Mus., vol. viii, 1912, p. 147, pl. xliii, fig. 32) from Cape York, which he compared with Pease's *parvus*. These may both be classed in *Lovellona*.

Oliver named a Kermadec shell *Mitramorpha* [sic] *expeditionis* (Trans. New Zealand Inst., vol. xlvii, 1915, p. 539, fig. 36), which does not appear to be at all closely related to any named Turroid group, so that I propose the new genus APATURRIS for it. I have evidence of other species in the Indo-Pacific area to be discussed later. I anticipate that Hedley will not deal with the extra Australian fossil species allotted to *Mitromorpha*, nor will I, but I would here note for the benefit of palæontological workers that a heterogeneous assemblage appears also to have been created in connection with the name, and as *Mitromorpha* has now been shown to be untenable in connection with the recent shells commonly so named it would be well to rearrange the fossils without much consideration of the name here given to the group which Adams' species is referred to.

CALLANAITIS, gen. nov. for SALACIA, Jukes-Browne, preocc.

When I wrote my *Commentary on Suter's Manual of the New Zealand Mollusca* (Trans. New Zeal. Inst., vol. xlvii, 1915, pp. 417-97), I sketched a tentative classification of the Veneridæ of New Zealand,

based on Jukes-Browne's results. In that place, p. 494, I included with generic rank *Salacia*, Jukes-Browne, for the two species *dissecta*, Perry, 1811, and *yatei*, Gray, 1835. Unfortunately I overlooked the fact that Jukes-Browne's name was invalid, having been used several times previously. My mistake led Hedley to accept *Salacia* in his *List of West Australian Mollusca*, so that rectification is necessary. Jukes-Browne, simultaneously with his proposal of *Salacia*, added *Bassina* for *Venus paucilamellata*, Sow. = *alata*, Reeve. I do not know the exact relationship of this and the preceding, so propose, with *yatei*, Gray, as type, the new name *Callanaitis*.

ANOPSIA, Gistel, *vice* PSYCHE, Rang.

The name *Psyche* was proposed by Rang, Ann. Sci. Nat. Paris, vol. v, 1825, p. 284, but he had been anticipated by Schrank. In Bronn's *Klassen Ordnungen Thierreichs*, vol. ii, 1862, p. 645, Kieferstein proposed *Halopsyche*, for *Psyche*, Rang, *non* Linn., etc. Verrill accepted Bronn's correction, but Cossmann (Rev. Crit. Paléozool, 4th year, Jan. 1, 1900, p. 43) introduced *Verrillopsyche*, since he found *Halopsyche* was also invalid. In this innovation Cossmann was unfortunate, for even prior to Kieferstein, Gistel in 1848 (Naturg. Thierr. Schulen) had corrected Rang's error, proposing on p. x *Anopsia* for Rang's *Psyche*, to make doubly certain, for on p. 174 he had used *Philopseudes* as a suitable emendation. It is noteworthy that Gistel's second thoughts came first, and that the correct name appears to be *Anopsia*.

HYDROMYLES, Gistel, *vice* EURIBIA, Rang,

is an exact parallel to the preceding. Rang (Ann. Sci. Nat. Paris, vol. xii, Nov. 1827, p. 328) proposed *Euribia*, years later than Mergen (Nouv. Class. Mouches, 1800, p. 36). Kieferstein (loc. cit.) corrected to *Theceurybia*, which has been lately used. Gistel (loc. cit., p. ix) had previously introduced *Hydromyles*, and in this case was seemingly content with one choice. His name therefore replaces Rang's.

ON SOME NEW SPECIES OF MARINE MOLLUSCA FROM
CHRISTMAS ISLAND, INDIAN OCEAN.

By TOM IREDALE.

Read 8th June, 1917.

PLATE XIII.

SOME years ago Mr. R. Kirkpatrick, of the British Museum, made an expedition to Christmas Island, Indian Ocean, for the purpose of securing living examples of a peculiar marine sponge. In this quest he was successful after tedious and difficult dredging, and he brought back a few samples of the sand dredged which have just recently been handed to me for examination for small molluscan forms. The results have been so extraordinary that I hope later, under more favourable circumstances, to furnish a full account of them. I suggest that 200-300 species are represented in the small quantity of sand available, and many are of great systematic interest. I herewith describe a few of remarkable aspect and unknown relationship. These were all sorted from a parcel labelled "Rich Foraminiferal sand, with shells and corallines, 100 fathoms off North-East Point, Christmas Island . . ." The matter is all very dead, but a very few live shells occur which are obviously living in that depth. I do not consider that the majority of the dead shells had, however, lived there, but had been washed down from less depths. In consequence of this result Mr. Kirkpatrick handed over to me a second parcel of the same depth but another place, when most of the previously recognized shells were again observed, with many additional forms. Dr. C. W. Andrews, who made large collections at Christmas Island, and upon whose researches the Monograph of Christmas Island was based, has interested himself, and through his intervention, which is here gratefully acknowledged, I hope to receive new and better material whereby this most interesting fauna can be studied. The peculiar novelties hereafter described may not be in any sense local, but may be widely distributed throughout the Indo-Pacific Region, as I have already noted species not hitherto recorded from the Indian Ocean.

SHERBORNTIA MIRABILIS, gen. et sp. nov. (Pl. XIII, Figs. 1-4.)

Shell small, commencing life regularly as a dextral fusiform shell with a short open canal, and upon approaching maturity developing tubular apertures whilst the canal recurves. Thereafter, from the oral aperture, two tubular apertures being persistent at the side opposite and the canal being closed and left also as an aperture, a shelly plate develops in concentric circles forming a platform. This new genus is a further development along the evolutionary lines of the *Triphoridae*, and has so many peculiar features that I have no hesitation in proposing for it alone a new family *Sherborniidae*, which may temporarily be placed next the *Triphoridae*, but I do *not* suggest that this is its true taxonomic position. I am

deeply gratified at being allowed to dedicate this peculiar genus to my friend Mr. C. Davies Sherborn, of "Index Animalium" fame, and I apply to the type (and at present only) species the trivial name of *mirabilis*, an adjective I deem well applicable to my friend also. The nucleus is dextral and glassy, consisting of one and a half whorls, succeeded by strong rounded spiral liræ which develop nodules in some instances: the interstices are plain and there appears to be no longitudinal sculpture. The figures given show the peculiarities of the shell better than a long description. The peculiar specific features cannot be determined until congeners are recognized. The specimens are dead shells and pure white, which seems to be the normal coloration. The complete immature shell measures about 2 mm. in length, while the adult measures about 3 mm. long; in breadth the platform increases the shell from about 1 mm. to 2.5 mm. The tubular apertures present features of importance, though the accessory small tube puzzles the student as to its function. From criticism of many of the Trituba group of Triphoroids I am convinced they are parasitic upon living organisms and use the tubes for circulatory purposes. The present genus appears to have developed a plate in order to secure itself to its host, but what the latter may be I cannot at present suggest: perhaps it is some quickly moving object.

PICKWORTHIA KIRKPATRICKI, gen. et sp. nov. (Pl. XIII, Fig. 6.)

Shell small, turreted, elongate triangular, base flattened, non-umbilicate, mouth small, circular, surrounded by a very heavy varix. This new genus I also consider representative of a new family Pickworthiidae, which may be placed alongside the Liotiidae, but as in the case of the genus just described I would emphasize my inability to pronounce exactly on its correct association. It might be compared to a turreted *Liotina*, but really this would be only a fanciful resemblance.

Type: *Pickworthia kirkpatricki*, sp. nov.

The apical whorls are minute, smooth, and three in number; the adult whorls are sculptured with nodules, not arranged longitudinally; the base is very flattened, and no longitudinal sculpture is present. There is no umbilicus, but an umbilical depression is observed bounded by a thick revolving spiral. The sculptured whorls are seven in number.

The nodules appear in two rows to the whorl, an intervening depression separating the rows; the suture between the whorls is deep and marked; the number of nodules to the whorl varies from twelve in the earlier to fifteen in the later ones.

There is no coloration present, the shell being white, vitreous, and solid. The periphery of the last whorl develops a flange-like process, and the nodulous sculpture becomes obsolete as the aperture is reached, while on this last whorl a minor nodulous thread appears between the two major rows. The base is flat, a revolving thread below the peripheral flange being succeeded by a revolving spiral rib which runs round the one bounding the umbilical region. The

mouth is small, circular, duplex, surrounded by the heavy varicose extension which is angulate by the spiral sculpture of the last whorl. The whole mouth system, including the varix, is so oblique that the shell can rest upright upon the base.

Length about 4 mm., breadth 2 mm.

The only genus which I have studied with any care is *Mecoliotia*, Hedley, but that is much smaller and umbilicate. I have not used it, as in this collection I have several minute things which are not congeneric with this species, yet seem nearer to Hedley's genus. This species is named after Mr. R. Kirkpatrick, who collected the sand; while the generic name is given in memory of Dr. Samuel Pickworth Woodward, the distinguished conchologist, who may be spoken of as the father of our science, since his Manual is the basis of the only two later ones in existence, Fischer's and Tryon's.

PICKWORTHIA ANDREWSI, sp. nov. (Pl. XIII, Fig. 8.)

This species seems absolutely congeneric with the preceding, from which it differs in its proportions and detail of sculpture. In the type the apex is missing, but from immature broken shells classed as conspecific it would be three-whorled, turbinate, and dextral. The sculpture consists of nodules, increasing in size but not much in numbers on the five adult whorls. Three rows of nodules are present on each whorl, separated by a well-marked suture. The upper two rows are smaller than the lower, the nodules rather smaller and more or less connected so as to form indistinct retractive longitudinals. On the last whorl this formation is distinct, so that the upper two are almost continuous, while the lowest forms a basal buttress, but not a flange-like process as in the preceding. The nodules of this buttress are elongately continued so as to appear as longitudinals from a basal view. The base is very like that of the preceding, but lacks the post-peripheral thread, while the succeeding spirals are stronger and the umbilical depression is deeper. The varix is not so developed, though similar.

Length, without apex, 2.5 mm.; breadth 1.5 mm.

The species is named after Dr. C. W. Andrews, the pioneer collector of mollusca from this locality.

REYNELLONA NATALIS, gen. et sp. nov. (Pl. XIII, Fig. 7.)

Shell small, elongate, rather conical, base rather flattened, aperture contracted to a small circular opening with duplex, but not varicose, peristome. Again I would introduce a new family, Reynellonidæ, which could be placed near the Pickworthiidæ, but this is mere conjecture. It bears a fanciful resemblance to the figure of *Exelissa formosa*, Lycett, given in Fischer's "Manuel", p. 683, fig. 451, from the "Terrains jurassiques", which was placed in the family Cerithiidæ.

Type: *Reynellona natalis*, sp. nov.

Apical whorls two, dextral, smooth, succeeded by seven whorls sculptured with retractive slanting ribs, which do not increase much in number, but the smooth spaces between become enlarged with the

growth of the shell; thus eleven may be counted on the third whorl, while there are only fourteen on the last; these ribs are prominent, rounded, and not continuous from whorl to whorl. The earlier whorls slowly increase, but at the antepenultimate the increase becomes more rapid, at the last, however, rapidly contracting in the descent to the unvaricosed aperture. The base is sculptured with five deep incisions separating five rounded spiral liræ. There is no umbilicus. The mouth is circular, strongly oblique to the axis, duplex, but not varicose.

Length about 3 mm., breadth 1.5 mm.

I have named this genus after my friend Mr. Alex. Reynell, whose help with regard to literature is again acknowledged.

ANXIETAS PERPLEXA, gen. et sp. nov. (Pl. XIII, Fig. 5.)

Shell minute, conical, base flattened, mouth somewhat quadrangular, edges thin, columella simple, imperforate.

Type: *Anxietas perplexa*, sp. nov.

This peculiar little species gives no clue to its affinities in any way, and I place it in the Trochidæ with considerable reserve, but it has no striking feature whereby it can otherwise be determined. Shell conical, top flattened, sides rounded, almost unsculptured. Colour pale brownish yellow, a darker line at the sutures. Five whorls may be counted, of which the apical two form a planate nucleus, the succeeding three rather rapidly descending but tightly wound with no umbilicus. Below the periphery of the last whorl on the base appear a couple of incised lines close together, but no other sculpture seems present, save a similar incised line above the periphery, which is seen parallel to the suture on the three post-nuclear whorls. Columella simple, erect, a little curved. Aperture oblique, edges thin. Height 1.5 mm., breadth 1 mm.

The names given to this shell express my opinion regarding it. One live shell was recovered, proving that it lived at this depth, with several dead ones. It resembles no juvenile Trochoid I have examined, and that comprises a fair number.

I may observe that these descriptions may be regarded as more or less provisional, subject to extension upon receipt of better material and more species. In any case I hope to furnish with any further detailed account additional figures elaborating the peculiar points of the species.

EXPLANATION OF PLATE XIII.

FIG.

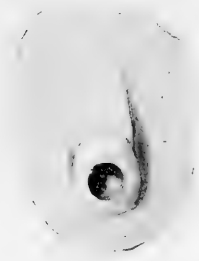
1. *Sherbornia mirabilis*, gen. and sp. n., adult from above. × 11. p. 331.
2. " " immature. × 15.
3. " " adult, from below.
4. " " adult, side view.
5. *Anxietas perplexa*, gen. and sp. n. × 18. p. 334.
6. *Pickworthia kirkpatricki*, gen. and sp. n. × 9. p. 332.
7. *Reynellona natalis*, gen. and sp. n. × 12. p. 333.
8. *Pickworthia andrewsi*, sp.n. × 14. p. 333.



1.



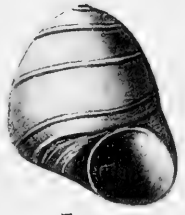
2.



3.



4.



5.



6.



7.



8.

Huth, coll.

NEW MARINE MOLLUSCA FROM CHRISTMAS I., INDIAN OCEAN.



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A † is prefixed to the names of fossil species.

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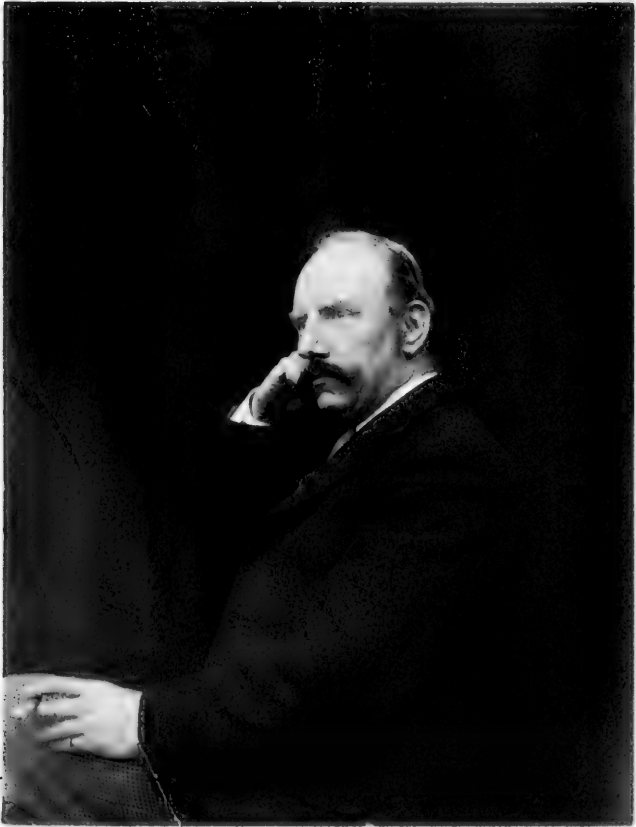
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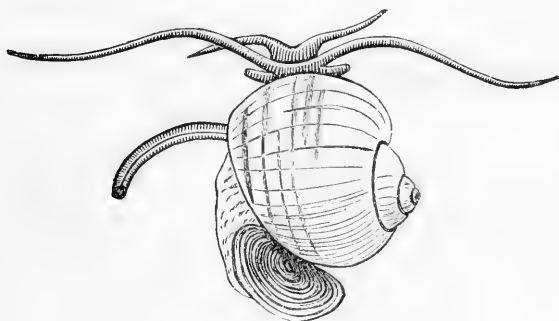
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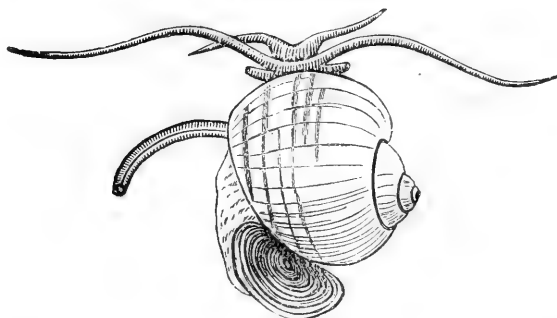
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LONDON :

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HON. SEC.: J. W. JACKSON, F.G.S., etc., Manchester Museum,
Manchester.

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The Journal of Conchology, the organ of the Society, is issued quarterly to all Members.

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For information concerning the

MALACOLOGICAL SOCIETY OF LONDON

See page iv of this wrapper.

PROCEEDINGS
OF THE
MALACOLOGICAL SOCIETY OF LONDON.

ORDINARY MEETING.

FRIDAY, 9TH NOVEMBER, 1917.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Dr. C. T. Trechmann, F.G.S., was elected a member of the Society.

The following communications were read:—

1. "On the dates and manner of publication of the parts of Forbes & Hanley's *British Mollusca*." By Alexander Reynell.
2. "On the Radula of *Acanthina*." By the Rev. Dr. A. H. Cooke, M.A., F.Z.S.
3. "On the occurrence in England of *Hygromia limbata* (Drap.)." By A. S. Kennard, F.G.S., and B. B. Woodward, F.L.S.

ORDINARY MEETING.

FRIDAY, 14TH DECEMBER, 1917.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. A. M. Gunnell, F.R.A.I., F.R.Met.Soc., was elected a member of the Society.

The following communications were read:—

1. "Descriptions of a new species of *Tenagodus* from South Africa." By J. R. Le B. Tomlin, M.A., F.E.S.
2. "On the North American genus *Oreohelix*." By J. Henderson.
3. "Note on a white specimen of *Ena montana*." By H. Overton.
4. "On a new species of *Siliquaria* from South Africa." By J. R. Le B. Tomlin, M.A., F.E.S.

Mr. Tom Iredale exhibited a specimen of *Caporbis africana*, Bartsch, with the protoconch well preserved.

Mr. G. K. Gude, F.Z.S., exhibited a series of several species of *Oreohelix* in illustration of Mr. Henderson's paper.

ORDINARY MEETING.

FRIDAY, 11TH JANUARY, 1918.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. H. C. Fulton and Mr. W. J. Wintle were appointed Auditors.

The following communications were read:—

1. "S. Wood and S. P. Hanley and the *Index Testaceologicus*." By Alexander Reynell.
2. "More Molluscan Nomenclatural Problems and Solutions." By Tom Iredale.
3. "Descriptions of two new forms of Land Mollusca." By G. K. Gude, F.Z.S.
4. "Note on the malacophagous propensities of *Helix nemoralis*." By Dr. W. T. Elliott, F.L.S., F.Z.S.

MALACOLOGICAL SOCIETY OF LONDON.

INCOME AND EXPENDITURE FOR THE YEAR ENDED DECEMBER 31, 1917.

| | £ | s. | d. | CR. | £ | s. | d. |
|--|------|----|----|--|------|----|----|
| To Balance at Bank and Cash in hand | | | | By Cost of "Proceedings"— | | | |
| January 1, 1917 ¹ | 72 | 11 | 9 | Printing and Postage | £92 | 0 | 9 |
| Annual Subscriptions— | | | | Illustrations and Blocks | 11 | 16 | 7 |
| Ordinary Members | 38 | 7 | 0 | | 103 | 17 | 4 |
| Corresponding Members | 19 | 0 | 10 | Printing Circulars | 2 | 5 | 6 |
| Entrance Fees | 3 | 3 | 0 | Linnean Society— | | | |
| Life Member | 7 | 7 | 0 | Gratuities to Attendant | 2 | 0 | 0 |
| Sale of "Proceedings" and Reprints | 10 | 3 | 8 | To Secretary's Expenses | 5 | 3 | 2 |
| Donations | 4 | 2 | 6 | Editor's Postages | 10 | 6 | 6 |
| Advertisement | 5 | 0 | 0 | Treasurer's Postages | 10 | 6 | 6 |
| Dividend on £50 Metropolitan 2½% Stock | 1 | 5 | 0 | Cheque Book | 2 | 6 | 6 |
| | £156 | 5 | 9 | Balance at Bank December 31, 1917 ² | 41 | 16 | 3 |
| | | | | | £156 | 5 | 9 |

¹ Detailed for statement for 1916 as—

| | £ | s. | d. |
|--|----|----|----|
| Liabilities | 27 | 5 | 11 |
| Balance at Bank and Cash in hand | 45 | 5 | 10 |

² Against this were outstanding liabilities on Dec. 31, 1917—

| | £ | s. | d. |
|---|----|----|----|
| Printing "Proceedings", Vol. XII, Part VI | 36 | 17 | 8 |
| Linnean Society for Rooms | 3 | 3 | 0 |

Examined with Vouchers and found correct, January 25, 1918.

R. BULLEN NEWTON, Hon. Treasurer.
January 25, 1918.

HUGH C. FULTON } Auditors.
W. JAMES WINTLE }

ANNUAL GENERAL MEETING.

FRIDAY, 8TH FEBRUARY, 1918.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. H. C. Fulton and Mr. C. Oldham were appointed scrutineers.
The following report was read:—

“In presenting their twenty-fifth Annual Report your Council have much pleasure in again recording a year of continued progress. The papers printed during the past year have maintained their general standard of excellence.

“It is with deep regret your Council have to record the loss by death of two members: Mr. G. C. Crick, F.G.S., F.Z.S., and Dr. T. H. May; while four members have resigned.

“During the year six new members have been elected, so that the membership of the Society on December 31st, 1917, stood as follows:—

| | |
|---------------------------------|------------|
| Ordinary members | 66 |
| Corresponding members | 84 |
| Total | <u>150</u> |

“It is to be regretted that the financial position of the Society is unsatisfactory and calls for immediate attention. Although the year ends with a balance of £41 16s. 3d., liabilities to the amount of £40 0s. 8d. have to be immediately met, so that only a sum of £1 15s. 7d. is available with which to commence the year. Our heavy printing accounts, now encumbered with an extra war charge of 30 per cent, and the other expensive items, are unable to be fully discharged within the year on the present low membership fee. Suggestions will, therefore, be placed before members as early as possible to consider the desirability of increasing all annual subscriptions and entrance fees, and thus endeavouring to place the Society upon a sounder financial basis.

“We still hold £50 Metropolitan 2½ per cent stock.

“The usual three parts of the ‘Proceedings’, Parts 4–6 of Vol. XII, with title-pages and index completing the volume, were issued in May, August, and November respectively. They comprise 217 pages of text, illustrated with 7 plates and 14 sets of text-figures.

“The following authors have very kindly assisted in the cost of these illustrations, or have furnished drawings, photographs, or blocks for reproduction: H. H. Bloomer, H. Overton, E. W. Bowell, Dr. A. E. Boycott, Rev. Dr. A. H. Cooke, the late G. C. Crick, H. C. Fulton, C. Hedley, T. Iredale, Dr. J. Cosmo Melvill, and G. B. Sowerby.

“A portrait of our late Treasurer, J. H. Ponsonby-Fane, was subscribed for and presented by: T. Iredale, A. S. Kennard, Dr. J. Cosmo Melvill, R. Bullen Newton, A. Reynell, A. E. Salisbury, E. R. Sykes, J. R. Le B. Tomlin, and B. B. Woodward.

“Further, the thanks of the Society are again especially due to the Council of the Linnean Society, through whose kindness it has

been permitted, since the year 1894, to hold its meetings in Burlington House."

On the motion of Mr. A. S. Kennard, seconded by Mr. Tom Iredale, the foregoing was adopted as the Annual Report of the Society.

The following were elected Officers and Council for the year 1918:—

President.—J. R. Le B. Tomlin, M.A., F.E.S.

Vice-Presidents.—The Rev. Dr. A. H. Cooke, M.A., F.Z.S.; Tom Iredale; Alexander Reynell; H. O. N. Shaw, B.Sc., F.Z.S.

Treasurer.—R. Bullen Newton, F.G.S.

Secretary.—G. K. Gude, F.Z.S.

Editor.—B. B. Woodward, F.L.S.

Other Members of Council.—A. S. Kennard, F.G.S.; Charles Oldham; A. E. Salisbury; G. B. Sowerby, F.L.S.; E. R. Sykes, B.A., F.L.S.; W. J. Wintle, F.Z.S.

On the motion of Mr. H. C. Fulton, seconded by Mr. W. J. Wintle, a unanimous vote of thanks was passed to the retiring Officers and members of the Council, and to the Scrutineers.

ORDINARY MEETING.

FRIDAY, 8TH FEBRUARY, 1918.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. Percy T. Deakin was elected a member of the Society.

The President delivered his Annual Address entitled "A Systematic List of the Fossil Marginellidæ".

Mr. R. Bullen Newton proposed, and Mr. H. O. N. Shaw seconded, a vote of thanks to Mr. Tomlin for his Address, and requested him to allow it to be printed *in extenso* in the Society's Proceedings.

ORDINARY MEETING.

FRIDAY, 8TH MARCH, 1918.

R. BULLEN NEWTON, F.G.S., Treasurer, in the Chair.

The following communications were read:—

1. "On the generic position of *Zemira*, H. & A. Adams." By the Rev. Dr. A. H. Cooke, M.A., F.Z.S.

2. "On a new variety of *Anodonta anatina* (L.)." By Percy T. Deakin. The author described the peculiar features of three half-grown specimens of *Anodonta anatina* found among some hundred or more individuals taken alive from a pond at King's Norton, Worcestershire, in the autumn of 1916, in company with *A. cygnea* and *Unio pictorum*. These three examples showed, on a ground colour of dusky-olive, rays of a different tint, which coincided with raised lines or ribs, and the author proposed to accord them varietal rank.

3. "Description of a new species of *Everettia* from Borneo."
By G. K. Gude, F.Z.S.

Mr. Alexander Reynell exhibited some original drawings for Swainson's Zoological Illustrations, *Conchology*, 1st series. He also exhibited specimens of *Bellardiella gracilis*, Mart., from the Clyde area, for comparison with specimens of the same species from Sicily.

SPECIAL MEETING.

FRIDAY, 12TH APRIL, 1918.

The Rev. Dr. A. H. COOKE, M.A., F.Z.S., Vice-President, in the Chair.

The meeting was convened by the Council for the purpose of submitting the following resolution:—

"That in order to meet the increased cost in the production of the Society's publications, for which the present income is inadequate, the annual subscription to the Society shall be in future one guinea for ordinary members and 15s. for corresponding members; the composition fees for life members shall be ten guineas and seven guineas respectively; and the entrance fee shall be one guinea. Members elected prior to the passing of this resolution shall be invited to strengthen the financial position of the Society by voluntarily adopting the increased subscription; but failure to do so shall not prejudice the standing of any such member."

The resolution was formally moved by Mr. A. S. Kennard and seconded by Mr. A. E. Salisbury. After some discussion by various members the following amendment was moved by Mr. C. Oldham, accepted by Mr. Kennard, and carried unanimously:—

"To substitute for 'in future' the words 'for the year 1919 and after'."

The Secretary then moved on behalf of Mr. E. F. Wesley, and Mr. H. O. N. Shaw seconded, the following resolution:—

"That the price to the public for single parts shall be raised to 10s. The price of back numbers to remain the same, and that members of the Society be allowed to purchase extra copies of any numbers at 25 per cent discount from the published prices."

The Council's resolution, as amended, and Mr. Wesley's resolution, were then put to the vote and carried unanimously.

ORDINARY MEETING.

FRIDAY, 12TH APRIL, 1918.

The Rev. Dr. A. H. COOKE, M.A., F.Z.S., Vice-President, in the Chair.

Five candidates were proposed for membership.

No communications were read.

ON THE RADULA OF THE GENUS *ACANTHINA*, G. FISCHER.¹

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 9th November, 1917.

THE genus *Acanthina* is peculiar to the west coast of America, ranging from Bolinas Bay in the north to Cape Horn and round to the Falklands in the south. The species hitherto known under the name fall into three geographical groups.

1. The northern, comprising *paucilirata*, Stearns, *punctulata*, Sowb., and *unicarinata*, Sowb., and extending from Bolinas Bay to San Diego.

2. The central, with *brevidentata*, Wood, *grandis*, Gray, and *muricata*, Brod., ranging from Lower California (point unknown) to Paita, including the Galapagos.

3. The southern, with *calcar*, Martyn, and *crassilabrum*, Lam. (many unite the two as one species), ranging from Peru southward, round to the Falklands. *A. lugubris*, Sowb., whose northern limit is Todas Santos Bay, San Diego, but whose southern range is not precisely known, though it reaches the Galapagos, forms a connecting link between the northern and southern groups.²

P. Fischer (Manuel de Conchyliologie, p. 646) remarks: "Les *Acanthina* ne sont en réalité que des *Purpura* et peuvent être divisés en sections correspondant à celles de ce genre par leurs principaux caractères. L'*A. lugubris*, Sowb., est un *Thalessa*, l'*A. crassilabrum*, Lam., un *Polytropa*, l'*A. muricata*, Brod., un *Planithais*, etc., les exemples montrent que le caractère tiré de la présence d'une dent au labre est tout à fait artificiel et sans valeur."

There is much to be said in favour of the view contained in the last sentence quoted. But the additional evidence drawn from an examination of the radula tends to show that the different geographical groups of *Acanthina*, as laid down above, exhibit well-marked differences in the structure of this organ, that accentuate the obvious dissimilarity of the shells. Viewed in this light the northern and southern groups stand apart from one another, while the central group, or what remains of it, differs strongly from both, if it does not disappear altogether. The affinities of *A. lugubris*, Sowb., lie with the southern group. From a conchological point of view one would have expected this to be so. The more globular form and wide mouth, and also the very prominent tooth of *lugubris*, bear more resemblance to the forms of *calcar* and *crassilabrum* than to the narrow long-drawn shape of the Upper Californian *Acanthina* with their extremely tiny hook.

¹ All the radulae employed in the preparation of this paper belong to the collection of the late Professor H. M. Gwatkin, now in the Natural History Museum, South Kensington.

² Compare R. E. C. Stearns, Amer. Journ. Conchology, vii, 1872, pp. 167-71; W. H. Dall, Proc. U.S. Mus., xxxvii, 1909, pp. 147-294; Melvill & Standen, Ann. Mag. Nat. Hist., ser. VIII, vol. xiii, 1914, p. 123.

It will be convenient to take first the representatives of—

I. THE CENTRAL GROUP.

1. *A. brevidentata*, Wood. The rhachidian has a strong, pointed central cusp, the two side cusps are strongly singly denticled on the inside, three or four small denticles, scarcely climbing,¹ intervene between the side cusps and the external projection (the "knob"); the base is simply curved below. In other words, the radula is of the normal *Thais* type, hardly to be distinguished from that of many species of that genus.

The spine or spines, for there are sometimes traces of more than one, seem scarcely analogous with the corresponding formation in other *Acanthinæ*. In *brevidentata* the spine is a continuation of the external layer of the shell surface, and projects from it, while in certain of the other species its shape and position suggest an origin from one of the internal denticulations within the mouth. In *brevidentata*, as well as in the other species, the characteristic groove is present, marking the line of growth of the spine.

I propose to relegate *brevidentata* to the genus *Thais*. Both the shell and the radula are in close agreement with that group, and the presence of the spine on the outer lip is too common a feature in other genera to warrant a separation.

2. *A. muricata*, Brod. This species shows a different and very striking type of radula. The rhachidian tooth is very thick, tricuspid on a broad base; the central cusp is long, sharp, and flanked by two small similarly shaped side cusps, which are only one-fourth the length of the central cusp, and are closely adjacent to it. There are no denticles, either on the side cusps or beyond them, while the knob does not exist. The base is simple, slightly arched below. The laterals are broad-bladed, widening rapidly from a sharply curved apex, with a greatly produced base.

In general facies this radula (see Fig. 1) bears not the remotest resemblance to that of any other form of *Acanthina*. The type to which it is most closely allied appears to be that of *Rapana*, and I am inclined to think that, both conchologically, and from the point of view of the radula, *A. muricata*, whose position among the other west coast *Acanthinæ* must surely have puzzled many conchologists, must be separated from them and placed, with *grandis*, Gray (whose radula is not yet known), in a new subgenus of its own, close to *Rapana* of the Old World. Neither from the point of view of the shell nor from that of the radula (so far as it is known) can these two species any longer be associated with the west coast *Acanthinæ*, in spite of R. E. C. Stearns' remark that "the projecting wave is, in his specimens, developed into a horn of sufficient prominence to enable the shell to enter the genus on its own hook". It has been abundantly shown that the possession of a "horn" is often an accident of development, especially in west coast genera.

NEORAPANA, n. subgen., is therefore here proposed by me; having

¹ By a denticle "climbing" I mean ascending the external edge of the side cusps.

Acanthina muricata, Brod., for its type, *A. grandis*, Gray, being associated with it.

II. THE NORTHERN GROUP.

Paucilirata, Stearns

Punctulata, Sowb.

Unicarinata, Sowb.

All three species exhibit the same type of radula, with but little modification (Figs. 3, 4). The central cusp of the rhachidian is long, sharp, and thick, and is sunk in a sort of shallow pit between the two side cusps; it is mounted on a thick and rounded pillar, which runs right through to the lower base of the tooth, in which its end forms a rounded projection. Thus the base is doubly curved, with this projection between the curves. The side cusps are broad, sharply pointed, denticled strongly on the inside and less strongly on the outside; they are mounted on a sort of thickened and rounded buttress, not so thick as the pillar of the central cusp, and not running through to the base. The knob is prominent and elevated, and sometimes there are signs of an additional small denticle between it and the external denticle of the side cusp.

These features constitute a very wide distinction between this type of radula and that of *Thais* proper (Fig. 2), in which the three cusps, whether denticled or not, form simple knife edges on the upper margin of the tooth, and have no deep-set pillar or buttress on which they are mounted.

On the other hand, the type of radula now described as present in these northern *Acanthinæ* is precisely that of the genus *Nucella*. All the West American "purpuroid" forms known to me, *lima*, Mart., *plicata*, Mart., *emarginata*, Desh., and their varieties, with our own *lapillus*, L. (Fig. 5), exhibit a radula of this type, the different species differing only in minor details. Thus the northern group of *Acanthina*, from the point of view of the radula, stands in very close relation to *Nucella*, from which it is a probable derivative. *ACANTHINUCELLA*, n. subgen., is now proposed by me for the reception of these northern *Acanthina*, having *A. punctulata*, Sowb., as the type.

III. THE SOUTHERN GROUP.

A. calcar, Martyn, with its closely related species, or variety, *unicornis*, Brug. (= *crassilabrum*, Lam.).

In each of these forms the rhachidian tooth differs from that of the northern group in the following points.

1. The central cusp, which is much broader, and not so thick, is not sunk in a shallow pit between the side cusps.

2. It is not mounted on a strong pillar carried through to the lower side of the base, but its roots are just sufficiently carried through to cause a slight projection in the base-line.

3. The side cusps are not buttressed.

4. The knob appears to be doubled, because the plate which carries both the cusps and the usual knob is superposed on a support or framework which is also sharply knobbed at the two upper angles.

Troschel (Das Gebiss, ii, pl. xiii, figs. 7, 8) gives what are in some

respects good figures of the two forms. In fig. 8 (*crassilabrum*) the roots of the central cusps are not carried through to the base, as they should be, while in fig. 7 (*calcar*) I am not able to recognize the two prominent denticles which he figures between the side cusps and the knob. Again, the central cusp of *calcar* should not be so bluntly bullet-shaped, but should approximate closely in form to that of *crassilabrum*.

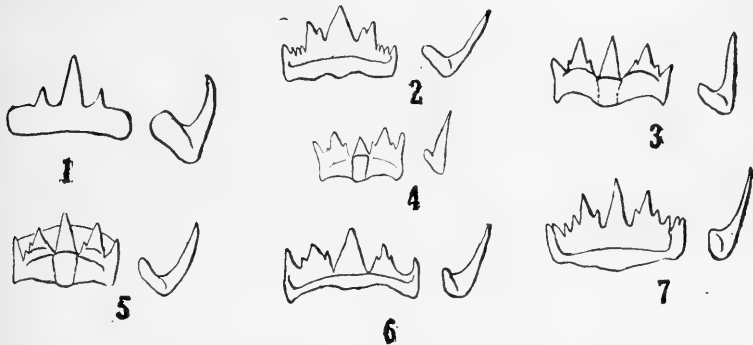


FIG. 1. *Neorapana muricata*, Brod. Panama.
 ,, 2. *Thais brevidentata*, Wood. Panama.
 ,, 3. *Acanthinucella punctulata*, Sowb. California.
 ,, 4. *A. unicarinata*, Sowb. California.
 ,, 5. *Nucella lapillus*, L. Torquay.
 ,, 6. *Acanthina calcar*, Mart. Chili.
 ,, 7. *A. lugubris*, Sowb. Lower California.

In *crassilabrum* the central cusp is somewhat more broadly triangular than in *calcar*; the denticle on the inside of the side cusps is strong, and points slightly towards the central cusp; that on the outside is weak. In *calcar* (Fig. 6) the outside denticle is somewhat more prominent, while what may be called the false (or underneath) knob is sharp and very long. In both forms the central cusp is not greatly longer than the side cusps.

These differences in structure on the whole are small, and offer no obstacle to the view that the two forms are conspecific; one would expect the causes which have made the shell to vary to produce some variation in the radula.

IV.

Finally, the radula of *A. lugubris*, Sowb. (Fig. 7), appears to be of a form intermediate between that of the northern and the southern groups, but more akin to the latter.

The central cusp is long and narrow, set on a pillar which is faintly carried through to the base, and forms a slight projection on the under-side. The side cusps, which are sharp, are not set on a buttress, they carry a strong sharp denticle both on the inside and outside, then comes a single toothlet, sharp, prominent, quite detached; at the base of the knob is another smaller toothlet or denticle; knob strong, prominent.

The rhachidian, as a whole, conveys an impression of extreme sharpness in all its cusps and denticles. The absence of the buttress in the two side cusps, and the less powerful pillar on which the central cusp rests, appear decisively to range the species with the southern and not with the northern group.

In all the species under consideration, except *muricata*, the laterals afford little assistance in grouping, for (a) their shape is, in essentials, similar throughout, (b) experience shows that a very slight change in the position of a lateral on the slide often appears to indicate a change of shape which is not really existent. Special care is needed in basing conclusions upon the laterals in this and the allied groups (*Thais*, *Morula*, etc.).

The whole group will work out as follows:—

Subgenus ACANTHINA, G. Fischer, 1807, Mus. Demidoff, iii, p. 174
(= *Monoceros*, Lam. (pars), 1822, Anim. s. vert., vii, p. 250).

1. *Acanthina calcar* (Martyn).

1784. *Buccinum calcar*, Martyn, Universal Conchologist, i, f. 10.
1786. *B. monodon*, Solander, Portland Cat., p. 17, No. 372.
1788. *B. monodon*, Gmelin: Linné, Syst. Nat., 13th ed., p. 3483, No. 50.
1788 (?). *B. calcar-longum*, Martyn, Univ. Conch., ii, f. 50.
1822. *Monoceros imbricatum*, Lamarck, Anim. s. vert., vii, p. 251.
1822. *M. striatum*, Lamarck, Anim. s. vert., vii, p. 251.
1822. *M. breve*, Sowerby, Genera No. 5, pl. cexxxix, f. 2.
1835. *M. acuminatum*, Sowerby, Proc. Zool. Soc. Lond., p. 50.
 Var. *unicornis*, Brug.
1789. *Buccinum unicorne*, Bruguière, Encycl. Méth., Vers. i, p. 254.
1822. *Monoceros crassilabrum*, Lamarck, Anim. s. vert., vii, p. 252.
1822. *M. glabratum*, Lamarck, Anim. s. vert., vii, p. 251.
1835. *M. citrinum*, Sowerby, *costatum*, Sowb., *globulus*, Sowb., Proc. Zool. Soc. Lond., p. 50.

2. *Acanthina lugubris* (Sowerby).

1822. *Monoceros lugubre*, J. & G. B. Sowerby, Genera No. 5, pl. cexxxix, f. 3.
1825. *M. cymatum*, Sowerby, Tankerv. Cat., No. 1888.
1828. *Buccinum armatum*, Wood, Suppl., p. 12, No. 12, pl. iv (Bucc.), f. 12.
1835. *Monoceros cymatum*, Sowerby, Conch. Illust., sp. 6, pl. lxxxii, f. 11.
1835. *M. cymatum*, Sowerby, Proc. Zool. Soc. Lond., p. 50.

Subgenus ACANTHINUCELLA, n.

1. *Acanthinucella punctulata* (Sowerby).

1835. *Monoceros punctulatum*, Sowerby, Proc. Zool. Soc. Lond., p. 50.
1835. *M. punctulatum*, Sowerby, Conch. Illust., sp. 13, pl. lxxxix, f. 3.
1837. *Purpura* (*Monoceros*) *lapilloides*, Conrad, Journ. Acad. Nat. Sci. Philad., vii, p. 265, pl. xx, f. 18.

1839. *Monoceros punctatum*, Gray, Zoology Beechey's Voyage, p. 124.
 1846. *M. punctatum*, Gray: Reeve,¹ Conch. Icon., *Monoceros*, sp. 2.

2. *Acanthinucella unicarinata*² (Sowerby).

1835. *Monoceros unicarinatum*, Sowerby, Proc. Zool. Soc. Lond., p. 50.
 1835. *M. unicarinatum*, Sowerby, Conch. Illust., sp. 14, pl. lxxxii, f. 5.
 1837. *Purpura (Monoceros) engonata*, Conrad, Journ. Acad. Nat. Sci. Philad., vii, p. 264, pl. xx, f. 17.
 1837. *P. (Monoceros) brevidens*, Conrad, Journ. Acad. Nat. Sci. Philad., vii, pp. 264-5.
 1846. *Monoceros unicarinatum*, Sowerby: Reeve,¹ Conch. Icon., *Monoceros*, sp. 1.

3. *Acanthinucella paucilirata* (Stearns).

1872. *Monoceros paucilirata*, Stearns, Amer. Journ. Conch., vii, p. 167, pl. xiv, f. 16.

At a distance from these, and close to *Rapana*, will come —

Subgenus NEORAPANA, n.

1. *Neorapana muricata* (Broderip).

1832. *Purpura muricata*, Broderip, Proc. Zool. Soc. Lond., p. 125.
 1833. *P. truncata*, Duclos, Mag. Zool., pl. xxii, f. 2.
 1835. *Monoceros*³ *tuberculatum*, Sowb. (Gray MS.), Conch. Illust., sp. 15, pl. lxxxii, f. 9.

2. *Neorapana grandis* (Sowerby).

1835. *Monoceros grande*, Sowb. (Gray MS.), Conch. Illust., sp. 7, pl. lxxix, f. 1-1a.
 1835. *Purpura grayi*, Kien., Iconographie, *Purpura*, p. 109, pl. xxviii, f. 74.
 1839. *Monoceros grandis*, Gray, Zool. Beechey's Voyage, p. 124.

¹ Reeve unfortunately reverses, in error, the numbers denoting the figures of his species 1 and 2, *unicarinatum* and "*punctatum*".

² Blainville's *Purpura spirata* (Nouv. Annales Muséum Paris, i, 1832, p. 252, No. 105, pl. xii, fig. 8) has been generally accepted as a large variety of *engonata*, and would take precedence. Certainly the figure is remarkably like *engonata*. But the description makes one hesitate: "Les premiers [tours] sont cordonnés par des séries décurrentes de squames, le dernier seulement strié; ouverture ovale, subcanaliculée . . . cinq denticules au bord droit; couleur brune en dehors, d'un blanc violet en dedans. Cette jolie espèce nous paroit parfaitement distincte de toutes celles qui composent aujourd'hui le genre Pourpre, principalement par la différence de travail que présentent les tours de la spire à la surface." He does not mention the spine, which certainly becomes obscure in some forms of the species, and his description of the surface markings does not accord with *engonata*. Nor do the five tubercles inside the outer lip. Nor the locality (Sandwich Is.).

³ An examination of a fine series in the Natural History Museum from St. Elena, W. Colombia (M.C.), shows conclusively that the "species" is a variety of *muricata* in which the tubercles, instead of being scaled and running into one another, are long, separate, and considerably smoother than in the typical form.

ON THE TAXONOMIC POSITION OF *ZEMIRA*, H. & A. ADAMS.

By the Rev. A. H. COOKE, Sc.D., F.Z.S.

Read 8th March, 1918.

THE subgenus *Zemira*, founded by H. & A. Adams in 1853 (Genera, vol. i, p. 110), for the reception of the single species *Zemira australis*, Sowb., has long been a waif and a stray in the waters of classification. Its career was stormy from the first. Kiener ("Iconographie," *Eburna*, 1835, p. 3), taking up a hint of Gray's ("*Cancellaria spirata*, secund. D. Gray," Sowerby, Conch. Illust., pt. xx, 1833, No. 8, fig. 5), wildly remarked that Sowerby's *Eburna australis* as figured in Conch. Illust. ought to remain in *Cancellaria* where Lamarck had placed it, as it united all the characteristics of that genus.

Kobelt (Jahrb. Malak. Gesell., vol. vii, 1880, p. 335, pl. vii, figs. 5-8) redescribed the species, the figures of Reeve (Conch. Icon., vol. v, *Eburna*, p. 4, fig. 4) and Sowerby (loc. cit.) being from worn specimens. He first figured the operculum, and concluded that the species was a genuine *Eburna*, but that the subgenus *Zemira*, as constituted by the brothers Adams for its reception, was fully justified.

Mr. C. Hedley (Rec. Austr. Museum, vol. iii, 1897, pp. 118-20, "A review of the systematic position of *Zemira*, Adams") gives an excellent account of the literary and scientific wanderings of the subgenus. He concludes with a suggestion of his own, based on purely conchological grounds, that it should no longer be placed among the *Rachiglossa*, but rank in the *Struthiolariidæ*, i.e. among the *Tænioglossa*. He admits, however, that "though the operculum of *Zemira*, as figured by Kobelt, does not well agree with that of *Eburna*, figured by Adams, yet it does not answer to those of *Struthiolaria*, figured by Gray or Smith".

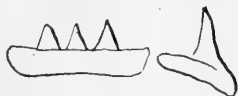
The shell of *Zemira*, in spite of its curious spine, and the groove on which it rests, looks certainly very like an *Eburna*, or, as we now call it, *Latrunculus*. In *Latrunculus* there are at least two types of operculum. In *L. spiratus*, Lam., and *borneensis*, Sowb., it is thick, massive, and the nucleus is terminal at the forward end; in *L. valentinianus*, Swains., it is thin, while the nucleus is subcentral on the columella side. In *Zemira* the nucleus is subterminal, but the special feature of the operculum is the series of radiating striæ, which cross the lines of growth and give the surface a finely tessellated appearance.

The radula of *Latrunculus* shows a five-cusped rhachidian tooth, the three central cusps being long, sharp, and very thick, while the two outer cusps are removed from the others and are much thinner and shorter; the base-line is waved and produced into a blunt angle at the ends; the laterals are bicuspid, cusps as in *Alectrion*, but very thick and solid (*japonicus*, Reeve).

In *Zemira* the average length of the radula is 74-5 rows. The rhachidian tooth shows three long triangular cusps of equal size,

separate and equidistant from one another, set on the upper margin of the tooth, but not deeply rooted in it. The base is wide and narrow, the upper margin continued beyond the two outer cusps, sharply curved in at the sides, slightly angularly projecting upwards at the upper corners, very slightly arched below, curve of base and upper margin exactly parallel. In one specimen the side cusp on the left is slightly nearer to the central cusp than that on the right. The laterals are single-bladed on a rather broad base, blades sharp but not narrow, broadening out widely as they approach the base; without any sign of denticles (see figure).

The type of radula is thus widely different from that of *Latrunculus*, and stands quite by itself. The only radulæ at all comparable to it are those of *Oliva* and *Murex*. *Oliva* shows, in the rhachidian, three sharp cusps on a narrow base, but the cusps are much closer together, and the central cusp is invariably much smaller than the two side cusps; the curves of the base are also much more pronounced. The laterals in *Oliva* are leg-of-mutton shaped, with the basal angles very obtusely angled.



On the other hand, the *Zemira* radula is much more closely allied to that of *Murex* proper, the characteristic of which is a tricuspid rhachidian tooth, with two much smaller cusps between the externals and the central. The three larger cusps approximate closely in length, and the base is very nearly that of *Zemira* (see Troschel, *Das Gebiss*, vol. ii, pl. x, figs. 19-21; pl. xi, figs. 1-8). In fact, if you take away the two small intermediate cusps in *Murex* you have a rhachidian tooth most closely allied to that of *Zemira*, while the laterals in both correspond exactly.

On the whole, therefore, the evidence of the radula, regarded apart from all other considerations, conchological or otherwise, points unmistakably to a classification of *Zemira* which will remove it from *Latrunculus* and place it near to *Murex*. This will involve giving it generic instead of subgeneric rank.

The specimens of the radula of *Zemira* which I have been able to examine are all from the mounting of the late Professor H. M. Gwatkin. One is in the collection at the Natural History Museum, South Kensington, one in the Museum of Zoology, Cambridge, and one in my own possession.

The exact geographical limits of the distribution of *Zemira* have yet to be laid down. The British Museum has four specimens from Port Jackson, three of which are from the Cuming Museum, the fourth from the Sow and Pigs Reefs (Brazier), and also specimens obtained by the *Challenger* from Port Jackson (6-7 fathoms), and from off East Moncour Island, Bass Straits (38 fathoms). The McAndrew Collection at Cambridge has specimens from Lake Macquarie. Tenison Woods ("Census of the Marine Shells of

Tasmania and the adjacent Islands": Proc. Roy. Soc. Tasmania, 1877, pp. 26-57) records it as "rather rare". R. Tate, describing *Z. præcursoria* from the Older Tertiary of Muddy Creek (Goulburn River, Victoria), remarks that "the discovery of a fossil species of *Zemira* is of interest from the circumstance that the genus has hitherto been known by one species (*Z. australis*, Sowb.), inhabiting the temperate seas of Eastern Australia" (Trans. Roy. Soc. South Australia, vol. x, 1888, p. 163, pl. xi, fig. 5).

ON THE OCCURRENCE IN ENGLAND OF *HYGROMIA ODECA* (LOCARD)¹ [= *HELIX LIMBATA*, DRAP., 1804, *NON DA COSTA*, 1778].

By A. S. KENNARD, F.G.S., and B. B. WOODWARD, F.L.S., etc.

Read 9th November, 1917.

THE *Helix limbata* of Draparnaud was first recorded as a British species in 1837 by J. Alder, who stated that it was "found in the neighbourhood of London by Mr. G. B. Sowerby, from whom I have specimens" (Mag. Zool. & Bot., vol. ii, p. 106). In 1840 Dr. J. E. Gray noted that it "lives in the hedges near London, on the New North Road to Barnet, near Hampstead, on brambles (G. B. Sowerby). Native of the S. of France, whence perhaps it was introduced" (Turton's Manual, 2nd ed., pp. 143-4). This statement was copied, though not literally, by Captain T. Brown in 1844 (Illust. Recent. Conch. Gt. Britain and Ireland, p. 46). In 1857 Dr. J. E. Gray published a very different version, for he states that "a few living specimens were set free on the New North Road, near Hampstead, by Mr. G. B. Sowerby, but they did not propagate themselves" (Turton's Manual, 3rd ed., pp. 293-4). In 1863 J. Gwyn Jeffreys noted that "*H. limbata* has been introduced into the list of our mollusca on the authority of the late Mr. G. B. Sowerby in consequence of several specimens having been once found on hedges near Hampstead . . . Possibly it may be rediscovered in this country and have its claim to admission as a British species recognized" (Brit. Conch., vol. i, p. 192). In the same year L. Reeve stated "In my monograph of *Helix* in Conch. Iconica (pl. clxii, fig. 1079) I figured *H. limbata*, Drap., as a British species, on the strength of the discovery of some specimens by Mr. Sowerby, in the neighbourhood of Hampstead. Its claim to a place in our fauna has not, however, been confirmed by subsequent collectors" (L. & F. W. Mollusks of the British Isles, p. 67). Subsequent writers (including Mr. G. B. Sowerby, third of the name, in his "Index Brit. Shells", 1887) have ignored this species as a British form, but in 1911 A. W. Stelfox recorded "a single living specimen,

¹ Prodrôme Malac. Franç., 1882, p. 314 (or, Ann. Soc. Agric. Lyon, ser. v, tom. iv, 1882, p. 588), as of Bourguignat.

found some years ago in Dickson's Nursery at Belfast. No example seen since" (Proc. Roy. Irish Acad., vol. xxix, sect. B, p. 134). Whether the Middlesex specimens were an intentional introduction, or an accidental, it is now impossible to say, but the Irish record certainly falls into the latter category. This, however, is certain, that hitherto there has been no certain record of the species as an inhabitant of these Islands.

In July of this year one of us (A. S. K.) obtained three examples of this species at Coombe in Teignhead, near Teignmouth. Subsequently Mr. C. H. Huggins made special excursions to the locality and traced it over a wide area, including the opposite bank of the Teign. He saw over 100 examples, most of which, however, were immature. All were found on roadside banks. Speaking broadly, the Devon shells are decidedly smaller than the Continental examples we have seen, being 9×12 mm., whilst Moquin-Tandon's figures for this species are $12-14 \times 12-17$ mm., but Mr. Hugh Watson informs us that he has taken examples in the south-west of France which are quite as small as our shells. In colour, too, the majority of the Devon shells are decidedly darker than French forms. Judging from the description, our shells might be referred to var. *sarratina*, Moq.-Tand., but J. R. Le B. Tomlin has kindly lent us examples of this form collected by St. Simon (ex Crosse Coll.), and these are decidedly paler than our shells, while the peripheral band is more pronounced. This last character is ignored in the original description (Hist. Nat. Moll. France, vol. ii, p. 194). Possibly the soil on which they live may account for the abnormal coloration, for examples of *Hygromia striolata* (Pfr.) from the same locality possess a similar coloration. Spanish examples, according to Bofill, would appear to be similar to the Devon shells (Moll. Vall. Rebas., 1884, p. 12). Several examples of the var. *albina*, Moq.-Tand., were also obtained by Mr. Huggins, and in these the animal as well as the shell were white. As in the case of *Helicella neglecta* (Drap.) it is interesting to note that the district is famous for its rarities in other branches, for it is the only English locality for the Jersey Tiger Moth (*Callimorpha quadripunctata*, Poda, 1761 = *hera*, Linné, 1767), and for the plant *Trichonema columnæ*.

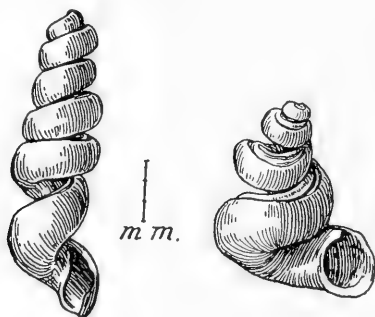
ON *SILIQVARIA WILMANÆ*, N.SP., FROM SOUTH AFRICA.

By J. R. LE B. TOMLIN, M.A., F.E.S.

Read 14th December, 1917.

THE species which I propose to designate by this name is very possibly that listed by Sowerby¹ as a small form of *Siliquaria obtusa*, Schumacher, and by Bartsch² as *S. weldi*, T.-Woods; at any rate, it is one of the many endemic Cape species that have till recently been erroneously identified with species from other parts of the world. This shell does not tally with Schumacher's description of his *Anguinaria obtusa*, and I do not entertain for a moment the possibility of its identity with a Tasmanian species.

The shell is smooth and without sculpture, as far as can be ascertained from beach specimens, white or brownish in colour, consisting of 6-7 whorls, which as a rule take the form of a rather regular, disconnected, spiral coil.



The apex is decollate in all the specimens I have seen, and the broken end of the coil is frequently plugged by the animal. The slit appears on the upper whorls as a deep canaliculation closed with a lamella, becoming open on the last two or three whorls, and the species therefore falls into Mörch's section *Pyxipoma*. The altitude of the type-specimen is 15.5 mm., and the diameter of the tube 2.5 mm., but the latter measurement varies considerably in different specimens.

Loc.—Port Alfred, Jeffreys Bay, and East London. Probably it is generally distributed in the Cape region.

In general form and size *S. wilmanæ* is very similar to *S. senegalensis*, Récl., but the latter belongs to the section *Agathirses*, the slit taking the form of a series of separate, irregular apertures.

Type.—The longer of the two examples figured, which is in my own collection.

¹ *Marine Shells of South Africa*, p. 39.

² Rept. Turton Coll. S. Afr. Marine Moll. (U.S. Nat. Mus. Bull. 91), p. 117.

NOTE ON A WHITE SPECIMEN OF *ENA MONTANA* (DRAP.).

By H. OVERTON.

Read 14th December, 1917.

WHILST spending a few days at Painswick, Gloucestershire, early in September, 1914, I found a fine specimen of *Ena montana f. albina*, Moquin-Tandon, on the trunk of a beech-tree in a wood near Sheepscombe; further repeated research failed to reveal a second example. The specimen in question is fully grown, with the periostracum in excellent condition and not worn as in the case of the majority of the type-specimens, which were very plentiful, in company with *Clausilia laminata* (Montagu) and its form *albina*, Moq.-Tandon, many of which were decollated, *Clausilia bidentata* (Ström), and *Ena obscura*, Müller.

The specimens of *Hygromia striolata* (Pfr.) collected in the same wood, with the exception of the immature examples, all appeared to have the periostracum very much worn, a characteristic which I have also noticed in Ditcham Wood, Hants. One would naturally expect that in a wood where the shells have protection against the elements the periostracum would be more perfect.

DESCRIPTION OF TWO NEW SPECIES OF LAND MOLLUSCA.

By G. K. GUDE, F.Z.S.

Read 11th January, 1918.

Two apparently undescribed forms of land mollusca were placed in my hands for identification by Mr. H. C. Fulton. The one from Assam is represented by only four specimens, while of the Tonkin form several have been received.

KHASIELLA FULTONI, n.sp.

Shell perforate, depressedly conoid, subangulate at the periphery, pale corneous, radiately and closely costulate above, the costulæ gradually disappearing below the periphery, smooth and shining below with traces of spiral sculpture; spire low, apex subacute, whorls 8, closely wound, slightly convex above, the last subangulate at the periphery, not descending, swollen below; aperture slightly oblique, subovate; peristome obtuse, slightly thickened; basal margin arcuate, outer obtusely angled, columellar obliquely ascending; umbilicus perforate.

Diam. maj. 18.5, min. 17 mm.; alt. 9 mm.

Hab.—Assam.

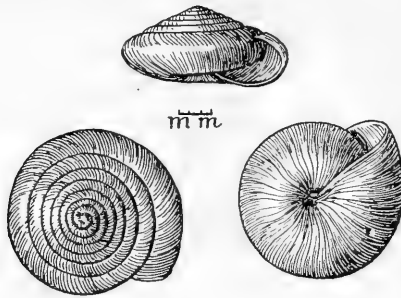
Type in British Museum.

Intermediate between *K. vidua*, Blanf.,¹ and *K. climacterica*, Bens.² From the former it differs in having a lower spire, by its larger diameter, and closer and more regular costulæ, while from the latter it may be separated by its convex whorls, wider aperture, and smaller protoconch; the costulæ are also less pronounced below the periphery. From both it differs in its perforated umbilicus. It is also related

¹ Hanley & Theobald, *Conch. Ind.*, 1875, p. 52, pl. cxxx, figs. 2, 3.

² Benson, *Journ. Asiat. Soc. Bengal*, vol. v, 1836, p. 352.

to *K. ornatissima*, Bens.,¹ but that species has the costulæ placed much closer together.



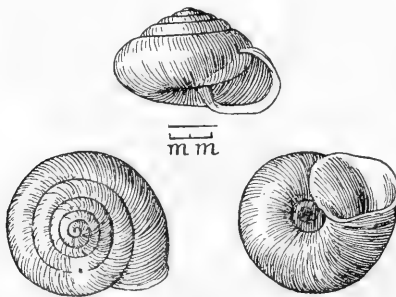
Two of the specimens are larger than the type, measuring: diam. maj. 21·5, min. 20 mm.; alt. 10 mm.

I have much pleasure in associating Mr. Fulton's name with this interesting new species.

PLECTOTROPIS CHONDRODERMA, var. *SUBINFLATA*, n.

Differs from the type in being smaller and paler in colour and in having a narrower umbilicus, while the last whorl is more swollen and rounded at the periphery, which in the type is subangulate.

Diam. maj. 8, min. 7·5 mm.; alt. 5·5 mm.



Hab.—Lao Kay, Tonkin.

Type in the British Museum.

The typical form, described from Annam,² never having been illustrated, I have much pleasure in giving a figure of this geographical race. Mr. Fulton informs me that he received the shells as *P. subinflata*, Mabille, but although this name has never been published I have embodied it, since it may have been distributed, so labelled, to other collectors.

¹ Benson, Ann. & Mag. Nat. Hist., ser. III, vol. iii, 1859, p. 269.

² Möllendorff, Nachr. Blatt Deutsch. Malak. Gesells., 1900, p. 131.

ON *EVERETTIA* *KLEMMANTANICA*, N.SP., FROM BORNEO.

By G. K. GUDÉ, F.Z.S.

Read 8th March, 1918.

THE genus *Everettia* was established, on anatomical grounds, as a subgenus of *Dyakia*, by Col. Godwin-Austen in 1891¹ with *Helix jucunda*, Pfr., as the type. He included six other species. One of these, however, as pointed out by Smith, *i.e.* *E. bocki*, Issel, "is purely imaginary and is not described at the reference given."²

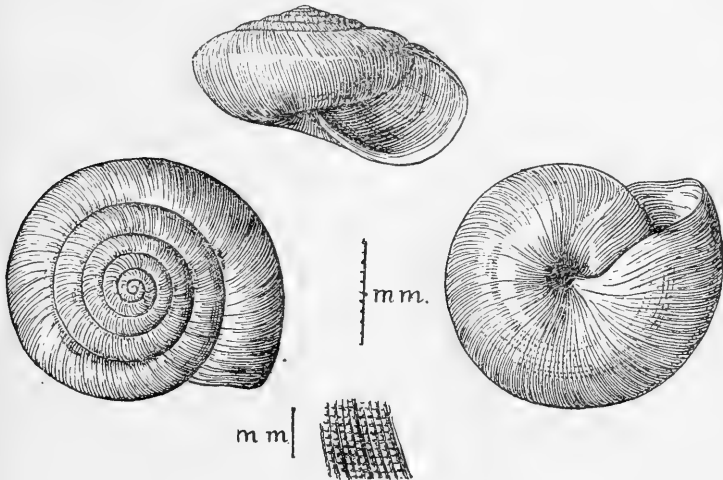
In 1895 Smith raised *Everettia* to generic rank and added five new species.² The next author to deal with the genus from an anatomical point of view was Wiegmann,³ who gave details of three species—*jucunda*, Pfr., *moellendorffi*, Kob., and *fulvocarnea*, Mart.; the two last come from the Celebes, whereas all the other species hitherto referred to *Everettia* are from Borneo and adjacent small islands to the west.

Finally Kobelt again reduced *Everettia* to a subgenus of *Macrochlamys*,⁴ adding two Philippine species—*pseustes*, Pfr., and *sanchezi*, Quad. & Mlldff.—and one Siamese form, *dohrniana*, Pfr. It remains to be seen whether anatomical investigation will confirm these three references.

The new species, now described, is based on two specimens received from a natural history dealer as far back as 1904.

EVERETTIA *KLEMMANTANICA*, n.sp.

Shell subcovered perforate, depressed orbicular; closely and rugosely striated, the striæ above the periphery broken up into fine



¹ Proc. Zool. Soc., 1891, p. 33.

² Ibid., 1895, p. 106.

³ Abhandl. Senckenb. Naturf. Ges., xxiv, 1898, p. 352.

⁴ Conch. Cab., Die Heliceen, Abt. v, 1901, p. 1011 et seq.

granules by close spirals; below the periphery the spirals are microscopic; corneous, dull above, shining below. Whorls $5\frac{1}{2}$, increasing regularly, slightly convex above, tumid below, angulated at the periphery, not descending. Aperture sublunate; peristome acute, columellar slightly reflected over the narrow perforation of the umbilicus.

Diam. maj. 27.5, min. 25 mm.; alt. 14 mm.

Hab.—Borneo.

Type in my collection.

The second specimen, not quite in such good condition as the type, has six whorls completed and measures $29 \times 25.5 \times 15$ mm. The nearest ally appears to be *E. pseustes*, Sm., but that species is somewhat smaller, more depressed, shining above, rounded at the periphery, and imperforate. The only other spirally sculptured species is *E. subimperfata*, Sm., but from this the new species differs in being much more depressed, larger in diameter, and by having an angulated periphery. The specific designation is derived from the Malay name of Borneo: *Pulo Klemmantan*.

NOTE ON THE MALACOPHAGOUS PROPENSITIES OF
HELIX NEMORALIS, LINN.

By Dr. W. T. ELLIOTT, F.L.S.

Read 11th January, 1918.

I NOTICED in rearing some juvenile specimens of *Helix nemoralis*, L., that every now and then one of the animals had been partly devoured and the shell eaten away. On further close observation I found one animal in the act of devouring its fellow, which was much larger. I cannot find any previous direct reference to this abnormal propensity, but the following references may be quoted (Johnston's "Conchology", p. 336): "Pulmonated Gasteropods have a strange hankering after flesh and become cannibals in satisfying this propensity."

Taylor (Monograph, vol. i, p. 420) says: "In the British Isles, although many species intermittently display malacovorous, or cannibalistic propensities, such habits are not normal, but often induced by hunger or other excitant."

Miss Hele (Journ. Conch., vol. v, p. 43) records *Polita draparnaldi* as being carnivorous in captivity, but in this case it was due to want of food during the winter.

In the present instance the animals were in the height of the feeding season (July) and plentifully supplied with food, but they were rather crowded in the cage in which they were confined, and none of them were adults. The shells were not attacked at the mouth, which would have been a more ready way apparently of gaining access to the animal, for they were all in an active condition.

ON THE NORTH AMERICAN GENUS *OREOHELIX*.

By JUNIUS HENDERSON.

Read 14th December, 1917.

[Condensed.]

THE most important land-snail genus in North America, north of Mexico, is *Polygyra*, including more than 125 species and subspecies. A large majority of these inhabits the region east of the Mississippi and Missouri Rivers. The genus is also well represented west of those rivers in Texas, Indian Territory, Oklahoma, Louisiana, Arkansas, Southern Missouri, and Eastern Kansas. A few species are found through British America and the northern tier of the United States to the Pacific coast, thence southward to California. They are exceedingly rare in New Mexico, and, so far as I recollect, unknown in Arizona, most of the material formerly reported under that name from those states being now assigned to the south-western semi-desert genus *Ashmunella*. In the lower portions of Arizona and New Mexico the true desert genus *Sonorella* occurs, the species of which were formerly included in the genus *Epiphragmophora*. The most important genus of Helicoid snails in California is that comprising the species usually assigned to *Epiphragmophora*, but perhaps referable, on anatomical characters, to *Micrarionta*. Thus these four genera complete a circuit enclosing a vast "island" comprising Colorado, Utah, Wyoming, Western Kansas, Western Nebraska, Southern Idaho, and the greater part of Nevada, aggregating more than 500,000 square miles, from which those genera appear to be entirely absent. The only genus of large land-snails thus far found in that area is the viviparous, herbivorous *Oreohelix*,¹ though smaller snails, such as *Vallonia*, *Pupilla*, *Zonitoides*, *Vitrina*, and many others, are abundant and generally distributed in favourable stations throughout the mountainous portions. The present range of *Oreohelix* overlaps that of *Polygyra* in Montana, Northern Idaho, Washington, California, and perhaps Oregon. It overlaps that of *Epiphragmophora* in California, owing to the occurrence of a small form on Catalina Island, off the coast, and possibly also in Oregon, most of which is conchologically unexplored. It nearly meets the range of *Polygyra* in New Mexico, and is abundant within the range of *Ashmunella* and *Sonorella* in New Mexico and Arizona. The almost treeless and shrubless plains of Eastern Colorado, Wyoming and New Mexico, and Western Kansas and Nebraska, are wholly unfavourable to large land-snails, so the genus does not, along its eastern limit, touch the range of *Polygyra*, though a fossil form from the loess of Iowa tells of a former connexion.

The few who have critically studied *Oreohelix* now recognize approximately sixty species and subspecies, besides which there are more than twenty-five named forms of doubtful value. Undoubtedly

¹ Cf. H. A. Pilsbry, "Notes on the Anatomy of *Oreohelix*, with a Catalogue of the species": Proc. Acad. Nat. Sci. Philad., 1916, pp. 340 et seqq.

the list will be greatly augmented by future work. In the larger, more continuous ranges of the Rocky Mountain system, where favourable localities are not so strictly isolated by intervening expanses of wholly unfavourable territory, but few species and subspecies are found. Thus only three forms (*O. cooperi*, *O. strigosa depressa*, and *O. hendersoni*) have been recognized along the eastern slope and foot-hills of the Rockies from Northern New Mexico to Montana and South Dakota, a distance of more than 800 miles, and one of those forms is known from only one small colony. On the other hand, Western Utah, Southern Idaho, Southern New Mexico, Arizona, and Nevada, comprise an immense arid region, occupied by small mountain ranges separated by dry, treeless, and shrubless plains and valleys. Even different slopes and gulches within any given range are well insulated, from the standpoint of *Oreohelix*. Many of the mountains are composed of limestone, thus favouring the snails, while shrubbery affords shelter from the hot sun's rays. This arid condition, with many mountain ranges providing numerous localities favourable to snails, separated by wide expanses of unfavourable plains, has prevailed from at least far back in Pliocene times, though probably there was some slight fluctuation in climatic conditions there, as elsewhere, during Pleistocene times, which may have allowed temporary communication between some colonies now well isolated, thus making the problems more complex. Hence one is not surprised to find in that region a large number of distinct forms, each, with a few exceptions, occupying a very small area, though two forms (*cooperi* and *depressa*) are found here and there almost throughout the range of the genus.

A favourite habitat is loose talus, locally called "rock slide", at the base of a limestone ledge or cliff, though good colonies are also sometimes found in talus composed of sandstone, quartzite, granite, or gneiss. The snails occur near the base and lateral edges of the talus, where shade from overhanging shrubs and dwarf trees minimizes evaporation. During droughts they retire to the crevices between the rocks and cling to the sheltered surfaces, ready to emerge promptly after each rainfall. Some forms are also abundant under brush on calcareous slopes where there is no loose talus, or, rarely, in flat stream valleys far from rocks. Occasionally, flourishing colonies are found where there is no loose talus and very scant vegetative cover. In September, 1917, I discovered one form in abundance during very dry weather, in Wyoming, clinging to the barren face of a limestone ledge where there was no vegetative cover whatever for snails, either on or near the ledge. Since they are vegetarians, the only source of food appeared to be the lichens closely clinging to the rocks.

The climatic factor looms very large in determining the distribution of plants and animals in the South-Western United States. Since snails are more nearly immobile than most land animals, a thorough knowledge of the geological history and present distribution of *Oreohelices* may yet furnish the key to the Tertiary and Pleistocene climatic history of the region. But little can now be said of the

geological history of the genus. Although land and freshwater mollusks must have been abundant during Eocene, Oligocene, and Miocene times, and at least as abundant during the Pliocene and Pleistocene as to-day, it seems that conditions could not have been favourable for the preservation of their shells in the rocks then forming. In the immense areas covered by Miocene rocks in the *Oreohelix* country, it is very seldom that molluscan shells are found fossil. However, three species, *O. megarche*, Ckll. & Hend., *O. grangeri*, Ckll. & Hend., and *O. nacimientensis* (White), Ckll., have been described from the lower Eocene of Wyoming and New Mexico, indicating probable pre-Cainozoic origin of the genus.

It is not likely that more than half the recognizable living forms have yet been found and described, and little is known of the distribution of many others. Many of the species are enormously variable in characters usually used in differentiating species and subspecies, such as sculpture, size, relative width of umbilicus, relative height of spire, colour, and so on. This makes it necessary to obtain large quantities of material from numerous localities in order really to understand the various forms and their relationships.

Colonies of *Oreohelix* often cover only a few square yards or rods of ground, and are almost as completely isolated from colonies a mile distant as though they were situated on different continents. Some well-marked species and subspecies are known only from one small colony. Furthermore, in case of species that occupy more than one colony, the material from each colony, viewed in mass, may differ in certain average characters from that obtained at the nearest neighbouring colony, though plenty of individuals may be found in each colony to form a complete gradation. Hence it is very important to give the exact location of each station. It is often desirable to revisit stations for further studies as the investigation progresses. By careful attention to topographic notes and other data many of the type localities have been re-located, with some very interesting results.

The colour bands, normally two in number, are extremely variable. In some forms, as for example *O. hendersoni dakani*, Hend., the bands are confined to the earlier whorls and even there are faint. In some colonies of *O. strigosa depressa* (Ckll.) there are two very strong, dark bands extending to the aperture on nearly all specimens, while in other colonies the bands are so light on the later whorls that on most specimens they can be detected only with difficulty, and in most colonies the prominence and width of the bands vary greatly. In *O. cooperi* (W. G. B.) there are often a number of extra bands, especially below the periphery, and it is much more often the case with the immature shells. *O. peripherica* (Aney) varies from almost pure-white specimens with faint bands showing only on the early whorls (*Patula strigosa binneyi*, Hemph.), through specimens with two narrow bands extending to the aperture (var. *gouldi*, Hemph.), to specimens with two broad bands covering the whole shell except for a broad, white peripheral band (var. *albofasciata*, Hemph.), and these may all be found under one bush completely intergrading.

Probably the banding is a primitive character, now tending to disappear.

The sculpture varies as much as do the colour bands. It may be said that there are three general types of sculpture. *O. elrodi* (Pils.) and *O. idahoensis* (Newc.) are excellent examples of a type with very strong transverse ribs. *O. haydeni* (Gabb) well represents a type with very strong longitudinal (spiral) ribs. Other species are comparatively smooth, though usually, if not always, really representing a combination of the characters of both ribbed types on a reduced scale. Transversely ribbed forms pass by minute gradation into forms with numerous, scarcely noticeable ribs that are little more than exaggerated growth-lines. Spirally ribbed forms pass into those in which the spirals may be detected with difficulty by aid of a lens. Such as *cooperi* and *depressa* exhibit more or less indistinct microscopic spirals crossed by irregular, somewhat more conspicuous transverse riblets.

The relative altitude of the spire in certain species, if not in all, varies greatly, correlated with variation in relative width of the umbilicus. It has been suggested that this might be due to environmental conditions, the flatter ones being better able to hide under rocks and other shelter, and hence better adapted to a dry habitat. This suggestion seemed to me plausible, but does not conform to the facts as observed in the field.

In fact, I have not been able to correlate any of the foregoing variations with differences in environment. There are some indications that unfavourable environment tends to dwarf the snails, but the evidence even on that point seems inconclusive. There is some evidence that the thickness of the shell is directly influenced by environmental conditions, but further investigation is desirable.

There has been but little discussion of the food habits of these snails. I have studied a number of flourishing colonies when active. Only once have I seen them feeding on green vegetation. They were then eating the thick leaves of *Frasera speciosa*, Griseb. Once or twice I found them feeding upon live bark near the roots of shrubs. With those exceptions, I have not found green leaves or bark about the colonies that showed slime trails or looked as though they had been fed upon by snails. The snails were almost invariably observed upon dead leaves and decaying wood, apparently feeding upon them, or possibly upon the bacteria of decay or minute fungi on them. I had hoped that alcoholic material preserved during the season just past would throw some light upon this subject, but Professor T. D. A. Cockerell, who has examined some of it, informs me that they contained no remains of food at all. Since the snails were drowned for expansion before scalding, in the cleaning process, he suggests that they perhaps expelled all food during the process, which is not unlikely. In captivity I have fed them with lettuce, cabbage, and other vegetables, and have been informed that some voraciously ate cornmeal. I have seen no evidence at all that they are ever carnivorous.

ON THE DATES OF ISSUE OF THE PARTS OF FORBES AND
HANLEY'S *HISTORY OF BRITISH MOLLUSCA*.

By ALEXANDER REYNELL.

Read 9th November, 1917.

So far as I know, no detailed particulars of the parts and dates of issue of this work have ever been recorded, though Mr. B. B. Woodward communicated some information, founded on particulars obtained from Wiegmann's "Archiv für Naturgeschichte" and an incomplete copy with the original covers in possession of Mr. W. E. Hoyle. This information was read before the Conchological Society, published in their Journal (vol. x, p. 47, 1901).

A complete copy in the original parts having come into my possession I am able to supplement these particulars. Unfortunately I had them bound before setting down my information, and the binder divorced the plates from each part and followed the "instructions to the binder"; but as far as Vol. I is concerned, I am able to give dates of issue of the plates from another incomplete copy. The volumes and parts appeared as follows:—

VOL. I.

| PART. | | | | PLATES. |
|-------|-------|----------|--------------|------------------------|
| I. | Jan. | 1, 1848. | pp. 1-40. | A-B, 1-2. ¹ |
| II. | Feb. | 1, " | pp. 41-80. | C-D, 3-4. |
| III. | March | 1, " | pp. 81-120. | E, 5-7. |
| IV. | April | 1, " | pp. 121-160. | F, 8-10. |
| V. | May | 1, " | pp. 161-200. | G, 11-13. |
| VI. | June | 1, " | pp. 201-240. | H, 14-16. |
| VII. | July | 1, " | pp. 241-280. | I, 17-19. |
| VIII. | Aug. | 1, " | pp. 281-320. | K, 20-22. |
| IX. | Sept. | 1, " | pp. 321-360. | L, 23-25. |
| X. | Oct. | 2, " | pp. 361-400. | N, 26-28. |
| XI. | Nov. | 1, " | pp. 401-440. | O, 29-31. |
| XII. | Dec. | 1, " | pp. 441-477. | M, 32-34. ² |

VOL. II.

| | | | | |
|------|--------|-------|----------|---------------------------|
| Part | XIII. | Jan. | 1, 1849. | pp. 1-40. |
| " | XIV. | Feb. | 1, " | pp. 41-80. |
| " | XV. | March | 1, " | pp. 81-120. |
| " | XVI. | April | 2, " | pp. 121-160. |
| " | XVII. | May | 1, " | pp. 161-200. |
| " | XVIII. | June | 1, " | pp. 201-240. |
| " | XIX. | July | 2, " | pp. 241-280. |
| " | XX. | Aug. | 1, " | pp. 281-320. |
| " | XXI. | Sept. | 1, " | pp. 321-360. |
| " | XXII. | Oct. | 1, " | pp. 361-400. |
| " | XXIII. | Nov. | 1, " | pp. 401-440. |
| " | XXIV. | Dec. | 1, " | pp. 441-480. |
| " | XXV. | Jan. | 1, 1850. | pp. 481-520. |
| " | XXVI. | Feb. | 1, " | pp. 521-557. ³ |

¹ Prospectus dated May 22, 1847, on back of p. 4, cover.

² With temporary title-page, dated 1848, and temporary "Contents".

³ With temporary title-page, dated 1850, and temporary "Contents".

Plates Q to U, AA to DD, NN, FF, P and II of the animals. Plates xxxv–lxxix (except lxxv and lxxvi of the shells) were issued with Vol. II.

VOL. III.

| | | | |
|------|----------|----------------|---------------------------|
| Part | XXVII. | March 1, 1850. | pp. 1–40. |
| „ | XXVIII. | April 1, „ | pp. 41–80. |
| „ | XXIX. | May 1, „ | pp. 81–120. |
| „ | XXX. | June 1, „ | pp. 121–160. |
| „ | XXXI. | July 1, „ | pp. 161–200. |
| „ | XXXII. | Aug. 1, „ | pp. 201–240. |
| „ | XXXIII. | Nov. 1, „ | pp. 241–280. |
| „ | XXXIV. | Dec. 2, „ | pp. 281–320. |
| „ | XXXV. | Jan. 1, 1851. | pp. 321–360. |
| „ | XXXVI. | Feb. 1, „ | pp. 361–400. |
| „ | XXXVII. | March 1, „ | pp. 401–440. |
| „ | XXXVIII. | April 1, „ | pp. 441–480. |
| „ | XXXIX. | May 1, „ | pp. 481–520. |
| „ | XL. | June 2, „ | pp. 521–560. |
| „ | XLI. } | Sept. 1, „ | pp. 561–616. ¹ |
| „ | XLII. } | | |

Plates EE, GG, HH, JJ, KK, LL, OO, PP, RR to ZZ of the animals. Plates lxxv, lxxvi, lxxx to cxxi, and cxiva, cxivb, cxivc, and cxivd of the shells.

VOL. IV.

| | | | |
|------|---------|---------------|---------------------------|
| Part | XLIII. | Jan. 1, 1852. | pp. 1–40. |
| „ | XLIV. | Feb. 2, „ | pp. 41–80. |
| „ | XLV. | March 1, „ | pp. 81–120. |
| „ | XLVI. | April 1, „ | pp. 121–160. |
| „ | XLVII. | July 1, „ | pp. 161–200. |
| „ | XLVIII. | Sept. 1, „ | pp. 201–240. |
| „ | XLIX. | Dec. 1, „ | pp. 241–280. |
| „ | L. } | May 1, 1853; | pp. 281–301. ² |
| „ | LI. } | | |

Old covers with date and number altered were used for the latter parts after XLV.

THE INDEX TESTACEOLOGICUS OF W. WOOD & S. P. HANLEY.

By A. REYNELL.

Read 11th January, 1918.

CONCERNING the history of the first edition of this book published in 1818 there is not much available information. Dillwyn's "Descriptive Catalogue" had appeared a few years previously, and Wood remarks in his preface that his own "Index" is a list of names merely and not a descriptive index.

¹ With temporary title, dated 1851, list of contents.

² With a general index, title-pages, and list of contents to each of the four volumes.

Copies are found both with and without plates, eight in number when present, Wood appearing to catalogue only the unillustrated edition, which he prices in his own book catalogue at 9s.

Férussac criticized the book favourably in a paper published in the *Journal de Physique* (t. xc, 1820, p. 292).

The second edition of Wood's *Index* is dated 1825. It was, however, really issued in two parts: pp. vii and viii, 1-64 with plates 1-13 were issued in or before June, 1823. (I have a copy of the first part as issued with the subscriber's name, Anne Elizabeth Gregory Williams, and date, June, 1823.)

This first part contains a temporary index to the figures and a mention that the second part will be issued in the year following, but it was delayed until 1825. The complete edition contains a list of subscribers' names, as well as a table of errata.

In 1828 Wood republished his book with additional references, but minus the list of subscribers and table of errata, and an enlarged list of authorities, calling it the "second edition" (in reality it is the third). Later in the same year he published a "Supplement" of 59 pages with eight additional plates and a preface.

This finished W. Wood's connection with the book except as publisher.

S. P. Hanley, recognizing the usefulness and convenient size of the work, turned his attention thereto, brought it up to date as regards nomenclature, and at the same time added an appendix dealing with bivalve shells, which latter appeared in parts between 1842 and 1856. Hanley himself, in the preface to the completed appendix, dated on title-page 1842-1856, gives the dates approximate only in most cases of the appearance of the different parts as set out below.

| | |
|--------------------------|---------------------|
| Sheets B, C. | Close of 1842. |
| " reissued,) | |
| with pp. 1-144 + 7.) | Early in 1843. |
| Sheets L-S, pp. 145-272. | Close of 1843. |
| " J-Q. | " 1856. |
| Plates 9-13. | Early in 1843. |
| " 14-16. | " 1844. |
| " 17-19. | " 1846. |
| " 20-24. | July 26, 1855 or 6. |

The numbering of the plates follows on from pl. 8 in Wood's own supplement.

The title of the first part of Hanley's supplement read as follows: "An illustrated, enlarged, and English edition of Lamarck's species of shells, comprising the whole of the recent additions in Deshayes' last French edition, with numerous species not noticed by that naturalist: accompanied by accurate delineations of almost all the shells described, and forming the third edition of the *Index Testaceologicus*, 1843." This first part consisted of pp. 1-224, 1-8, 3 pp., Pls. 1-3. These plates did not reappear when the part was reissued and do not appear in the same form in the completed work, entirely new plates being issued because the method of reproduction was not considered satisfactory.

MOLLUSCAN NOMENCLATURE PROBLEMS AND SOLUTIONS.—NO. 1.

By TOM IREDALE.

Read 11th January, 1918.

SUMMARY.

Tritonia, Cuvier, discussed.

Euphurus, Rafinesque, 1815, should replace *Triopa*, Johnston, 1838.

Sphærostoma, Macgillivray, 1843, must be used instead of *Tritonia*, Cuvier, 1803, and of recent authorities, not of Cuvier-Lamarck, 1798-1801.

Dotona, gen. nov. for *Melibæa fragilis*, Forbes = *Doto*, Oken, 1815, not 1807.

Eubranchus, Forbes, 1838, should be used for *Galvina*, Alder & Hancock.

Laskeya, nom. nov. for *Eumeta*, Mörch, 1868, not Walker, 1855.

Collonista, gen. nov. for *Collonia picta*, Pease.

Talopena, gen. nov. for *Monilea incerta*, Iredale.

Korovina, gen. nov. for *Vanikoro wallacei*, Iredale.

Forskalena, gen. nov. for *Trochus fanulum*, Gmelin.

Enigma, gen. nov. for *Anomia rosea*, Gray = *Enigma ænigmatica*, auctt.

Amyclina, gen. nov. for *Buccinum corniculum*, Olivi.

Pyreneola, gen. nov. for *Columbella abyssicola*, Brazier.

Caporbis, Bartsch, is a Vermetid nucleus.

Propebela, gen. nov. for *Murex turricula*, Mont.

Calceolata, nom. nov. for *Calceolina*, A. Adams.

Microthya, not *Microtheca*.

Turrid names discussed.

Colicryptus, gen. nov. for *Buccinum fusiforme*, Broderip.

Siphonorbis marshalli, nom. nov. for *Fusus attenuatus*, Jeffreys.

Cominella and *Euthria* subdivided:—

Afrocominella, gen. nov. for *elongata*, Dunker.

Burnupena, gen. nov. for *porcatum*, Gmel. = *cincta*, Bolten.

Evarne, H. & A. Adams, must be used for *linea*, Martyn.

Euthrena, gen. nov. for *vittata*, Quoy & Gaimard.

Japeuthria, gen. nov. for *ferrea*, Reeve.

Syntaxma, nom. nov. for *Donovania*, Bucquoy, D., & Dollfus.

Acostea, Orbigny, will replace *Mulleria*, Férussac, 1823.

Gistel's Molluscan Generic Names, 1848, enumerated.

Damoniella, gen. nov. for *Bulla cranchii*, Fleming.

Muricodrupa, gen. nov. for *Purpura fenestrata*, Blainville.

Teretianax, gen. nov. for *Scalenostoma suteri*, Oliver.

It seems appropriate to initiate some general title for articles such as I have been lately contributing to these Proceedings, and hope to continue to do. The solutions in many cases are comparable to that applied to the Gordian Knot, and I may hereafter find that in this method I have been anticipated. In a similar case reproach was

levelled at the worker, but at the present time I conclude it is the only means of making progress. Thus, quite recently, I published some notes giving the correct names as determined at that time: such decisions were based on my own results, confirmed by the usage of such specialists as Dall, Hedley, Cossmann, etc., yet continuing my investigations I find further corrections necessary, and the case of *Eumeta* herein given may be quoted as an example, while I have others under consideration, such as *Azor*.

TRITONIA, Cuvier.

As introducing a number of nomenclatureal complexes the genus name *Tritonia* furnishes a good example. The first introduction of this name seems to be that of Cuvier in the *Tabl. Elém. Hist. Nat.*, Jan. 1798, p. 387, where a genus is diagnosed but no species are named in connexion. The name *Tritonium* had been proposed at an earlier date. Under the usage of British workers the later name should be discarded, but in this case for some unknown reason the practice was not followed. In 1801 Lamarck accepted the Cuvierian name and gave as example the species *clavigera*, Müller (*Syst. Anim. s. Vert.*, p. 65, Jan.). According to the International Rules this must be accepted as the monotype of Cuvier's genus, but I cannot understand the ruling, while in this case Cuvier later noted that *clavigera*, Müller, might be regarded as a member of the genus, but no certainty was expressed. However, in 1800 Meigen correctly proposed the name *Tritonia* for a genus of Insects: the point is, does the Cuvier-Lamarck name, 1798-1801, anticipate Meigen, 1800?

In the *Ann. Mus. Hist. Nat.*, Paris, vol. i, p. 483, April, 1803, Cuvier fully diagnosed his genus *Tritonia*, illustrating a fine new species, *T. hombergi*, and this has gained acceptance as representative of *Tritonia* and of the family Tritoniidæ. Lamarck's selection, although prior, was dismissed as not being that of Cuvier, and the name *Triopa* proposed by Johnston (*Ann. Nat. Hist.*, vol. i, p. 123, April, 1838) for *clavigera*, Müller, has been used instead. It may be noted that the two species *hombergi* and *clavigera* belong to very different families. If the Cuvier-Lamarck name be accepted it would displace *Triopa*. Several substitute names are on record. *Euphurus* was proposed for *Tritonia*, Lam., by Rafinesque (*Anal. Nat.*, 1815, p. 142), while Gistel, in 1848, introduced *Necromantes* and *Liriopie* for *Tritonia*, Cuvier, mentioning *hombergi* in the latter case. However, in 1843, Macgillivray had described a new species and genus, *Sphærostoma jamesonii* (*Hist. Moll. Anim. Aberd.*, pp. 335-6), which has been identified with *Tritonia hombergi*, Cuvier.

Under these conditions I suggest the rejection of *Tritonia*, Cuvier, as being preoccupied by *Tritonium*, Müller, 1774, and thus remove a most perplexing and unsatisfactory problem from Nudibranch nomenclature.

Then *Euphurus*, Rafinesque, would be available for the genus now called *Triopa*, and *Sphærostoma*, Macgillivray, for the one now bearing the name *Tritonia*, Cuvier, and of the latter *Necromantes* and *Liriopie*, Gistel, would be synonyms. I give a full list of Gistel's names later.

DOTONA, gen. nov. for *Melibæa fragilis*, Forbes.

In other ways than the preceding, Nudibranch names show confusion, and I propose *Dotona* for the species *Melibæa fragilis*, Forbes (Malac. Monensis, 1838, p. 4), the genus name *Doto* quoted as of Oken, 1815, having been used in 1807 by the same author in a different sense.

Galvina, Alder & Hancock, is in use for a group of which one species is the monotype of *Eubranchus*, Forbes, 1838 (loc. cit.), which has priority. Many more instances of this character occur, the case of *Lomanotus*, Verany, being on a parallel with *Tritonia*, Verany's name, 1844-6, being intercepted by *Eumenis*, Alder & Hancock, 1845, which has been rejected.

LASKEYA, nom. nov. for *Eumeta*, Mörch, 1868.

Recently I concluded that *Eumeta* was the valid generic name for a British shell, because the name had been accepted by Thiele, Hedley, etc. I overlooked the fact, as my co-workers had done, that it was preoccupied by Walker. I therefore propose *Laskeya*, nom. nov. for *Eumeta*, Mörch, 1868. I would note that Locard introduced *Cerithiolinum* (Ann. Soc. Agric. Lyon, ser. II, vol. x, 1903, p. 110) as a new name for *Lovenella*, Sars, 1878, about twenty years too late.

COLLONISTA, gen. nov. for *Collonia picta*, Pease.

The genus name *Collonia* has been discussed and is now relegated to fossils agreeing with the type. There seems to be a recent group having much the same features. *Leptothyra* proves to have been first published by Pease in connexion with a juvenile shell of a different genus. The matter is complex and needs careful handling, but I here remedy one item by the above proposition.

TALOPENA, gen. nov. for *Monilea incerta*, Iredale.

Under the name *Monilea* many different shell groups have been confused, and when E. A. Smith pointed out that Swainson's description negated his tentative reference of his type to "*callifera*, Lam.", he used *Solariella*, S. V. Wood. That name given to a Crag fossil should not be used in connexion with recent shells showing unlike shell characters. Gray proposed *Talopia*, apparently for the *callifera* group, but without diagnosing it, and later cited it as a synonym of *Monilea*, Swainson, giving *callifera*, Lam., as type of the genus. Consequently, I conclude *Talopia* would become valid for the *callifera* group. This, however, is not congeneric with the austral species commonly referred to *Monilea*, and two other names have been cited in conjunction with them.

Minolia, A. Adams, and *Conotrochus*, Pilsbry, the latter afterwards being considered by its author as synonymous with the former. Since the last-named is an invalid name, certain corrections seem necessary.

I herewith propose *Talopena* for *Monilea incerta*, which I described from the Kermadecs, and which is typical of a well-marked austral series.

KOROVINA, gen. nov. for *Vanikoro wallacei*, Iredale.

When I named *Vanikoro wallacei* in these Proceedings from the Kermadecs I commented upon the opercular characters, which disagreed with those given for the genus *Vanikoro* by H. & A. Adams. Mr. Hedley informs me that he has a note upon the invalidity of *Vanikoro*, with which I agree, so I now propose *Korovina* for my Kermadec species.

FORSKALENA, gen. nov. for *Trochus fanulum*, Gmelin.

H. & A. Adams introduced *Forskalia* in the Gen. Rec. Moll., vol. i, p. 432, June, 1854, for *Trochus declivis*, Forskal, *fanulum*, Gmel., etc. The previous year that name had been given by Kolliker (Die Schwimmpolypen von Messina, 1853, p. 2) to a Cœlenterate.

I perpetuate the dedication by alteration to *Forskalena*, the second-named species being designated as type. I conclude Forskal was not a binomial writer, so that his species names cannot be legitimately used; since his work was published after his death, the names selected may have simply been preliminary latinized descriptive terms.

ENIGMONIA, gen. nov. for *Anomia rosea*, Gray.

As a rare and peculiar North Australian mollusc, *Ænigma ænigmatica* (Chemn.) has been cited. The correct name of the shell proves as perplexing as this combination reads, since it seems neither generic nor trivial name can be maintained. *Ænigma* is credited to Koch, 1846, the quotation (incomplete) referring to Martini & Chemn., Cont., lief. 56, band vii. I have been unable to trace this. My earliest reference is to the quotation by Gray in the Proc. Zool. Soc. Lond., 1849, p. 114, as a MS. name in the cabinet of Mr. Cuming. It was probably so published at the earlier date. However, in April, 1836, E. Newman had published *Ænigma* in the Entom. Mag., ser. III, vol. v, p. 499, for a beetle.

Tellina ænigmatica, Chemnitz, cannot be used because that author was non-binomial, and according to Sherborn's *Index Animalium* that name was not binomially used before 1800. I have not seen it legitimately employed until 1837, while in Thomson's *Annals of Philosophy*, n.s., vol. ix, Feb. 1825, p. 139, Gray had introduced *Anomia rosea* for the species figured by Chemnitz, vol. x, pl. 199, figs. 1949-50. Gray's type is in the British Museum.

AMYCLINA, gen. nov. for *Buccinum corniculum*, Olivi.

Some years ago I pointed out that *Amycla*, H. & A. Adams, was invalid, and, since I have seen no rectification in the meantime, I propose the new genus *Amyclina* for *Buccinum corniculum*, Olivi.

PYRENEOLA, gen. nov. for *Columbella abyssicola*, Brazier.

I have already noted the distinctness of this genus without naming it, so here provide the above name, because the group is more or less known, and I cannot as yet publish the full account.

CAPORBIS, Bartsch.

Bartsch, in an essay on South African Marine Molluscs (Bull. U.S. Nat. Mus., No. 91, 1915), introduced the name *Caporbis* (p. 170) in

the family Vitrinellidæ. The good figures showed it to be the nucleus of a Vermetid, and Mr. J. R. Le B. Tomlin has recovered examples showing the nucleus perfectly.

PROPEBELA, gen. nov. for *Murex turricula*, Mont.

The above name is proposed because the species selected as type is not congeneric with those recently associated under *Bela*, and the correct generic name of which is *Oenopota*, Mörch. Most recent authorities have agreed with this conclusion, but have not rectified the error.

CALCEOLATA, nom. nov. for *Calceolina*, A. Adams.

A. Adams (Ann. & Mag. Nat. Hist., ser. III, vol. xi, April, 1863, p. 267) introduced a genus *Calceolina*, writing, "This little genus is established on a shell I found at Tanabe, and which I believe to be the same as the *Neritina pusilla* of C. B. Adams." The genus and species were then described, and since the generic name had been anticipated by Rafinesque almost fifty years before, and the species is not that of C. B. Adams, I introduce the new generic name *Calceolata*, while the new specific name will be *anomala*.

MICROTHYCA stands instead of *Microtheca*.

Two pages earlier A. Adams (*op. cit.*) proposed *Microthyca*, and this was altered to *Microtheca*, and has since commonly been so spelt; in the latter state it is invalid, so that reversion must be made to the first spelling, otherwise a new name would be necessary.

TURRID GROUP NAMES.

Dr. Dall has recently published (April 5, 1918) two extremely valuable papers in the Proc. U.S. Nat. Mus., vol. liv, entitled "Notes on *Chrysodomus* and other Mollusks from the North Pacific Ocean" (pp. 207-34), and "Notes on the nomenclature of the Mollusks of the family Turritidæ" (pp. 313-33). Both are really beyond criticism, and the points I here deal with are comparatively trivial, but are offered to complete the cases and draw attention to such items.

The latter is a most complete list of sectional names, and though I have been noting these for some years, I can scarcely make any additions save with regard to incomplete references. Dr. Dall's complete work will be a most invaluable aid to the student of these most puzzling forms, and I anticipate many more sections in connexion with the small Indo-Pacific species, the nuclear characters showing diverse origin in conchologically similar shells, the differences observed being radical, such as the contrast being a highly sculptured "Sinusigera" and a bulbous one-whorled smooth turn.

Thus, *Tomopleura*, Casey, is a well-marked and distinct group which Dall, in one place, refers to *Turris*, s.str., and then to *Teres*, with neither of which can it be confused, while these are very different from each other.

Dall has not seen the paper in the Nat. Sicil., an. ix, May 1, 1890, in which Monterosato proposed *Smithiella*, p. 186, *Villiersiella*, p. 191, and published *Teretia*, p. 187, that name previously appearing only in a privately printed manuscript.

The rejection of *Clionella*, Gray, 1847, in favour of *Melatoma*, Swainson, 1840, seems to need reconsideration, judging from Swainson's figure, since the South African *Clionella* has a short canal quite unlike the long canal indicated by Swainson. I purpose tracing Swainson's type, and in the meantime counsel the retention of the certain name *Clionella*.

Zafra certainly does not seem referable to this family, but I suggest we are confusing several "families" through the influence of the posterior canal. For instance, from the figure, Schepman's *Daphnellopsis* is a close relation to the groups Dall separated as *Maculotriton*, etc., the canal in this case being the one seen in the *Bursa* family, and not of Turrid significance.

COLICRYPTUS, gen. nov. for *Buccinum fusiforme*, Broderip.

When this paper was read I had written *Colicryptus* for *Buccinum fusiforme*, Broderip. Since then I received Dall's "Notes on *Chrysodomus*", in which I see he still retains *Kryptos*, Jeffreys, and says, "*Fusus fenestratus*, Turton (+ *fusiforme*, Broderip, + *Broderipii*, Jeffreys) probably belongs to this genus." Dall thus confirms Dautzenberg & Fischer's usage, who claim priority for the first named, indicating also the latter has been anticipated by Kiener, 1834. Their statement is, however, incorrect, since Broderip's name dates from 1830, not 1835, as given by those authorities. *Fusus fusiforme* has not much likeness to the other members of the group, and I reject *Kryptos* as preoccupied by *Cryptus*, a logical conclusion under the International Rules for Nomenclature. I also introduce the new name

SIPHONORBIS MARSHALLI for *Fusus attenuatus*, Jeffreys,

which is preoccupied by *Fusus attenuatus*, Philippi (*Palæontographica*, Bd. i, pt. ii, March, 1847, p. 72), while I suggest that Marshall's *Fusus consimilis* is founded on a specimen distorted by fracture.

I am quite unable to understand the reason of Dall's rejection of *Neptunea*, Bolten, in favour of *Chrysodomus*, Swainson, for these whelks, seeing that the former is absolutely valid and has been current for many years without question.

It is strange to find so doughty a champion of Boltenian names and stalwart a protagonist of selection of type by elimination calmly throwing over both with the callous remark (p. 214), "The name *Neptunea*, Bolten, was given to a heterogeneous collection now divided into eight or more genera of several distinct families."

COMINELLA AND EUTHRIA DISCUSSED.

I had drawn up some notes on the species classed under *Cominella* and *Euthria*, when the Rev. Dr. A. H. Cooke informed me he was engaged upon the examination of the radulæ of these groups. I therefore withheld my notes until his work was completed. It is worthy of emphasis that his results coincide more or less with my own conclusions based on shell characters, proving once more the concordance of external and internal features. Some of Dr. Cooke's

conclusions, based on published accounts, need reconsideration, as for instance "two (species) at least of which are also found in Australian waters". This refers to Neozelanic species and the two cited "*costata*, Quoy, *lineolata*, Lam." are not truly Neozelanic. I determined a dead shell as referable to the first named, but I am sure now that was a mistake. Neither does the genus occur at the Kermadecs as given by Suter. It is remarkable that one of the radulæ figured by Dr. Cooke (ex Gwatkin coll.) should have been named as "*costata*, Quoy: New Zealand", and I cannot recognize to what it really belonged. The genus name *Cominella* was proposed by Gray in 1850 (Fig. Moll. Anim., vol. iv, p. 72), the species attached being *testudinea*, *maculosa*, etc., and the first-named figured. I here designate that as type. As shown by Dr. Cooke, the radulæ of the Austro-Neozelanic species are similar in type and consequently shell characters have to be considered. The *costata-lurida* group show a constant shell formation very different from *adpersa*, *maculosa*, and *virgata*. These last three differ among themselves, and a more detailed examination will probably result in their separation. At the present time I propose to deal with the South African "*Cominella*", which are readily separable by shell characters and whose radulæ are remarkably different. The exact names of these species will be dealt with later, but I introduce *Afrocominella* for *elongata*, Dunker, and *tigrina*, Kiener, designating the former as type, and propose *Burnupena* for the peculiarly distinct group, *delalandii*, Kiener, *lagenaria*, Lam., *limbosa*, Lam., and *porcata*, Gmelin, designating the last named as type, while pointing out that the species name is preoccupied and that it should be *cineta*, Bolten (Mus. Bolten, 1798, p. 113), proposed for Martini, 4, t. 126, figs. 1213-14. So that the type name stands *Burnupena cineta* (Bolten).

With regard to the radula of *Euthria*, Dr. Cooke has shown that diverse groups have been confounded under this name, a fact communicated to me by Professor Gwatkin many years ago. Cooke places the Neozelanic *linea*, Martyn, with the European *cornea*, L., the type of the genus: the radula is somewhat different and the shell decidedly so, that I revive for it the genus name *Evarne*, proposed by H. & A. Adams, but afterwards ignored. The other Neozelanic species cannot be classed with *linea*, so I introduce the name *Euthrena* for them, naming *vittata*, Quoy & Gaimard, as type.

The extraordinary radula presented by *ferrea*, Reeve, from Japan, proves at once that this species is no relation to either the European *Euthria* or the Southern so-called *Euthria*. In order to attract attention I propose *Japeuthria* for Reeve's species alone. Cooke shows by means of the radulæ that the Magellanic species of *Euthria* belong in reality to *Cominella*, a fact I pointed out to Messrs. E. A. Smith and H. B. Preston some years ago from consideration of conchological features alone.

SYNTAGMA, nom. nov. for *Donovania*, B., D., & D.

In an essay on Crustacea in Brewster's Edinburgh Encyclopedia, vol. vii, 1814, Leach proposed the generic names *Donovania* (p. 435),

Montagua and *Mulleria* (p. 436). All these three were later introduced for molluscs, the first and last still being used, the second one rejected on different grounds.

The first-named has been constantly used since 1882, and has no valid synonymy, so I name the genus *Syntagma*, the species *Buccinum brunneum*, Donovan, being retained as type. The genus is included by Dall in his list of Turritidæ, without comment, though years ago M. Woodward showed that the radula was buccinoid.

ACOSTÆA, Orbigny, will replace *Mulleria*, Férussac, 1823.

As above noted *Mulleria* can no longer be used for the well-known freshwater Oyster, but there is a ready-made alternative, *Acostæa*, Orbigny, 1851 (Rev. & Mag. Zool., sér. II, tom. iii, p. 184), available for use.

GISTEL'S MOLLUSCAN GENERIC NAMES, 1848.

In a book entitled "Naturgeschichte des Thierreichs für Schulen", published in 1848, Gistel introduced a large number of corrections (?) of invalid names, and these escaped note for some time, probably through carelessness, as H. & A. Adams cited many of them in their "Genera of Recent Mollusca". The names are recorded in two places: firstly, in a prefatory discussion on preoccupied names, and secondly, in the body of the work. The former list was obviously compiled as an after-thought, and frequently Gistel has named the same thing twice, and just as often used the same name twice in different connexions, while he very commonly selected preoccupied names in his corrections. Since the book is not well known and the names may need consideration, I give a list of the Gistel innovations, as follows:—

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| p. viii. | <i>Cerana</i> , new name for | <i>Artemis</i> , Conchyl. Anton Cat. |
| | <i>Ebion</i> | <i>Bonellia</i> , der Conchyl. Anton Conchyl. Cat., <i>Cerithium</i> . |
| | <i>Macropelmus</i> | <i>Calcar</i> , Montfort; <i>Trochus imperialis</i> , Lam. |
| | <i>Fabius</i> | <i>Cavolinia</i> , Brug., Isis, 1834, p. 263, Eschch. Zool. Atlas. |
| | <i>Potamius</i> | <i>Cavolinia</i> , D'Orb., Isis, 1839, p. 522. |
| | <i>Geodes</i> | <i>Achatina</i> , Lam., Mollusq. |
| | <i>Ephrada</i> | <i>Buchanaania</i> , Lesson, 1830; Isis, 1833, p. 126, Mollusk. |
| | <i>Averna</i> | <i>Ceratophora</i> , d'Orb. = <i>Cerophora Hyalæa</i> . |
| | <i>Symmethus</i> | <i>Brocchia</i> , Bronn, Reise ii, p. 479, Fossil, <i>Patella</i> . |
| | <i>Epulo</i> | <i>Cirroteuthis</i> , Eschricht. Act. Leop. Acad., vol. xviii, p. 2. |
| | <i>Harpax</i> | <i>Cunninggia</i> , Broderip, Conchyl. Isis, 1835, p. 452. |
| | <i>Hyperia</i> | <i>Cuvieria</i> , Lesson, Rang, etc., Isis, 1839, 497. |

- p. viii. *Cencus*, new name for *Cyclops*, Lam., Conchyl.
Cænobita *Chromocochlea*, *C. turbinoides*.
Cleone *Dipsas*, Leach, *Mytilus*.
- p. ix. *Hydromyles* *Eurybia*, Rang, Isis, 1829, p. 519.
Hydrodactes *Gervillia*, Defrance, Foss. Austr.
Asmena *Melanopsis*, Lam.
Epistrophea *Eledone*, Leach, *Sepia*.
Lora *Defrancia*, Millet, Gasterop; *D. viridula*, O. Fabr.
Lithoparches *Melania*, Conchyl.
- p. x. *Eudrastus* *Peronia*, Quoy, Isis, 1834, p. 287.
Potamius *Potamis*, Brong., *Buccinum*.
Ecmanis *Proboscidea*, Sch., *Buccinum igneum*,
 Lin.
Anopsia *Psyche*, Rang, em. *Clio*.
Epitychusa *Rossia*, Owen, Cephalopoda palpebrosa.
Echomythes (not p. viii) *Physa*, Draparnaud, Schneck.
Apanthausa *Rissoa*, Frém., Gasterop.
- p. xi. *Nyctilochus* *Triton*, Broderip, Isis, 1835, p. 453.
Erethismus *Trichia*, Hartm., Schneck, 1842,
T. clandestina.
Necromantes *Tritonia*, Cuvier, Mollusq.
Amphibulima *Succinea*, Draparn., Schneck.
Artopoa *Terebellum*, Lam., Schneck.
Oicodespina *Villersia*, d'Orbigny in Guérin,
 Magas., vol. vii.
- p. xiv. *Pagana* *Vitrina*, Drap., Mollusk.
Cordium *Cardium*.
Cordissa *Cardissa*.
Eustylon *Cacophonia*, p. 172.
- p. 166. *Crino* *Limacina*.
p. 168. *Oncæa* *Achatina*.
Chernites *Neritina*.
p. 169. *Anatasia* *Rissoa*.
Hydrognoma *Melania*.
Ceneona *Melanopsis*.
Carassa *Pedipes*.
Orthopnæa *Phasianella*.
Pimpellies *Monodonta*.
Achates *Janthina (communis)*.
Scalator *Delphinula*.
- p. 170. *Lucis* *Terebellum*.
Galanthis *Eburna (tessellata)*.
Charonia *Tritonium tritonis*.
- p. 171. *Potamis* *Potamides*, Brong.
Dadone *Glaucus (eucharis and atlantica)*.
Liriope *Tritonia (hombergi)*.
- p. 172. *Haplomochlia* *Psammobia*.
Butor *Anatina*.
Cacophonia *Lutraria*.

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| p. 172. | <i>Isarcha</i> , new name for | <i>Sanguinolaria</i> , Lam. |
| | <i>Procos</i> | <i>Capra</i> . |
| | <i>Armida</i> | <i>Cyprina</i> . |
| | <i>Cerceis</i> | <i>Hippopus</i> . |
| p. 173. | <i>Eufira</i> | <i>Iridina</i> , Lam. |
| p. 174. | <i>Nausimacha</i> | <i>Laniogerus</i> . |
| | <i>Philopseudes</i> | <i>Psyche</i> . |
| | <i>Herse</i> | <i>Cuvieria</i> . |

I have already drawn attention to *Lora*, *Anopsia*, *Hydromyles*, *Charonia*, and would here note that *Hyperia* and *Herse*, both provided for *Cuvieria*, were each invalid, but such a name as *Ecmanis* may later be called into use. If a substitute for *Glaucus* be needed *Dadone* must be considered, while the two substitutes for *Cavolinia* as used by Eschscholtz & d'Orbigny need criticism, but as *Fabius* is invalid neither may claim usage. The consideration of the preceding confirms my conclusion that all are absolutely substitute names, and can only be determined as such, and consequently the mention of a species cannot legitimize Gistel's name in that connexion as opposed to its substitution value.

DAMONIELLA, gen. nov. for *Bulla cranchii*, Fleming.

In the Proc. Zool. Soc. Lond., 1847, p. 161, "*Roxania*, Leach MSS., 1819. *Bulla cranchii*" was given by Gray. This was published in November, but in the October number for the same year of the Ann. & Mag. Nat. Hist., vol. xx, p. 268, the name had been printed as "*Roxania cranchii*", which twenty years before Turton, in the Zool. Journ., vol. ii, p. 566, 1826, had recorded from Torbay and Scarborough. However, *Bulla cranchii* was not described until 1828, when Fleming gave an account in his Hist. Brit. Anim. (ante April 1), p. 292, from specimens received from Leach procured at Plymouth Sound. Leach was apparently distributing species under his generic names to different people, and, moreover, different species were confused. Thus Lamarck described *Bulla cornea* from specimens received from England, citing as a synonym *Bulla cranchi*, Leach. This species has been identified as *Bulla hydatis*, Linné, which seems to invalidate the specific name. Then in the Mag. Nat. Hist. (London), vol. vii, p. 352, July, 1834, Turton described *Bulla hyalina*, citing in association with it the genus name *Roxania*, Leach MS. This seems to be the earliest legitimate use of the name. Since this species is quite unlike the usually accepted one, it is fortunate that Stephens had previously proposed *Roxana* for a genus of Lepidoptera.

There is no necessity to quibble as to whether *Roxania* and *Roxana* may be used independently, because the name is that of one of the wives of Alexander the Great, and appears under both spellings in history. In the proof-sheets of the Synopsis of the Mollusca of Great Britain, printed in 1819, the name appears on pp. 49 and 60 as *Roxania*, but in the MS. index, written by J. E. Gray, it is spelt *Roxana*.

I might here note that *Mangelia* was invented by Leach and accepted by Risso, and it is a pure coincidence that it should look like a name intended to honour Mangili, with whom, as far as I have been able to trace, it has absolutely no connexion. Through inattention to this detail some of our most conscientious writers have spelt it *Mangilia*.

MURICODRUPA, gen. nov. for *Purpura fenestrata*, Blainville.

A certain peculiar shell has long been known as *Ricinula* (or *Sistrum*) *cancellata*, Quoy & Gaimard. The generic name was inapplicable, and I now find the specific one also doubly invalid, being anticipated as well as preoccupied. Firstly, *Drupa*, Bolten, is earlier than *Ricinula* or *Sistrum*, as well as *Ricinella*, all based on the same group. The shell under consideration was obviously not congeneric with the members of that genus. Lumped in, however, was a series of smaller shells whose generic name appears to be *Morula*, and it was likewise discordant with these. Shells more like, also included, have been separated by Martens as *Semiricinula*. I noted this name used subgenerically in the *Wissensch. Ergeb. Deutsch. Tiefsee Exped., Valdivia, 1903, vol. vii, pp. 95 and 137*, without indication of novelty, so that it may have been previously proposed, but the name does not appear in the *Zoological Record* so far as I have seen. I therefore name *muricina*, Blainville, as type, and for the shell named *Purpura fenestrata*, Blainville, 1832 = *cancellata*, Quoy & Gaimard, 1833, not of Bolten, 1798, I add *Muricodrupa*.

In arriving at this result the following facts came to light. In January, 1832, Duclos published a preliminary note (*Ann. Sci. Nat.*, tom. xxv, pp. 90-5) on Purpuroid shells, following it up with a further item in May (*op. cit.*, tom. xxvi, pp. 103-12), describing some new species, and declaring his intention of monographing the group with illustrations. He quoted (p. 109) the publication of Valenciennes' species, *P. speciosa*, which he described as *P. centriquadra*. After June, but before August, Blainville published a complete monograph, and therein named species figured by Quoy & Gaimard in the *Atlas to the Voyage of the Astrolabe* under vernacular names, the text to the latter not appearing until 1833. The chronology reads thus: *Ante* May, 1832, Valenciennes; May, 1832, Duclos; *post* June, *ante* August, 1832, Blainville; 1833, Quoy & Gaimard. The species concerned seem to be

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| <i>Purpura canaliculata</i> , Valenciennes, antedates | <i>P. canaliculata</i> , Duclos. |
| <i>chaidea</i> , Duclos | „ <i>P. nassoidea</i> , Blainville = <i>P. nassoidea</i> , Quoy & Gaimard. |
| <i>speciosa</i> , Valenciennes | „ <i>P. centriquadra</i> , Duclos. |
| <i>granulata</i> , Duclos | „ <i>P. tuberculata</i> , Blainville. |
| <i>bicarinata</i> , Blainville | „ <i>P. helena</i> , Quoy & Gaimard. |

Purpura monodonta, Blainville, antedates *P. monodonta*, Quoy & Gaimard.
fenestrata, Blainville ,, *P. cancellata*, Quoy & Gaimard, not of Bolten, Mus. Bolt., 1798, p. 143.

However, *P. chaidea*, Duclos, is claimed to be identical with the prior *Purpura nodulifera*, Menke, 1829.

The species Duclos described as *Purpura sphaeridia* has been recognized as *Ricinula morus*, Lamarck, which name is later than *Morula papillosa*, Schumacher, and which I determine as *Drupa uva*, Bolten (Mus. Bolt., 1798, p. 56). In order to avoid change of the well-known *morus* Pilsbry has recently pleaded that the figure given by Chemnitz was not accurately determinable. The description, however, is very good. He would then fall back upon the illustration in the Tabl. Encycl. Méthod., pl. 395, fig. 6. Here again danger lies, because that figure was named *Ricinula nodus* by Lamarck himself prior to his proposal of the name *morus* for the same shell.

The outstanding groups appear to be as follows:—

Drupa, Bolten, 1798 (type, *Murex ricinus*, Linné) = *Sistrum*, Montfort, 1810 = *Ricinula*, Lamarck, 1816 = *Ricinella*, Schumacher, 1817.

Morula, Schumacher, 1817 (type, *M. papillosa* = *Drupa uva*, Bolten, 1798).

Semiricinula, Martens, 1903 (type, *Purpura muricina*, Blainville).

Muricodrupa, gen. nov. for *Purpura fenestrata*, Blainville.

I had ranged the species in order when Dr. Cooke informed me that he proposes to develop his studies on the radulae in the near future, and his notes show that in this group not only shell distinctions coincide with radular differences, but also that convergence in shell features may mask divergence in the characters of the radula.

TERETIANAX, gen. nov. for *Scalenostoma suteri*, Oliver.

Bartsch in his "Monograph of West American Melanellid Mollusks" (Proc. U.S. Nat. Mus., vol. liii, Aug. 1917, pp. 295-356) has in my opinion misused group names in an extraordinary manner. One item will suffice: *Melanella*, Bowdich, is employed, two subgenera being accepted, *Melanella*, s.str., and *Baleis*, Leach, 1852. The former is characterized "Melanellas with straight shells", the latter "Melanellas with flexed shells". The diagnosis of *Melanella* reads "Turreted; spire curved", and the type of *Baleis* is a straight shell and is so included by Bartsch himself. In the Bull. U.S. Nat. Mus. No. 90, Jan. 21, 1915, his colleague, Dr. Dall, gave a cursory review of the group, writing the facts correctly.

On p. 354 Bartsch used *Lambertia* as of Souverbie, 1869, but that name was invalid and had been corrected to *Hypermastus* by Pilsbry in a paper quoted elsewhere in this essay by Bartsch. As a matter

of fact I note many group names missing which might have significance in connexion with the new groups introduced by Bartsch. He greatly confuses *Subeulima* and *Scalenostoma*, as may be seen from the fact that he has described a *Subeulima magnifica*, a shell 5 mm. long, whereas the type was 23 mm. long and not congeneric.

I hope to deal thoroughly with this group later on, for I possess species belonging to such rare sections as *Selma*, A. Adams, *Apicalia*, A. Adams, and *Hoplopteron*, Fischer, the last named appearing to be misunderstood by both Dall and Bartsch. In the meanwhile I propose *Teretianax* for the shell from the Kermadecs described by Oliver under the name *Scalenostoma suteri*, a doubtful member of this family(?).

PRESIDENTIAL ADDRESS.

By J. R. LE BROCKTON TOMLIN, M.A., F.E.S., etc.

Delivered 8th February, 1918.

A SYSTEMATIC LIST OF THE FOSSIL MARGINELLIDÆ.

IN the List of recent Marginellidæ published last year I ventured to hope that I might have time eventually to catalogue the fossil species as well. This necessary complement I am now able to bring forward, arranged on precisely similar lines and with similar limitations. It contains 350 names, but probably a number of omissions will be detected from time to time, since I find the Zoological Record so much less complete an index to fossil forms. In the case of papers which appeared in serials the separate titles have frequently been added in brackets when the paper is an important or comprehensive one. The geological formation is quoted as given by the author in his original description.

It only remains for me to express my thanks for renewed assistance to the friends who helped me before, and to add the names of C. D. Sherborn, A. Reynell, K. Martin, and M. Cossmann, to whom I am equally indebted.

- ABNORMIS, Morlet (*Marginella*), April 1, 1888. Journ. de Conch., xxxvi, 216, pl. x, f. 5, 5a, b. *Loc.*—Crènes and La Tuilerie (Eoc. Sup.). *Type.*—Coll. Morlet (from Crènes).
- ACUTANGULA, Deshayes (*Marginella*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 551, pl. 104, f. 24-6. *Loc.*—Les Groux and Parnes (Calc. Gross.). *Type.*—Coll. Deshayes.
- ACUTISPIRA, Cossmann (*Marginella*), 1889. Ann. Soc. Roy. Malac. Belg., xxiv, 206, pl. vii, f. 12 (Cat. Ill. Coq. Foss. Eoc. Environs Paris). *Loc.*—La Ferme de l'Orme (Eoc. Moy., Eoc. Sup.). *Type.*—Coll. Bezançon. Var. *subconca*, Cossmann, l.c., f. 13. *Loc.*—Chaussy. *Type.*—Coll. Cossmann.
- acutiusecula*, Sowerby (*Volvaria*), 1822. Genera Rec. and Foss. Shells, pt. v, pl. 257, f. 3. *Loc.*—Hordwell (London Clay). *Type.*—Coll. Sowerby in Brit. Mus. Not a Marginellid.
- acyensis*, Cossmann (var.), 1889. See BIFIDOPPLICATA, Edwards.
- ÆSTUARINA, Edwards (*Marginella*), Dec. 1, 1865. Geol. Mag., ii, no. 12, 541, pl. xiv, f. 7a-c. *Loc.*—Headon Hill and Roydon. *Type.*—Coll. Edwards in Brit. Mus. This species was originally included in PUSILLA, Edwards.
- AFFINIS, Sacco (*Marginella* (*Glabella*)), 1890. Mem. R. Accad. Sci. Torino, ser. II, xl, 316, pl. ii, f. 6 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Colli Torinesi (Mioc. Med.). *Type.*—Mus. Geol., Torino.
- AGLAJA, Semper (*Marginella*), 1861. Paläont. Untersuch., no. 13, p. 231 (from Archiv Ver. Freunde Naturg. Mecklenburg, 1861). New name for *eburnea*, Brongn., non Lam.
- albidolineata*, Sacco (var.), Aug. 1904. See ELONGATA, B. & M.
- ALBINGÆ, Tate (*Marginella*), 1878. Trans. Phil. Soc. Adelaide for

- 1877-8, p. 90 (Foss. Marg. Australia). *Loc.*—Blanche Point, Aldinga, S.A. (Eoc. Marls).
- americana*, Conrad (*Marginella*), 1861. Foss. Med. Tert. U.S., no. 4, p. 86 (name only without description), pl. xlix, f. 12. *Type.*—Lost. = COLUMBA, I. Lea, *vide* Dall, in Trans. Wagner Free Inst. Sci. Philad., iii, 56.
- AMIANTULA, Dall (*Marginella* (*Volutella*)), Aug. 1890. Trans. Wagner Free Inst. Sci. Philad., iii, pt. 1, 55, pl. v, f. 9 (Contrib. Tert. Fauna Florida). *Loc.*—Caloosahatchie marl, Florida (Plioc.). *Type.*—U.S. Nat. Mus.
- AMINA, Dall (*Marginella*), Dec. 30, 1896. Proc. U.S. Nat. Mus., xix, 309, pl. xxix, f. 15 (Descr. Tert. Foss. Antill. Reg.). *Loc.*—Potrero, Rio Amina, Santo Domingo (Oligoc.). *Type.*—U.S. Nat. Mus.
- AMPHICOMUS, Fuchs (*Marginella*), 1869. Denkschr. k. Akad. Wissensch. Wien, xxx, 184, pl. x, f. 28, 29 (Beitrag Kenntn. Conch.-Fauna Vicent. Tertiärgeb.). *Loc.*—Sangonini (Tongrian).
- AMPHORA, Oppenheim (*Marginella* (*Closia*)), 1896. Zeitschr. Deutsch. geol. Gesell., xlviii, Heft 1, 76, pl. iii, f. 7 (Alt Tert. Colli Berici Venet.). *Loc.*—Zovencedo (Eoc.).
- AMPULLA, Deshayes (*Marginella*), 1835. Descr. Coq. Foss. Environs Paris, ii, 711, pl. xcv, f. 17-19. *Loc.*—Valmondois. *Type.*—“Mon cabinet.” Deshayes subsequently referred this species to *Erato*, but Cossmann considers it a *Marginella*.
- anatina*, I. Lea (*Marginella*), Nov. 1833. Contrib. Geol., p. 176, pl. vi, f. 186. *Loc.*—Claiborne, Ala. (Tert.). = CRASSILABRA, Conrad.
- ANGUSTIFORIS, Rothpletz & Simonelli (*Marginella*), 1891. Zeitschr. Deutsch. geol. Gesell., xlii, Heft 4, 718, pl. xxxvi, f. 5, 5a (Marin. Ablag. Gran Canaria). *Loc.*—La Vista Süd, Gr. Canaria.
- ANGYSTOMA, Deshayes (*Marginella*), 1835. Descr. Coq. Foss. Environs Paris, ii, 710, pl. xcv, f. 23-5. *Loc.*—Parnes, Grignon, and Mouchy. *Type.*—“Mon cabinet.”
- ANTIQUA, Redfield (*Marginella*), June, 1852. Ann. Lyc. Nat. Hist. New York, v, 226. *Loc.*—Petersburg, Virginia (Mioc.). *Type.*—Coll. Redfield in Acad. Nat. Sci. Philad. (no. 2518).
- arctata*, Deshayes (*Marginella*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 549, pl. civ, f. 33-5. *Loc.*—Chambors (Calc. Grossier). *Type.*—Coll. Deshayes. = DENTIFERA, Lam., *vide* Cossmann in Ann. Soc. Roy. Malac. Belg., xxiv, 201.
- ARCUATA, Guppy (*Marginella* (*Persicula*)), Dec. 30, 1896. Proc. U.S. Nat. Mus., xix, 308, pl. xxix, f. 13 (Descr. Tert. Foss. Antill. Reg.). *Loc.*—Pointapier, Trinidad (Tert.). *Type.*—U.S. Nat. Mus., no. 107141.
- auris-leporis*, DeFrance (*Marginella*), ex Brocchi (*Voluta*). Quoted by DeFrance, Diet. Sci. Nat., xxix, 146 (1823), from Brocchi's Conch. Foss. Subapenn., ii, 320, pl. iv, f. 11a, b (1814). Not a Marginellid.
- auris-leporis*, Hoernes (*Marginella*), 1853. Jahrb. geol. Reichs-Anst., 1853, p. 190. *Loc.*—Otttnang (Tert.). = STURI, Hoernes.
- AURORA, Dall (*Marginella*), Aug. 1890. Trans. Wagner Free Inst.

- Sci. Philad., iii, pt. 1, 51, pl. vi, f. 4a (Contrib. Tert. Fauna Florida). *Loc.*—Miocene beds of the Chipola River, Florida. *Type.*—U.S. Nat. Mus.
- avena*, Michelotti (*Marginella*), 1847. Naturk. Verhand. Holl. Maatsch. Wet. Haarlem, Verzam. ii, Deel 3, Stuk 2, 323 (Descr. Foss. Terr. Mioc. Ital. Septentr.). *Loc.*—Tortona. *Types.*—Mus. Soc. Holl.; "mon cabinet." Generally identified with *OBLONGATA*, Redf.; queried by Sacco as perhaps = his *IRLÆ* (q.v. for reference).
- BALLISTA, Dall (*Marginella*), Aug. 1890. Trans. Wagner Free Inst. Sci. Philad., iii, pt. 1, 47, pl. iv, f. 6 (Contrib. Tert. Fauna Florida). *Loc.*—Tampa silex beds at Ballast Point, Florida (Oligoc.). *Type.*—U.S. Nat. Mus., no. 112906.
- BARRANDEI, Hoernes & Auinger (*Eratopsis*), Dec. 31, 1880. Gasterop. Meeres-Abt. Mioc. Med.-Stufe, Lief. ii, 64, pl. viii, f. 8–10. *Loc.*—Niederleis. Cf. *planulosa*, Sism.
- barreti*, Morlet (*Marginella*), April 1, 1888. Journ. de Conch., xxxvi, 215, pl. x, f. 6, 6a (not 4, 4a). *Loc.*—Le Ruel, La Tuilerie, Crènes (Eoc. Sup.). *Type.*—Coll. Morlet (La Tuilerie). = *PUSILLA*, Edwards, *vide* Cossmann in Ann. Soc. Roy. Malac. Belg., xxiv, 205.
- BEBERKIRIANA, K. Martin (*Marginella*), 1906. Samml. geol. Reichs-Mus. Leiden, n. ser., i, Heft 10, 300, pl. xliii, f. 714 (Foss. von Java). *Loc.*—Tji Beber Kiri (Tert.). *Type.*—Rijks Geol.-Mineral. Mus., Leiden.
- BELLA, Conrad (*Prunum*), Oct. 1, 1868. Amer. Journ. Conch., iv, 67, pl. vi, f. 4. *Loc.*—Day's Point, James River, Va. (Mioc.). *Types.*—Acad. Nat. Sci. Philad. (8), no. 2513. This species also occurs in a recent condition (cf. Proc. Malac. Soc. Lond., xii, 253). As *Porcellana bella*, Conrad, the name is found as a *nomen nudum* in Proc. Acad. Nat. Sci. Philad., 1862, p. 564. Var. *bellula*, Dall, Aug. 1890. Trans. Wagner Free Inst. Sci. Philad., iii, pt. 1, 53, pl. iv, f. 8e. *Loc.*—Florida (Plioc.). *Type.*—U.S. Nat. Mus., no. 165053. Var. *inepta*, Dall, Aug. 1890. l.c., f. 8d. *Loc.*—Florida (Plioc.). *Type.*—U.S. Nat. Mus., no. 112101.
- BELLARDIANA, Semper (*Marginella*), 1861. Paläont. Untersuch., no. 13, p. 229 (from Archiv Ver. Freunde Naturg. Mecklenburg, 1861). *Loc.*—Orciano (Mioc.) and Coroncina (Plioc.), both in Tuscany.
- bellula*, Dall (var.), Aug. 1890. See BELLA, Conrad.
- benestarensis*, Seguenza (*Marginella*), 1880. Atti R. Accad. Lincei, ser. III, vi (Memorie), 101, pl. xi, f. 2, 2a (Formaz. Terz. Prov. Reggio). *Loc.*—Benestare. = *EMARGINATA*, Sism. (*marginata*, Mich.), *vide* Sacco in Mem. R. Accad. Sci. Torino, ser. II, xl, 319 (as *benasterensis*).
- beyrichi*, Deshayes (*Marginella*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 546. New name for *eburnea*, Beyrich, non Lam. = *INTUMESCENTS*, Koenen.
- BEYRICHII, Semper (*Marginella*), 1861. Paläont. Untersuch., no. 13, p. 232 (from Archiv Ver. Freunde Naturg. Mecklenburg, 1861).

- Loc.*—"Verschwemmt in Diluvium von Mölln; ?Holsteiner Gestein."
- BEZANCONI, Cossmann & Lambert (*Marginella*), 1884. *Mém. Soc. Géol. France*, sér. III, iii, no. 1, 180, pl. iii, f. 2a, b (Étude Terr. Oligoc. Étampes). *Loc.*—Pierrefitte. *Types.*—Coll. Lambert; Coll. Cossmann.
- BIDENS, Koenen (*Marginella*), March, 1890. *Abhandl. geol. Specialkarte Preussen u. Thüring. Staaten*, x, Heft 2, Lief. ii, 553, pl. xxxviii, f. 11a-c (Norddeutsch. Unter-oligoc. Moll. Fauna). *Loc.*—Unseburg, etc., N. Germany (Unter-oligoc.).
- BIFIDOPPLICATA, Edwards, ex Charlesworth MS. (*Marginella*), 1854. *Monogr. Eoc. Moll. (Palæont. Soc.)*, pt. iii, p. 139, pl. xviii, f. 2a-g. *Loc.*—Highcliff sands; Barton beds; Alum Bay; Bracklesham Bay. *Type.*—Coll. Edwards in Brit. Mus. Var. *acyensis*, Cossmann, 1889. *Ann. Soc. Roy. Malac. Belg.*, xxiv, 202 (Cat. Illustr. Coq. Foss. Eoc. Env. Paris). *Loc.*—Acy. *Type.*—Coll. Cossmann.
- biplicata*, I. Lea (*Marginella*), Nov. 1833. *Contrib. Geol.*, 201, pl. vi, f. 216. *Loc.*—Claiborne, Alabama (Tert.). Is a *Ringicula*.
- BONNETI, Cossmann (*Marginella*), April, 1899. *Essais Paléococonch. Compar.*, iii, 87, pl. iii, f. 27, 28. *Loc.*—Karikal (Plioc.). *Type.*—Coll. Bonnet.
- BORSONI, Sacco, ex Bellardi MS. (*Marginella (Glabella)*), 1890. *Mem. R. Accad. Sci. Torino*, ser. II, xl, 314, pl. ii, f. 2 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Colli Torinesi (Mioc. Med.). *Type.*—Coll. Mus. Torino. Var. *crebrelineata*, Sacco, Aug. 1904. *Moll. Terr. Terz. Piemonte e Liguria*, pt. 30, p. 91, pl. xix, f. 36. *Loc.*—Colli Torinesi. *Type.*—Coll. Mus. Torino. This is Sacco's var. A of 1890.
- BOURDOTI, Cossmann (*Marginella*), Dec. 31, 1896. *Bull. Soc. Sci. Nat. Ouest France*, sér. I, vi, 221, pl. vii, f. 26-8 (Moll. Eoc. Loire-Inf^e). *Loc.*—Bois Gouët (Eoc.). *Type.*—Coll. Bourdot.
- BOURYI, Cossmann (*Marginella*), 1889. *Ann. Soc. Roy. Malac. Belg.*, xxiv, 203, pl. vii, f. 19 (Cat. Illustr. Coq. Foss. Eoc. Env. Paris). *Loc.*—Middle Eocene at Neauphlette (type loc.), Chambors and Réquiécourt. *Type.*—Coll. de Boury.
- BREVIS, Koenen (*Marginella*), March, 1890. *Abhandl. geol. Specialkarte Preussen u. Thüring. Staaten*, x, Heft 2, Lief. ii, 556, pl. xxxviii, f. 18-20 (Norddeutsch. Unter-oligoc. Moll. Fauna). *Loc.*—Lattorf, etc., N. Germany (Unter-oligoc.).
- brevis*, Sacco, ex Bellardi MS. (*Marginella (Persicula)*), 1890. *Mem. R. Accad. Sci. Torino*, ser. II, xl, 321, pl. ii, f. 16 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Colli Tortonesi, Stazzano (Mioc. Sup.). *Type.*—Coll. Mus. Geol., Torino. The above volume has a printer's date of Oct. 15, 1890, on the fourth page of cover, and the date of receipt at the Nat. Hist. Mus. was Dec. 5, 1890. = MICROGLAPHYRA, Tomlin.
- BREVISPIRA, Sacco, ex Bellardi MS. (*Marginella (Glabella)*), 1890. *Mem. R. Accad. Sci. Torino*, ser. II, xl, 317, pl. ii, f. 8 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Colli Torinesi (Mioc. Med.). *Type.*—Coll. Rovasenda.

- brevispira*, Oppenheim (*Marginella* (*Volvarina*)), Oct. 1906. Palæontographica, xxx, Abt. 3, Lief. ii, 334, pl. xxv, f. 3, 4 (Zur Kenntniss alttert. Faunen Ægypt.). *Loc.*—Mokattam (Ob. Mokattam - Stufe). *Type.*—Berlin Samml. = *TROCHISCUS*, Tomlin.
- brongniarti*, Deshayes (*Marginella*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 546. New name for *eburnea*, Brongn., non Lam. = *AGLAJA*, Semper.
- brunneozonata*, Sacco (var.), Aug. 1904. See *EMARGINATA*, Sism.
- bulloides*, Lamarck (*Volvaria*), Sept. 1804. Ann. Mus. Hist. Nat. Paris, v, 29. *Loc.*—Grignon. *Type.*—"Mon cabinet." Not a Marginellid.
- CALHOUNENSIS*, Maury (*Persicula*), March 1, 1910. Bull. Amer. Paleont., iv, no. 21, p. 134 (16), pl. iv, f. 5 (New Oligoc. Sh. Florida). *Loc.*—Bailey's Ferry, Florida (Chipola Oligoc.). *Type.*—Coll. Cornell University.
- cancellata*, Du Bois de Montpéreux (*Marginella*), 1831. Conch. Foss. et Aperçu Géogn. Form. Plat. Wolhyn.-Podolien, p. 24, pl. i, f. 17, 18. *Loc.*—Sable de Szuskowce (Tert.). *Type.*—Coll. Du Bois. The author queries the identity of his species with *M. costata*, Eichwald, and Orbigny (Prodr. de Paléont. Stratigr., iii, 37) confirms this synonymy. The species is a *Ringicula*.
- CASSIDIFORMIS*, Tate (*Marginella*), 1878. Trans. Phil. Soc. Adelaide, S. Australia, for 1877-8, p. 91 (Foss. Marg. Australia). *Loc.*—Muddy Creek, near Hamilton, Victoria (Mioc.).
- CENCHRIDUM*, Cossmann (*Marginella*), Dec. 31, 1896. Bull. Soc. Sci. Nat. Ouest France, sér. i, vi, 230, pl. vii, f. 16-18 (Moll. Eoc. Loire-Inf^e). *Loc.*—Bois Gouët (Eoc.). *Type.*—Coll. Cossmann.
- CHASTAINGI*, Cossmann (*Marginella*), 1889. Ann. Soc. Roy. Malac. Belg., xxiv, 200, pl. vi, f. 20-1 (Cat. Illustr. Coq. Foss. Eoc. Env. Paris). New name for *ventricosa*, Cossmann, non G. Fischer.
- CHEVALLIERI*, Cossmann (*Marginella*), 1889. Ann. Soc. Roy. Malac. Belg., xxiv, 208, pl. vii, f. 17 (Cat. Illustr. Coq. Foss. Eoc. Env. Paris). *Loc.*—Parnes (Eoc. Moy.). *Type.*—Coll. Chevallier.
- CHIPOLANA*, Maury (*Marginella*), March 1, 1910. Bull. Amer. Paleont., iv, no. 21, p. 133 (15), pl. iv, f. 2 (New Oligoc. Sh. Florida). *Loc.*—Chipola marls, Bailey's Ferry, Florida (Oligoc.). *Type.*—Coll. Cornell University.
- CINERACEA*, Dall (*Marginella*), May 27, 1889. A recent species, for which see these Proceedings, xii, 259. Var. *quadriplicata*, Böse, 1906. Bol. Inst. Geol. Mexico, no. 22, p. 42, pl. v, f. 1, 2 (Algun. Faun. Tert. Mexico). *Loc.*—Tuxtepec (Plioc.). This name is preoccupied by Risso (see these Proceedings, xii, 294), and I propose instead the name var. *tetraptlycta*.
- coarctata*, Tenison-Woods (*Mitra*), 1880. Proc. Linn. Soc. New S. Wales, iv, 8, pl. ii, f. 10. *Loc.*—Muddy Creek, Victoria (Tert., probably Mioc.). = (*Marginella*) *WINTERI*, Tate, *vide* Tate in Trans. Roy. Soc. South Australia, xi, 136.
- COLUMBA*, I. Lea (*Marginella*), Nov. 1833. Contrib. Geol., p. 177, pl. vi, f. 187. *Loc.*—Claiborne, Alabama (Tert.). ✓

- columbellina*, Deshayes (*Marginella*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 552. Quoted by Deshayes as a manuscript name in his own collection which he had intended to publish, and as synonymous with BIFIDOPPLICATA, Edw. Cossmann (Ann. Soc. Roy. Malac. Belg., xxiv, 202) gives it as a variety of Edwards' species.
- compresselabiata*, Sacco (var.), Aug. 1904. See LONGA, Sacco.
- concinna*, Sowerby (*Volvaria*), 1822. Genera, pt. 5, pl. cclvii, f. 2. *Loc.*—Neighbourhood of Paris. Not a Marginellid; cf. Deshayes in Descr. Coq. Foss. Env. Paris, ii, 713.
- CONDENSATA, Cossmann (*Marginella*), March 31, 1902. Bull. Soc. Sci. Nat. Ouest France, sér. II, ii, 125, pl. xi (xvi), f. 16 (Moll. Eoc. Loire-Inf^e). *Loc.*—Coislin (Eoc.). *Type.*—Coll. Dumas.
- CONFINIS, Ihering (*Marginella*), 1897. Rev. Mus. Paulista, ii, 307, pl. iii, f. 8 (Moll. Terr. Terc. Patagonia). *Loc.*—La Cueva, Patagonia (Tert.). *Type.*—Mus. S. Paulo, Brazil.
- CONICA, G. F. Harris (*Marginella* (*Glabella*)), 1897. Cat. Tert. Moll. Brit. Mus., pt. i (Australasian Tert. Moll.), p. 88, pl. iv, f. 7a, b. *Loc.*—Parimoa, N.Z. (Mioc.). *Type.*—Coll. Mantell in Brit. Mus.
- coniformis*, Sowerby (*Marginella*), 1850. Quart. Journ. Geol. Soc., vi, pt. 1, 45, figd. xxii, 288, pl. xvii, f. 2. *Loc.*—San Domingo (Tert.). = LONGIVARICOSA, Lam., *vide* Dall in Trans. Wagner Free Inst. Sci. Philad., iii, pt. 1, 56. A small race is recorded from the Gatun formation, Panama, by Brown and Pilsbry, Proc. Acad. Nat. Sci. Philad., lxiii, pt. 2, 348, pl. xxiv, f. 12.
- CONOIDEA, Sacco, ex Bellardi MS. (*Marginella* (*Persicula*)), 1890. Mem. R. Accad. Sci. Torino, ser. II, xl, 321, pl. ii, f. 17 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Tetti Borelli, near Castelnuovo d'Asti (Mioc. Sup.). *Type.*—Coll. Roval.
- CONOIDES, Koenen (*Marginella*), March, 1890. Abhandl. geol. Specialkarte Preussen u. Thüring. Staaten, x, Heft 2, Lief. ii, 554, pl. xxxviii, f. 10a-c (Norddeutsch. Unter-oligoc. Moll. Fauna). *Loc.*—Wolmirsleben (Unter-oligoc.).
- CONTRACTA, Conrad (*Marginella*), March 1, 1835. Foss. Shells Tert. Form. N. America, 2nd ed., i, no. 3, p. 46, pl. xvi, f. 15. *Loc.*—Claiborne, Alabama (Tert.).
- contracta*, Emmons (*Marginella*), 1858. Rept. N. Carolina Geol. Surv., p. 261, f. 135. *Loc.*—Miocene marl of N. Carolina. = CONTRACTA, Conrad.
- CONTRACTOIDES, Meyer & Aldrich (*Marginella*), July, 1886. Journ. Cincinnati Soc. Nat. Hist., ix, no. 2, 44 (108), pl. ii, f. 10 (Tert. Fauna Newton and Wautubbee, Miss.). *Loc.*—Newton, Miss.
- CONTABULATA, Deshayes (*Marginella*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 551, pl. civ, f. 30-2. *Loc.*—Grignon, etc. (Calc. Grossier). *Type.*—Coll. Deshayes.
- CONTRACTA, Conrad (*Marginella*), Oct. 6, 1870. Amer. Journ. Conch., vi, 262. New name for *contracta*, Emmons, non Conrad.
- conulata*, Sismonda (*Marginella*), 1842. Syn. Meth. Anim. Invert. Pedemont. Foss., p. 42. *Loc.*—Tertona ("Dert."). A *nomen*

- nudum*, quoted erroneously as of Lamarck. = OBLONGATA, Sacco, *vide* Sacco.
- conulus*, H. C. Lea (*Marginella*), 1846. Trans. Amer. Phil. Soc., n. ser., ix, pt. ii, 273, pl. xxxvii, f. 102. *Loc.*—Petersburg, Virginia (Tert.). = LAVALLEANA, Orb., *vide* Dall in Trans. Wagner Free Inst. Sci. Philad., iii, pt. i, p. 56. See *conulus*, H. C. Lea.
- CORDIFORMIS, Böse (*Marginella*), 1906. Bol. Inst. Geol. Mexico, no. 22, p. 44, pl. v, f. 7, 8 (Algun. Fauna Terc. Mexico). *Loc.*—Tuxtepec (Plioc.).
- CORNELLIANA, Maury (*Marginella*), March 1, 1910. Bull. Amer. Paleont., iv, no. 21, p. 133 (15), pl. iv, f. 3 (New Oligoc. Sh. Florida). *Loc.*—Chipola marls, Bailey's Ferry, Florida (Oligoc.). *Type.*—Coll. Cornell University.
- conulus*, H. C. Lea (*Marginella*), Sept. 1843. Proc. Amer. Phil. Soc., iii, 165. Error for *conulus*, H. C. Lea. A *nomen nudum* in this reference.
- COSSMANNI, Morlet (*Marginella*), April 1, 1888. Journ. de Conch., xxxvi, 214, pl. x, f. 4, 4a, not 6, 6a. *Loc.*—Crènes (Eoc. Moy.); Le Ruel (Eoc. Sup.). *Type.*—Coll. Morlet (Crènes).
- costata*, Eichwald (*Marginella*), 1830. Naturh. Skizze von Lithauen, Volhynien, und Podolien, p. 221. *Loc.*—Shukowze (Muschel-sande). Is a *Ringicula*, *vide* Orbigny in Prodrôme Paléont. Stratigr., iii, 37.
- crassa*, Dujardin (*Volvaria*), 1837. Mém. Soc. Géol. France, ii, 232, pl. xvii, f. 10. *Loc.*—Touraine (Craie). Not a Marginellid.
- CRASSILABRA, Conrad (*Marginella*), Aug. (or Sept.) 1833. Foss. Shells Tert. Form. N. America, 1st ed., i, no. 3, p. 33 [pl. xvii, f. 8, but plates never published]. *Loc.*—Claiborne, Alabama. *Type.*—Cabinet Acad. Nat. Sci. Philad. Figured in the 2nd ed., pl. xvi, f. 13.
- crassilabra*, I. Lea (*Marginella*), Nov. 1833. Contrib. Geol., p. 177, pl. vi, f. 188. *Loc.*—Claiborne, Alabama (Tert.). = HUMEROSA, Conrad.
- crassilabris*, Petit, ex Conrad (*Marginella*), 1851. Journ. de Conch., ii, 59. Error for CRASSILABRA, Conrad.
- CRASSULA, Deshayes (*Marginella*), Dec. 15, 1865. Deser. Anim. s. Vert. Bassin Paris, iii, 547, pl. civ, f. 9–11. *Loc.*—Chaumont, etc. (Calc. Grossier). *Type.*—Coll. Deshayes.
- crebrelineata*, Sacco (var.), Aug. 1904. See BORSONI, Sacco.
- CRENULATA, Deshayes (*Marginella*), Dec. 15, 1865. Deser. Anim. s. Vert. Bassin Paris, iii, 550, pl. civ, f. 18–20. *Loc.*—Houdan (Calc. Grossier). *Type.*—Coll. Deshayes.
- cretacea*, Binkhorst (*Volvaria*), 1861. Monog. Gastérop. et Céphalop. Craie Sup. Limbourg, p. 74, pl. va, 3 (*sic*), f. 3a, b. *Loc.*—Limbourg (Cretaceous). Apparently not a Marginellid.
- cuneata*, Doderlein (*Marginella*), 1862. Cenni Geol. Giac. Terr. Mioc. Sup. Ital. Centr., p. 24. *Loc.*—Monte Gibio. A *nomen nudum*.
- CUNEATA, Cossmann (*Cryptospira* (*Gibberula*)), 1903. Journ. de

- Conch., li, 121, pl. iv, f. 9, 10. *Loc.*—Karikal, Inde Française (Plioc.). *Type.*—Coll. Cossmann.
- cylindracea*, Deshayes (*Marginella*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 549, pl. civ, f. 21-3. *Loc.*—Le Fayel (Sables Moyens). *Type.*—Coll. Deshayes. = *PARISIENSIS*, Tomlin.
- cypræola*, Basterot (*Marginella*), 1825. Mém. Soc. Hist. Nat. Paris, ii, pt. i, 44. *Loc.*—Le Plaisantin, Touraine, Dax. = *Erato subcypræola*, Orb.
- DACRIA, Dall (*Marginella (Volutella)*), Dec. 1892. Trans. Wagner Free Inst. Sci. Philad., iii, pt. ii, 226, pl. xiv, f. 5 (Tert. Moll. Florida). *Loc.*—N. and S. Carolina (Plioc.). *Type.*—U.S. Nat. Mus.
- DACTYLUS, Lamarck (*Marginella*), Aug. 1822. A recent species for which see these Proceedings, xii, 262. Var. *inflata*, K. Martin, 1895. Foss. Java, p. 72. *Loc.*—Mouth of the Tji Djadjar in Cheriban, Java. *Type.*—Rijks Geol. - Mineral. Mus. Leiden. Var. *minor*, K. Martin, 1895, op. cit., p. 70, pl. x, f. 156-60. *Loc.*—Java. *Type.*—As above.
- DALLI, Böse (*Marginella*), 1906. Bol. Inst. Geol. Mexico, no. 22, p. 43, pl. v, f. 3-6 (Algun. Faun. Terc. Mexico). *Loc.*—Tuxtepec (Plioc.).
- DALLIANA, Maury (*Marginella*), Nov. 22, 1912. Journ. Acad. Nat. Sci. Philad., ser. II, xv, 67, pl. x, f. 5, 6 (Contrib. Paleont. Trinidad). *Loc.*—Trinidad (Upper Oligoc.). *Type.*—Coll. Cornell University.
- DAUTZENBERGI, Cossmann (*Marginella*), Dec. 31, 1896. Bull. Soc. Sci. Nat. Ouest France, sér. I, vi, 231, pl. vii, f. 13-15 (Moll. Eoc. Loire Infé). *Loc.*—Bois Gouët (Eoc.). *Type.*—Coll. Dautzenberg.
- DECIPIENS, Sacco, ex Bellardi MS. (*Marginella (Persicula)*), 1890. Mem. R. Accad. Sci. Torino, ser. II, xl, 321, pl. ii, f. 18 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Colli Tortonesi (Mioc. Sup.). *Types.*—Coll. Michelotti and Coll. Doderlein.
- DEGENSIS, Sacco, ex Bellardi MS. (*Marginella (Glabella)*), 1890. Mem. R. Accad. Sci. Torino, ser. II, xl, 313, pl. ii, f. 1 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Dego (Mioc. Inf.). *Type.*—Coll. Michelotti in Geol. Mus., Roma.
- DENTICULATOIDES, Maury (*Marginella*), March 1, 1910. Bull. Amer. Paleont., iv, no. 21, p. 134 (16), pt. iv, f. 4 (New Oligoc. Sh. Florida). *Loc.*—Oak Grove, Florida. *Type.*—Coll. Aldrich.
- DENTIFERA, Lamarck (*Marginella*), May, 1803. Ann. Mus. Hist. Nat. Paris, ii, 61. *Loc.*—Grignon. *Type.*—Cab. C. DeFrance.
- depresselabiata*, Sacco (var.), Aug. 1904. See *TAURINENSIS*, Mich.
- DESHAYESI, Michelotti (*Marginella*), 1847. Naturk. Verhand. Holl. Maatsch. Wet. Haarlem, Verzam. ii, Deel 3, Stuk 2, 321, pl. xvii, f. 16 (Descr. Foss. Terr. Mioc. Ital. Sept.). *Loc.*—Tortone. *Types.*—Mus. Soc. Holl.; "mon cabinet." Var. *fuscomaculata*, Sacco, Aug. 1904. Moll. Terr. Terz. Piemonte e Liguria, pt. 30, p. 92. This is var. B of pt. 6. *Type.*—Coll. Michelotti in Geol. Mus., Roma. Var. *subdentata*, Sacco, Aug. 1904. l.c., p. 91, pl. xix, f. 40 (var. A of pt. 6). Var. *sub-*

- rectelabiata*, Sacco, Aug. 1904. l.c., p. 92, pl. xix, f. 41 (var. c of pt. 6).
- deshaysii*, Redfield, ex Michelotti (*Marginella*), 1870. Amer. Journ. Conch., vi, 263. Error for DESHAYESI, Mich.
- DETECTA, Cossmann & Pissarro (*Persicula*), June, 1901. Bull. Soc. Géol. Normandie, xx (for 1900), 32, pl. ix, f. 4, 8 (Faune Eoc. Cotentin-Moll.). *Loc.*—Fresville. *Type.*—Coll. Pissarro.
- DICHOTOMOPTYCHA, Cossmann (*Marginella*), Dec. 31, 1896. Bull. Soc. Sci. Nat. Ouest France, sér. I, vi, 227, pl. vii, f. 5-6, 9-10 (Moll. Eoc. Loire Inf^e). *Loc.*—Bois Gouët (Eoc.). *Type.*—Coll. Cossmann.
- dienvali*, de Raincourt (*Volvaria*), May 4, 1885. Bull. Soc. Géol. France, sér. III, xiii, 471, pl. xv, f. 7, 7a. *Loc.*—Visigneux (Sables Inf., Paris Basin). Probably = LAMARCKII, Desh., *vide* Cossmann.
- DIJKI, K. Martin (*Marginella*), 1884. Samml. geol. Reichs-Mus. Leiden, iii, 96, pl. v, f. 98 (Tiefbohr. Java). *Loc.*—Ngembak, Java. *Type.*—Rijks Geol.-Mineral. Mus., Leiden.
- DISSIMILIS, Deshayes (*Marginella*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 548, pl. civ, f. 15-17. *Loc.*—Grignon, etc. (Calc. Grossier). *Type.*—Coll. Deshayes.
- distans*, Conrad (*Porcellana*), Dec. 1862. Proc. Acad. Nat. Sci. Philad., 1862, p. 563. *Loc.*—Miocene of Atlantic slope. *A nomen nudum.*
- DOMINGOËNSIS, Dall (*Marginella*), Dec. 30, 1896. Proc. U.S. Nat. Mus., xix, 310 (Descr. Tert. Foss. Antill. Reg.). *Loc.*—Santo Domingo, from an island in Lake Henriquillo; Potrero, Rio Amina (Bland). *Types.*—U.S. Nat. Mus., nos. 113683, 113768.
- DRYADOS, Maury (*Persicula*), March 1, 1910. Bull. Amer. Paleont., iv, no. 21, p. 134 (16), pt. iv, f. 6 (New Oligoc. Sh. Florida). *Loc.*—Oak Grove sands, Fla. *Types.*—Coll. Cornell Univ. and Coll. Aldrich.
- DUBIA, Hutton (*Marginella*), 1873. Col. Mus. and Geol. Surv. Dept., Miscell. Publ., no. 9, p. 8 (Cat. Tert. Moll. and Echinod. N.Z.). *Loc.*—Broken River (Lower Tert.); Chatham Is. (Tert.).
- EBURNEA, Lamarek (*Marginella*), May, 1803. Ann. Mus. Hist. Nat. Paris, ii, 61. *Loc.*—Grignon. *Type.*—"Mon cabinet." Var. *pentaptycta*, Cossmann, 1889. Ann. Soc. Roy. Malac. Belg., xxiv, 199 (Cat. Illust. Coq. Foss. Eoc. Env. Paris). *Loc.*—Le Cotentin, Hauteville (Eoc. Moy.). *Type.*—Coll. Cossmann. Var. *vicentina*, Cristofori & Jan, Sept. 1, 1832. Cat. Rer. Nat. in Mus. Exstant., sect. ii, pt. i, Conch. Foss., p. 14, no. 4½. *Loc.*—Castell' Gomberto.
- eburnea*, Brongniart (*Marginella*), 1823. Mém. Terr. Sédiment. Sup. Calc.-Trapp. Vicentin, p. 64. *Loc.*—Ronca, Sangonini. = AGLAJA, Semper.
- eburnea*, Grateloup (*Marginella*), Nov. 20, 1834. Act. Soc. Linn. Bordeaux, vi, 301. *Loc.*—Dax (Faluns). = SUBEBURNEA, Orb.
- eburnea*, Sissonda, ex Bonelli MS. (*Marginella*), 1842. Syn. Meth. Anim. Invert. Pedemont. Foss., p. 42, *Loc.*—Torino. Quoted

- as of Lamarck. A *nomen nudum*. = TAURINENSIS, Mich. (*vide* Sacco).
- eburnea*, Beyrich (*Marginella*), 1853. Zeitschr. Deutsch. geol. Gesell., v, Heft 2, p. 324, pl. ii, f. 9a, b (Conch. Norddeutsch. Tert.-Gebirg.). *Loc.*—Osterweddingen (Tert.). = INTUMESCENS, Koenen.
- EDWARDSI, Deshayes (*Marginella*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 547, pl. civ, f. 12-14. *Loc.*—Auvers, etc. (Sables Moy.). *Type.*—Coll. Deshayes.
- ELEGANTULA, Dall (*Marginella*), Aug. 1890. Trans. Wagner Free Inst. Sci. Philad., iii, pt. i, 54, pl. iv, f. 7 (Contrib. Tert. Fauna Florida). *Loc.*—Tampa silex beds, Florida (Oligoc.). *Type.*—U.S. Nat. Mus., no. 1112104 (? 112104).
- elevata*, Emmons (*Marginella*), 1858. Rept. N. Carolina Geol. Surv., p. 262, f. 138 (238 by error). *Loc.*—Miocene marl of N. Carolina. = EBURNEOLA, Conrad, *vide* Dall in Trans. Wagn. Free Inst. Sci. Philad., iii, pt. i, 51.
- elevata*, Cossmann (*Marginella*), April 1, 1882. Journ. de Conch., xxx, 127, pl. vi, f. 8. *Loc.*—Paris Basin, sables de Cuise; Saint-Gobain, Aisne. *Type.*—Coll. Cossmann. = PRÆNOMINATA, Cossm.
- ELONGATA, Bellardi & Michelotti (*Marginella*), 1841. Mem. R. Accad. Sci. Torino, ser. II, iii, 155, pl. v, f. 10, 11 (Saggio Orittogr. Gasterop. Foss. Piemonte). *Loc.*—Torino (Tert.). Var. *albido-lineata*, Sacco, Aug. 1904. Moll. Terr. Terz. Piemonte e Liguria, pt. 30, 92. *Loc.*—Colli Torinesi (Mioc. Med.). This is the var. A of Sacco in 1890.
- EMARGINATA, Sismonda, ex Bonelli MS. (*Marginella*), 1847. Syn. Meth. Anim. Invert. Pedemont. Foss., 2nd ed., 46. *Loc.*—Tortona (Mioc.). Occurs as a *nomen nudum* in Sismonda's 1st ed. Var. *brunneoazonata*, Sacco, Aug. 1904. Moll. Terr. Terz. Piemonte e Liguria, pt. 30, p. 92. *Loc.*—Colli Tortonesi (Mioc. Sup.). *Type.*—Coll. Mus. Geol. Torino.
- ENTOMELLA, Cossmann (*Marginella*), 1889. Ann. Soc. Roy. Malac. Belg., xxiv, 203, pl. vii, f. 20 (Cat. Illustr. Coq. Foss. Eoc. Env. Paris). *Loc.*—Chaussy (Eoc. Moy.). *Type.*—Coll. Bernay.
- ERATOFORMIS, Hoernes & Auinger (*Marginella*), Dec. 31, 1880. Gasterop. Meeres-Ablager: Mioc. Med.-Stufe, Lief. ii, 66, pl. viii, f. 15, 16. *Loc.*—Lissitz (Mioc.).
- ERATOIDES, Fuchs (*Marginella*), 1869. Denkschr. k. Akad. Wissensch. Wien, xxx, 148, pl. i, f. 14-16 (Beitr. Kenntn. Conch.-Fauna Vicent. Tertiärgeb.). *Loc.*—Gomberto (Stampian).
- EULIMA, Dall (*Marginella*), Dec. 1892. Trans. Wagn. Free Inst. Sci. Philad., iii, pt. ii, 225, pl. xiii, f. 10 (Tert. Moll. Florida). *Loc.*—Pliocene of Shell Creek and Caloosahatchie beds, Florida. Recorded by Dall, i.e., pt. i, p. 50, as a spotted var. of *M. limatula*, Conrad.
- EURYCHILUS, Cossmann (*Marginella*), 1891. Ann. Soc. Roy. Malac. Belg., xxiv, 68, pl. iii, f. 14 (Cat. Illustr. Coq. Foss. Eoc. Env. Paris). *Loc.*—Liancourt (Eoc. Inf.). *Type.*—Coll. Chevallier.

- avena*, Sacco, ex Michelotti (*Marginella*), 1890. Mem. R. Accad. Sci. Torino, ser. II, xl, 322. Error for *avena*, Mich.
- EXCAVATA, Sacco, ex Bellardi MS. (*Marginella* (*Glabella*)), 1890. Mem. R. Accad. Sci. Torino, ser. II, xl, 315, pl. ii, f. 5 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Colli Torinesi (Mioc. Med.). *Type.*—Coll. Mus. Torino. Var. *magnoventrosa*, Sacco, Aug. 1904. Moll. Terr. Terz. Piemonte e Liguria, pt. 30, p. 91, pl. xix, f. 39. This is the var. A of Sacco in 1890.
- exilis*, Eichwald (*Voluta*), 1829. Zool. Spec., i, 298, pl. xv, f. 15a, b. *Loc.*—"Calcem Poczaiowensem." *Marginella exilis*, Eichwald in Naturh. Skizzen Lithauen, Volhynien, u. Podolien, p. 221. The species is a *Ringicula*, *vide* Orbigny (Prodrome Paléont. Stratigr., iii, 37).
- exilis*, H. C. Lea (*Marginella*), 1846. Trans. Amer. Phil. Soc., n.ser., ix, pt. 2, 274, pl. xxxvii, f. 103. *Loc.*—Petersburg, Va. (Tert.). Occurs as a *nomen nudum* in Proc. Amer. Phil. Soc., iii, Sept. 1843, 165. = SUBEXILIS, Orb.
- FAUNULA, Dall (*Marginella*), Aug. 1890. Trans. Wagner Free Inst. Sci. Philad., iii, pt. 1, 53, pl. iv, f. 9b (Contrib. Tert. Fauna Florida). *Loc.*—Tampa silex beds, Florida. *Type.*—U.S. Nat. Mus., no. 112103.
- fooides*, Hutton (*Volvaria*), 1873. Col. Mus. and Geol. Surv. Dept., Misc. Publ., no. 9, p. 8 (Cat. Tert. Moll. and Echinod. N.Z.). *Loc.*—Oamaru, N.Z. (Tert.). Is a *Cypræa*, *vide* Suter in New Zealand Geol. Surv., Palæont., Bull. no. 2, pt. 1, p. 3.
- FLORIDANA, Dall (*Marginella*), Aug. 1890. Trans. Wagner Free Inst. Sci. Philad., iii, pt. 1, 49, pl. v, f. 6 (Contrib. Tert. Fauna Florida). *Loc.*—Caloosahatchie beds, Florida (Plioc.). *Type.*—U.S. Nat. Mus.
- FORNASINI, Foresti (*Marginella*), 1885. Bull. Soc. Malac. Ital., xi, 11, text-figures. *Loc.*—S. Luca, near Bologna (Mioc. Med.).
- FOURTAU, Cossmann (*Marginella*), 1901. Bull. Inst. Égypt., sér. iv, no. 1, fasc. vi, p. 8, pl. i, f. 10. *Loc.*—Dgebel Kibli el Ahram (Eoc. Moy.). *Type.*—Coll. Cossmann.
- FRACTA, Tomlin (*Marginella*), April 1, 1916. Journ. Conch., xv, 43. New name for *ventricosa*, Hutton, *non* G. Fischer.
- FRAGILIS, Deshayes (*Marginella*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 553, pl. civ, f. 39-41. *Loc.*—Grignon, Parnes (Calc. Grossier). *Type.*—Coll. Deshayes.
- FRECHI, Toulou (*Marginella*), Dec. 1911. Jahrb. k. k. geol. Reichsanst. Wien, lxi, Heft 3 and 4, 480, pl. xxix, f. 11 (Nachtr. jungtert. Fauna Tehuantepec). *Loc.*—Tehuantepec (Plioc.).
- FREDERICI, Cossmann (*Marginella*), 1889. Ann. Soc. Roy. Malac. Belg., xxiv, 205, pl. vii, f. 10 (Cat. Illust. Coq. Foss. Éoc. Env. Paris). New name for *ovulata*, Edwards, *non* Lam.
- FUCHSI, Cossmann (*Marginella*), April, 1899. Essais Paléonconch. Comp., iii, 91. New name for *gracilis*, Fuchs, *non* Edwards, *nec* C. B. Adams.
- fuscomaculata*, Sacco (var.), Aug. 1904. See DESHAYESI, Mich.
- GABBI, Dall (*Marginella*), 1890. Trans. Wagner Free Inst. Sci.

- Philad., iii, pt. 1, 56 (*gabbii*, p. 57). New name for *ovuliformis*, Gabb, *non* Orbigny.
- GABBIANA, G. D. Harris, ex Aldrich MS. (*Volvaria*), 1895. Proc. Acad. Nat. Sci. Philad., 1895, pt. i, p. 67, pl. vi, f. 7 (Tert. Moll. Texas). *Loc.*—Devil's Eye, Colorado River; Alum Creek, Texas (Lower Claiborne Eocene). *Type.*—Texas State Mus.
- galba*, Conrad (*Volvaria*), Aug. (or Sept.) 1833. Foss. Shells Tert. Form. N. America, 1st ed., i, no. 3, p. 34 [pl. xviii, f. 2; plates, however, never issued]. *Loc.*—Claiborne, Alabama. *Type.*—Cab. Acad. Nat. Sci. Philad. Called *Bulla galba* in the 2nd ed., p. 40. Is a *Cylichna*, *vide* Redfield.
- GATUNENSIS, Brown & Pilsbry (*Marginella*), April, 1911. Proc. Acad. Nat. Sci. Philad., lxiii, pt. ii, 347, pl. xxiv, f. 10 (Fauna Gatun Formation). *Loc.*—Gatun formation, Panama. *Type.*—Acad. Nat. Sci. Philad.
- GESLINI, Cossmann, ex Vasseur MS. (*Marginella*), Dec. 31, 1896. Bull. Soc. Sci. Nat. Ouest France, vi, 228, pl. vii, f. 3, 4 (Moll. Eoc. Loire-Inf^e). *Loc.*—Bois Gouët. *Type.*—École des Mines, Paris. This name occurs as a *nomen nudum* of Vasseur's in a paper published simultaneously in 1881 in Ann. Sci. Géol., xiii, 174, and in Bibl. École Hautes Etudes (Sect. Sci. Nat.), xxiii, 174, entitled "Récherches Géol. Terr. Tert. France Occid.-Stratigraphie". The paper was to have been followed by one on Paléontologie, but this was never published, though some plates were actually prepared and proof copies thereof distributed (see Cossmann, *op. cit.*, v, 159). Cossmann expressly states that these plates "ne se trouvent pas dans la commerce".
- GIBBEROSA, Oppenheim (*Marginella (Faba)*), 1906. Zeitschr. Deutsch. geol. Gesellsch., lviii, p. 87, pl. ix, f. 12a, b (Foss. Côte des Basques). *Loc.*—Côte des Basques, near Biarritz.
- glabella*, Borson (*Marginella*), 1820. Mem. R. Accad. Sci. Torino, xxv, 208. *Loc.*—Africa and Western America; fossil at Tortona. = DESHAYESI, Mich.
- glabella*, Orbigny, ex Borson (*Marginella*), 1852. Prodrôme Paléont. Stratigr., iii, 51. Error for *glabella*, Borson.
- GLOBULOSA, Koenen (*Marginella*), March, 1890. Abhandl. geol. Spezialkarte Preussen u. Thüring. Staaten, x, Heft ii, Lief. 2, p. 552, pl. xxxviii, f. 12a, b (Norddeutsch. Unter-oligoc. Moll. Fauna). *Loc.*—Westeregeln, N. Germany (Unter-oligoc.).
- GOOSSENSI, Cossmann (*Marginella*), 1889. Ann. Soc. Roy. Malac. Belg., xxiv, 209, pl. vii, f. 15, 16 (Cat. Illust. Coq. Foss. Eoc. Env. Paris). *Loc.*—Chaumont (Eoc. Moy.). *Type.*—Coll. Cossmann.
- GRACILIOR, Ihering (*Marginella*), 1897. Rev. Mus. Paulista, ii, 308, text-figs. 18 (Moll. Terr. Terc. Patagonia). *Loc.*—Jegua quemada, Patagonia (Tert.). *Type.*—Mus. S. Paulo.
- gracilis*, Edwards (*Marginella*), 1854. Monogr. Eoc. Moll. (Palæont. Soc.), pt. iii, p. 140, pl. xviii, f. 4a-c. *Loc.*—Barton. *Type.*—Cab. D'Urban. = SUBGRACILIS, Redfield.
- gracilis*, Fuchs (*Marginella*), 1869. Denkschr. k. Akad. Wissensch.

- Wien, xxx, 147, pl. iv, f. 6-8 (Beitr. Kenntn. Conch.-Fauna Vicent. Tertiärgeb.). *Loc.*—Gomberto (Stampian). = FUCHS, Cossmann.
- GRANDIS, Koenen (*Marginella*), March, 1890. Abhandl. geol. Specialkarte Preussen u. Thüring. Staaten, x, Heft ii, Lief. 2, p. 549, pl. xxxviii, f. 21a-c, 22a, b (Norddeutsch. Unter-oligoc. Moll. Fauna). *Loc.*—Westeregeh, etc., N. Germany (Unter-oligoc.).
- GRAVIDA, Dall (*Marginella*), Aug. 1890. Trans. Wagner Free Inst. Sci. Philad., iii, pt. 1, 55, pl. v, f. 3 (Contrib. Tert. Fauna Florida). *Loc.*—Miocene of Virginia; Pliocene of Caloosahatchie beds, Florida. *Type.*—U.S. Nat. Mus.
- GREGARIA, Dall (*Marginella*), Jan. 21, 1915. U.S. Nat. Mus. Bull. no. 90, p. 55. *Loc.*—Tampa silex beds, Florida (Oligoc.). *Type.*—U.S. Nat. Mus., no. 165081.
- GRISSENSIS, K. Martin (*Marginella*), 1884. Samml. Geol. Reichs-Mus. Leiden, iii, 95, pl. v, f. 97 (Tiefbohr. Java). *Loc.*—Grissee. *Type.*—Rijks-Geol.-Mineral. Mus., Leiden.
- HALENSIS, Dall (*Marginella*), Dec. 21, 1916. Proc. U.S. Nat. Mus., li, no. 2162, p. 504, pl. lxxxviii, f. 2. *Loc.*—Flint River, Ga. (Oligoc.). *Type.*—U.S. Nat. Mus., no. 166723.
- HARRIS, Cossmann (*Marginella*), April, 1899. Essais Paléoconch. Comp., iii, 88. New name for *ovata*, G. F. Harris, non I. Lea.
- HAUERI, Hoernes & Auinger (*Marginella (Volvarina)*), Dec. 31, 1880. Gasterop. Meeres-Ablager. Mioc. Med.-Stufe, Lief. ii, p. 70, pl. viii, f. 18. *Loc.*—Lapugy (Mioc.).
- HECTORI, Kirk (*Marginella*), May, 1882. Trans. New Zealand Inst., xiv (for 1881), 409. *Loc.*—Petane, Hawke's Bay (Tert.).
- HÖRNESI, Brusina (*Marginella*), Oct. 1, 1877. Journ. de Conch., xxv, 371. New name for *miliacea*, Hoernes (pars).
- HORDEACEA, Tate (*Marginella*), 1878. Trans. Phil. Soc. Adelaide, S.A. (for 1877-8), p. 91 (Foss. Marg. Australia). *Loc.*—Blanche Point Cliff, Aldinga, South Australia (Mioc.).
- HORDEOLA, Deshayes (*Marginella*), 1835. Descr. Coq. Foss. Env. Paris, ii, 708, pl. xcvi, f. 26-9. *Loc.*—Grignon, Parnes. *Type.*—"Mon cabinet."
- HUMEROSA, Conrad (*Marginella*), March 1, 1835. Foss. Shells Tert. Form. N. America, 2nd ed., i, no. 3, p. 45, pl. xvi, f. 14. New name for *crassilabra*, I. Lea, non Conrad.
- ICKER, K. Martin (*Marginella*), 1916. Samml. Geol. Reichs-Mus. Leiden, n. ser., ii, Heft 6, p. 232, pl. i, f. 16, 17 (Altmioc. Fauna West-Progogeb. Java). *Loc.*—Rembang Sokkoh. *Type.*—Rijks Geol.-Mineral. Mus., Leiden.
- IMPAGINA, Dall (*Marginella*), Jan. 21, 1915. U.S. Nat. Mus. Bull. no. 90, p. 56, pl. xii, f. 4. *Loc.*—Tampa silex beds, Florida (Oligoc.). *Type.*—U.S. Nat. Mus., no. 165060.
- INAURIS, Cristofori & Jan (*Marginella*), Sept. 1, 1832. Cat. Rer. Nat. in Mus. Exstant., sect. ii, pt. 1, Conch. Foss., p. 14, no. 5. *Loc.*—"Tab." (I am unable to elucidate this abbreviation.)
- INCRASSATA, Nelson (*Marginella*), 1870. Trans. Conn. Acad. Sci., ii, 197, pl. vi, f. 5, 6. *Loc.*—Peru (Tert.).

- incurva*, I. Lea (*Marginella*), Nov. 1833. Contrib. Geol., p. 179, pl. vi, f. 192. Loc.—Claiborne, Alabama. "Immature and indeterminate" (Dall in Trans. Wagner Free Inst. Sci. Philad., iii, 57).
- inepta*, Dall (var.), Aug. 1890. See BELLA, Conrad.
- inequidens*, Tate (*Marginella*), July, 1895. Trans. Roy. Soc. South Australia, xix, 111. Loc.—Cape Otway (Tert.). A *nomen nudum*.
- INERMIS, Tate (*Marginella*), 1878. Trans. Phil. Soc. Adelaide, S.A. (for 1877-8), p. 93. Loc.—Muddy Creek, Victoria (Mioc.).
- INFECTA, Dall (*Marginella*), Jan. 21, 1915. U.S. Nat. Mus. Bull. no. 90, p. 52, pl. xii, f. 3. Loc.—Tampa silex beds, Florida (Oligoc.). Type.—U.S. Nat. Mus., no. 165061.
- inflata*, Defrance (*Marginella*). A manuscript name, quoted by Grateloup (Actes Soc. Linn. Bordeaux, vi, 300, Nov. 20, 1834) and others as a synonym of *Voluta cypræola*, Broc. (= *Erato lævis*, Don.).
- inflata*, K. Martin (var.), 1895. See DACTYLUS, Lam.
- inflexa*, Emmons (*Marginella*), 1858. Rept. N. Carolina Geol. Surv., p. 261, f. 137. Loc.—N. Carolina (Mioc. Marl). = SUBINFLEXA, Redfield.
- INTENSA, Dall (*Marginella*), Jan. 21, 1915. U.S. Nat. Mus. Bull. no. 90, p. 56, pl. x, f. 8. Loc.—Tampa silex beds, Florida (Oligoc.). Type.—U.S. Nat. Mus., no. 165055.
- INTUMESCENS, Koenen (*Marginella*), 1865. Zeitschr. Deutsch. geol. Gesell., xvii, Heft 3, 505, pl. xvi, f. 5a, b (Fauna Unter-oligoc. Tert. Helmstadt). New name for *eburnea*, Beyrich, *non* Lam.
- involuta*, Zekeli (*Marginella*), 1852. Abhandl. k.k. geol. Reichsanst. Wien, i, Abth. ii, no. 2, 65, pl. xi, f. 11a-c (Gasterop. Gosau-gebilde). Loc.—Gosau (Cretaceous). Type.—Samml. k.k. geol. Reichsanstalt. "Probably an *Ovula*" (Redfield in Amer. Journ. Conch., vi, 264).
- IRIÆ, Sacco (*Marginella (Persicula)*), 1890. Mem. R. Accad. Sci. Torino, ser. II, xl, 322, pl. ii, f. 20a, b (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). Loc.—Villalvernia, near Tortona (Plioc. Inf.). Type.—Coll. Mus. Torino.
- KARIKALENSIS, Cossmann (*Marginella (Eratoidea)*), 1903. Journ. de Conch., li, 118, pl. iv, f. 2, 3. Loc.—Karikal (Plioc.). Type.—École des Mines, Paris.
- lævigata*, Eichwald (*Marginella*), 1830. Naturh. Skizze Lithauen, Volhynien, u. Podolien, p. 221. Loc.—Shukowze (Muschelsande). Is a *Ringicula*, *fide* Morlet in Journ. de Conch., xxvi, 265.
- lævis*, Bronn (var.), 1831. Ital. Tert. Gebilde, p. 17 (ex Ergebn. Nat. Reisen, ii). Given as a var. of *Marginella auriculata*, Mén., and in part = *Ringicula buccinea*, Broc. (*fide* Sacco).
- lamarekii*, Deshayes (*Volvaria*), Dec. 15, 1865. Descr. Anim. s. Vert. Bassin Paris, iii, 543, pl. civ, f. 1-3. Loc.—Laversine (Sables Inf.). Type.—Coll. Deshayes. Not a Marginellid.
- LARVATA, Conrad (*Marginella*), Aug. (or Sept.) 1833. Foss. Shells Tert. Form. N. America, 1st ed., i, no. 3, p. 33 [pl. xvii, f. 7,

- but plates never issued]. *Loc.*—Claiborne, Alabama. *Type.*—*Cab. Acad. Nat. Sci. Philadelphia.* Figured op. cit., 2nd ed., pl. xvi, f. 12.
- LATA, Schafhüttl (*Marginella*), 1863. Süd-Bayerns Leth. Geogn., p. 209, pl. xl, f. 4a, b. *Loc.*—Kressenberg (Tert.). *Type.*—Coll. Schafhüttl.
- LATOR, Böse (*Marginella*), 1906. Bol. Inst. Geol. Mexico, no. 22, p. 45, pl. v, f. 9-14 (Algun. Faun. Terc. Mexico). *Loc.*—Tuxtepec (Plioc.).
- LATRIMA, Sacco (*Marginella (Glabella)*), 1890. Mem. R. Accad. Sci. Torino, ser. II, xl, 316, pl. ii, f. 7 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Colli Torinesi (Mioc. Med.). *Type.*—Coll. Rovasenda.
- LATISSIMA, Dall (*Marginella*), Dec. 30, 1896. Proc. U.S. Nat. Mus., xix, 308, pl. xxix, f. 11 (Descr. Tert. Foss. Antill. Reg.). *Loc.*—Pliocene clays of Moen, Costa Rica (Gabb): Santo Domingo (Bland). *Type.*—U.S. Nat. Mus.
- LEANDER, Brown & Pilsbry (*Marginella*), Apr. 1911. Proc. Acad. Nat. Sci. Philad., lxiii, pt. 2, 347, pl. xxiv, f. 13 (Fauna Gatun Formation). *Loc.*—Gatun formation, Panama. *Type.*—Acad. Nat. Sci. Philad.
- LIMONENSIS, Dall (*Marginella*), Dec. 30, 1896. Proc. U.S. Nat. Mus., xix, 309, pl. xxix, f. 12 (Descr. Tert. Foss. Antill. Reg.). *Loc.*—Pliocene clays of Limon, Costa Rica. *Type.*—U.S. Nat. Mus., no. 107076.
- LONGA, Sacco (*Marginella (Glabella)*), 1890. Mem. R. Accad. Sci. Torino, ser. 2, xl, 315, pl. ii, f. 4 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Colli Torinesi (Mioc. Med.). *Types.*—Mus. Geol. di Torino e di Roma. Var. *compresselabiata*, Sacco, Aug. 1904. Moll. Terr. Terz. Piemonte e Liguria, pt. 30, p. 91, pl. xix, f. 37, 38. Called var. A in 1890, i.e.
- LUGENSIS, Fuchs (*Marginella*), 1869. Denkschr. k. Akad. Wissensch. Wien, xxx, 184, pl. viii, f. 19, 20 (Beitr. Kenntn. Conch.-Fauna Vicent. Tertiärgeb.). *Loc.*—Sangonini (Tongrian).
- MACDONALDI, Dall (*Marginella*), March 2, 1912. Smithsonian Miscell. Coll., lix, no. 2077, p. 7. *Loc.*—Costa Rica (Plioc.?). *Type.*—U.S. Nat. Mus., no. 214348.
- magnoventrosa*, Sacco (var.), Aug. 1904. See *EXCAVATA*, Sacco.
- marginata*, Michelotti, ex Bonelli MS. (*Marginella*), 1847. Naturk. Verhand. Holl. Maatsch. Wet. Haarlem, Verzam ii, Deel 3, Stuk 2, 321, pl. xiii, f. 10, 11 (Descr. Foss. Terr. Mioc. Ital. Septentr.). *Loc.*—Tortona. *Types.*—Mus. Soc. Holl.: "mon cabinet." = *EMARGINATA*, Sism.
- marginellus*, Schlotheim (*Volutites*), 1820. Petrefactenk., p. 124. *Loc.*—Weinheim. = *EBURNEA*, Lam. *fide* Holl, Handb. Petrefactenk., Bdchen. iii, p. 263.
- MEDIOCRIS, Pilsbry & Brown (*Marginella*), March 27, 1917. Proc. Acad. Nat. Sci. Philad., Feb. 1917, p. 32, pl. v, f. 2. *Loc.*—Cartagena, Columbia (Oligoc.).
- melliflua*, Redfield (*Marginella*). Quoted by Dall, Trans. Wagn. Free Inst. Sci. Philad., iii, pt. 1, 52, Aug. 1890, as an

- unpublished name for the amber variety of *eburneola*, Conrad (= *opalina*, Stns.).
- MICROGLAPHYRA, Tomlin (*Marginella*), 1918. New name here proposed for *brevis*, Sacco, non Koenen.
- MICULA, Tate (*Marginella*), 1878. Trans. Phil. Soc. Adelaide, S.A., for 1877-8, p. 93 (Foss. Marg. Australia). *Loc.*—Muddy Creek, Victoria (Mioc.).
- miliacea*, Dujardin (*Marginella*), 1837. Mém. Soc. Géol. France, ii, 302, pl. xix, f. 18. *Loc.*—Bordeaux (Faluns). = SUBMILIACEA, Orb.
- miliacea*, Sismonda (*Marginella*), 1847. Syn. Meth. Anim. Invert. Pedemont. Foss., 2nd ed., p. 46. *Loc.*—Piedmont (Plioc.). = IRLE, Sacco (Mem. R. Accad. Sci. Torino, ser. 2, xl, 322).
- miliacea*, Hoernes (*Marginella*), 1852. Abhandl. k. k. geol. Reichsanst., Wien, iii, 84, pl. ix, f. 1, 2 (Foss. Moll. Tert. Beck. Wien). *Loc.*—Gainfahren. *Types.*—Imperial Mus., Vienna. Fig. 1 = HÖRNESEI, Brusina, and fig. 2 = LAVALLEANA, Orb.
- MINDIENSIS, Cossmann (*Marginella (Bullata)*), Sept. 5, 1913. Journ. de Conch. lxi, 61, pl. v, f. 13-15. *Loc.*—Mindi, Panama Canal (Mioc.). *Type.*—École des Mines, Paris.
- minima*, I. Lea (*Oliva*), 1833. Contrib. Geol., p. 184, pl. vi, f. 200. *Loc.*—Claiborne, Alabama (Tert.). = SEMEN, I. Lea, *vide* Heilprin in Proc. Acad. Nat. Sci. Philad., 1890, p. 397.
- minor*, Cristofori & Jan (var.), Sept. 1, 1832. See PHASEOLUS, Brongn.
- minor*, K. Martin (var.), 1895. See DACTYLUS, Lam.
- minor*, K. Martin (var.), 1895. See VENTRICOSA, G. Fischer.
- MIRULA, Cossmann (*Marginella*), Dec. 31, 1896. Bull. Soc. Sci. Nat. Ouest France, sér. 1, vi, 227, pl. vii, f. 21 (Moll. Eoc. Loire Inf^e). *Loc.*—Bois Gouët (Eoc.). *Type.*—Coll. Dumas.
- MOLLITOR, Dall (*Marginella*), Jan. 21, 1915. U.S. Nat. Mus. Bull. no. 90, p. 52, pl. xii, f. 1. *Loc.*—Tampa silex beds, Florida (Oligoc.). *Type.*—U.S. Nat. Mus., no. 165058.
- multicingulata*, Sandberger (*Volvaria*), 1863. Conch. Mainzer Tert.-beck., p. 267, pl. xiv, f. 7, 7a, b. *Loc.*—Weinheim. Recorded in Untersuch. Mainzer Tert.-beck., 1853, p. 10, as *V. acutiuscula*, Sow. Not a Marginellid.
- MUSCARIoidES, Tate (*Marginella*), 1878. Trans. Phil. Soc. Adelaide, S.A., for 1877-8, p. 91 (Foss. Marg. Austral.). *Loc.*—Muddy Creek, Victoria (Mioc.).
- mutica*, Edwards (*Marginella*). A manuscript name quoted in Morris' Cat. Brit. Foss., 2nd ed., 1854, p. 257. *Loc.*—Headon Hill (Mid. Eoc.).
- MYRINA, Dall (*Marginella*), Jan. 21, 1915. U.S. Nat. Mus. Bull. no. 90, p. 57, pl. xii, f. 2. *Loc.*—Tampa silex beds, Florida (Oligoc.). *Type.*—U.S. Nat. Mus., no. 165056.
- nana*, Conrad (*Marginella*), 1834. App. to Morton's Syn. Org. Remains Cretac. Group U.S., p. 2. *Loc.*—U.S.A. (Tert.). A nomen nudum.
- nana*, Edwards (*Marginella*). A manuscript name quoted in Morris' Cat. Brit. Foss., 2nd ed., 1854, p. 257. *Loc.*—Highcliff (Mid. Eoc.).

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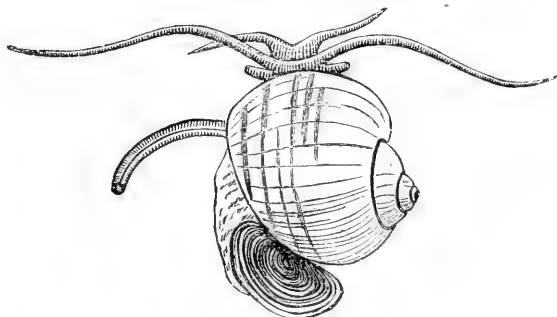
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OF THE

MALACOLOGICAL SOCIETY
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See page iv of this wrapper.

- nana*, Zittel (var.), 1862. See OVULATA, Lam.
- NANGGULANENSIS, K. Martin (*Marginella* (*Cryptospira*)), 1916. Samml. Geol. Reichs-Mus. Leiden, n.ser., ii, Heft 6, 232, pl. i, f. 18 (Altmioc. Fauna West-Progogeb. Java). *Loc.*—Rembang Sokkoh (Mioc). *Type.*—Rijks Geol.-Mineral. Mus., Leiden.
- NEWMANI, Dall (*Marginella*), Aug. 1890. Trans. Wagn. Free Inst. Sci. Philad., iii, pt. i, 54, pl. iv, f. 8 (Contrib. Tert. Fauna Florida). *Loc.*—Tampa silex beds, Florida (Oligoc.). *Type.*—U.S. Nat. Mus., no. 112105.
- newmanni*, Cossmann, ex Dall (*Marginella*), April, 1899. Essais Paléococh. Comp., iii, 88. Error for NEWMANI, Dall.
- NITIDULA, Deshayes (*Marginella*), 1835. Descr. Coq. Foss. Env. Paris, ii, 709, pl. xcv, f. 10, 11. *Loc.*—Parnes. *Type.*—Coll. Deshayes.
- NUGAX, Pilsbry & Johnson (*Marginella*), May 4, 1917. Proc. Acad. Nat. Sci. Philad., April, 1917, p. 165 (New Moll. S. Domingan Oligoc.). *Loc.*—Santo Domingo. *Type.*—Acad. Nat. Sci., Philadelphia, no. 2802.
- OBLONGATA, Redfield, ex Bonelli MS. (*Marginella*), Oct. 6, 1870. Amer. Journ. Conch., vi, 266. *Loc.*—Piedmont (Upper Mioc.). Occurs as a *nomen nudum* in Sismonda's Syn. Meth. Anim. Invert. Piedmont. Foss., 2nd ed., p. 46. I cannot find that the name has been properly characterized by any author earlier than Redfield.
- obovata*, Doderlein (*Marginella*), 1862. Cenni Geol. Giac. Terr. Mioc. Sup. Ital. Centr., p. 24. *Loc.*—Monte Gibio. A *nomen nudum*.
- OBTUSA, Fuchs (*Marginella*), 1869. Denkschr. k. Akad. Wissensch. Wien, xxx, 147, pl. i, f. 11-13 (Beitr. Kenntn. Conch.-Fauna Vicent. Tertiärgeb.). *Loc.*—Gomberto (Stampian).
- OCTOPLICATA, Tenison-Woods (*Marginella*), 1877. Papers Roy. Soc. Tasmania for 1876, p. 109. *Loc.*—Table Cape, Tas. (Tert.). Tate, Trans. Proc. Rept. Phil. Soc. Adelaide, S.A. (for 1877-8), p. 96, queries this as an *Erato*.
- octopticata*, Johnson, ex Tenison-Woods (*Marginella*), 1877. Papers Roy. Soc. Tasmania for 1876, p. 90b. Error for OCTOPLICATA, T.-W.
- OLIGOPTYCHA, Cossmann (*Glabella*), April, 1899. Essais Paléococh. Comp., iii, 194, pl. iii, f. 29-30. *Loc.*—Karikal (Plioc.). *Type.*—Coll. Bonnet.
- oliviformis*, Emmons (*Marginella*), 1858. Rept. N. Carolina Geol. Surv., 1858, p. 261, f. 133. Error for *oliviformis*, T. & H.
- olivella*, Ortmann (*Marginella*), 1902. Repts. Princeton Univ. Exp. Patagonia, 1896-9, vol. iv (Paleont., i, pt. 2, Tert. Invertebr.), 225, pl. xxxv, f. 3a, b. New name for *oliviformis*, Ortmann, non Tuomey & Holmes. = ORTMANNI, Tomlin.
- oliviformis*, Tuomey & Holmes (*Porcellana*), 1857. Pleioc. Foss. S. Carolina, p. 131, pl. xxvii, f. 12, 13. *Loc.*—Sumter District. *Type.*—Mus. Coll. of Charleston. = ANTIQUA, Redf.
- oliviformis*, Ortmann (*Marginella*), Nov. 1900. Amer. Journ. Sci., x, 376. *Loc.*—Santa Cruz, Patagonia (Tert.). = ORTMANNI, Tomlin.

- ONCHIDELLA, Dall (*Marginella*), Dec. 1892. Trans. Wagn. Free Inst. Sci. Philad., iii, pt. 2, 226, pl. xiii, f. 7 (Tert. Fauna Florida). *Loc.*—Pliocene of the Caloosahatchie and Shell Creek, Florida. *Type.*—U.S. Nat. Mus.
- OPPENHEIMI, Cossmann (*Marginella*), April, 1899. Essais Paléococh. Comp., iii, 89. New name for *quinquesplicata*, Opp., non *quinqueplicata*, Lam.
- ORTMANNI, Tomlin (*Marginella*), 1918. New name here proposed for *olivella*, Ortmann (1902), non Reeve (1865).
- ✓ *ovata*, I. Lea (*Marginella*), Nov. 1833. Contrib. Geol., p. 179, pl. vi, f. 191. *Loc.*—Claiborne, Alabama. = *LARVATA*, Conrad.
- ovata*, Emmons (*Marginella*), 1858. Rept. N. Carolina Geol. Surv., 1858, p. 261, f. 136. *Loc.*—N. Carolina (Mioc. Marl). = *SEMEN*, I. Lea, *vide* Dall in Trans. Wagn. Free Inst. Sci. Philad., iii, pt. 1, 57.
- ovata*, G. F. Harris (*Marginella (Glabella)*), 1897. Cat. Tert. Moll. Brit. Mus., pt. i (Australasian Tert. Moll.), p. 88, pl. iv, f. 6a, b. *Loc.*—Parimoo, N.Z. (Mioc.). *Type.*—Coll. Mantell in Brit. Mus. = *HARRISI*, Cossmann.
- OVIFORMIS, Conrad (*Volutella (Microspira)*), Oct. 1, 1868. Amer. Journ. Conch., iv, 66, pl. v, f. 3. *Loc.*—Virginia (Mioc.).
- ovula*, Conrad (*Persicula*), July 7, 1870. Amer. Journ. Conch., vi, 78. *Loc.*—James River, Virginia. *Types.*—Acad. Nat. Sci. Philad. (two), no. 2511. Conrad refers to "Miocene Fossils, pl. xlix, f. 9", i.e. his "Foss. Med. Tert. U.S." (1861), where f. 9 is erroneously assigned to *Marginella limatula*, Conr. He apparently forgot that he had described the same species in the same periodical, two years before, as *OVIFORMIS*.
- ovulaformis*, Seguenza (*Marginella*), 1880. Atti R. Accad. Lincei, ser. III, vi (Memorie), 253, pl. xvi, f. 12 (Form. Terz. Prov. Reggio). *Loc.*—S. Cristina, Gallina. = *SEGUENZE*, Tomlin.
- OVULATA, Lamarek (*Marginella*), May, 1803. Ann. Mus. Hist. Nat. Paris, ii, 61. *Loc.*—Grignon. *Type.*—"Mon cabinet." Var. *nana*, Zittel, 1862. Sitzungsab. k. Akad. Wissensch. Wien, xlvi, Abth. i, 368, pl. i, f. 2a-c. *Loc.*—Forna, Hungary (Upper Nummulit.). = *ZITTELI*, Oppenheim. Var. *polyptycta*, Cossmann, 1889. Ann. Soc. Roy. Malac. Belg., xxiv, 204 (Cat. Illust. Coq. Foss. Eoc. Env. Paris). *Loc.*—Chaussy, Aey, etc. (Eoc. Med. - Eoc. Sup.). *Type.*—Coll. Cossmann. Var. *spirata*, Cossmann, 1889, l.c. *Type.*—Coll. Cossmann.
- ovulata*, Grateloup (*Marginella*), Nov. 20, 1834. Actes Soc. Linn. Bordeaux, vi, 301. *Loc.*—Dax (Faluns). = *SUBOVULATA*, Orb.
- ovulata*, Beyrich (*Marginella*), 1853. Zeitschr. Deutsch. geol. Gesell., v, Heft 2, 321, pl. ii, f. 10a, b (Conch. Norddeutsch. Tert.-Gebirg.). *Loc.*—Westeregeln, N. Germany (Tert.). = *PEROVALIS*, Koenen.
- ovulata*, Edwards (*Marginella*), 1854. Monogr. Eoc. Moll. (Palæont. Soc.), p. 141, pl. xviii, f. 5a-c. *Loc.*—Bracklesham. *Type.*—Coll. Edwards in Brit. Mus. = *FREDERICI*, Cossmann.
- ovuliformis*, Gabb (*Marginella*), 1881. Journ. Acad. Nat. Sci. Philad.,

- n.ser., viii, 355, pl. xlvi, f. 39. *Loc.*—Costa Rica (Plioc.).
Types.—Acad. Nat. Sci. Philad. (six), no. 2490. = GABBI, Dall.
ovum, Schafhüttl (*Marginella*), 1863. Süd-Bayerns Leth. Geogn.,
 p. 209, pl. lxv, f. 12. Kressenberg (Tert.). *Type.*—Coll.
 Schafhüttl. = TRANSNOMINATA, Tomlin.
- pallida*, Wood (pars) (*Voluta*), 1828. Index Test., 2nd ed., pl. xix,
 f. 59. = *Volvaria bulloides*, Lam. The references on p. 94,
 no. 59, are all to the shell hitherto called *Marginella pallida*,
 Don. (= TENUILABRA, Tomlin).
- PAMOTANENSIS, K. Martin (*Marginella (Cryptospira)*), 1906. Samml.
 Geol. Reichs-Mus. Leiden, n.ser., i, Heft 10, 300, pl. xliii,
 f. 715 (Foss. Java). *Loc.*—Pamotan. *Type.*—Rijks Geol.-
 Mineral. Mus., Leiden.
- PARDALIS, Dall (*Marginella apicina*, Mke., var. ?), Aug. 1890. Trans.
 Wagn. Free Inst. Sci. Philad., iii, pt. 1, 49, pl. v, f. 2 (Contrib.
 Tert. Fauna Florida). *Loc.*—Caloosahatchie beds, Florida
 (Plioc.). *Type.*—U.S. Nat. Mus.
- PARISIENSIS, Tomlin (*Marginella*), 1918. New name here proposed for
cyliindræa, Desh. (1865), non da Costa (1778).
- PARVULA, Sacco (*Marginella (Volvarina)*), 1890. Mem. R. Accad. Sci.
 Torino, ser. II, xl, 320, pl. ii, f. 12 (Moll. Terr. Terz. Piemonte
 e Liguria, pt. 6). *Loc.*—Colli Torinesi (Mioc. Med.). *Type.*—
 Mus. Geol., Torino.
- PAUCISPIRA, Fuchs (*Marginella*), 1869. Denkschr. k. Akad. Wissensch.
 Wien, xxx, 184, pl. x, f. 11–13 (Beitr. Kenntn. Conch.-Fauna
 Vicent. Tertiärgeb.). *Loc.*—Sangonini (Tongrian).
- pentaptycta*, Cossmann (var.), 1889. See EBURNEA, Lam.
- PEREXIGUA, Conrad (*Marginella*), 1842. Journ. Acad. Nat. Sci. Philad.,
 viii, 189. *Loc.*—Calvert Cliffs, Maryland (Tert.).
- PERGRACILIS, Koenen (*Marginella*), March, 1890. Abhandl. geol.
 Specialkarte Preussen u. Thüring. Staaten, x, Heft 2, Lief. ii,
 548, pl. xxxviii, f. 13a–c, 14a–c (Norddeutsch. Unter-oligoc.
 Moll. Fauna). *Loc.*—Lattorf, etc., N. Germany (Unter-oligoc.).
- PERKEO, Oppenheim (*Marginella*), March, 1901. Palæontographica,
 xlvii, Lief. iv–vi, 223, pl. xxi, f. 11, 11b. *Loc.*—Grancona
 (Priabonian).
- PEROVALIS, Koenen (*Marginella*), 1865. Zeitschr. Deutsch. geol.
 Gesell., xvii, Heft 3, 506 (Fauna Unter-oligoc. Tert. Helmstadt).
 New name for *ovulata*, Beyr., non Lam.
- PHASEOLUS, Brongniart (*Marginella*), 1823. Mém. Terr. Sédiment.
 Sup. Calc.-Trapp. Vicentin, p. 64, pl. ii, f. 21a, b. *Loc.*—Ronca
 and Turin. Var. *minor*, Cristofori & Jan, Sept. 1, 1832. Cat.
 Rer. Nat. in Mus. Exstant., sect. ii, pt. 1, Conch. Foss., p. 14,
 no. 6½. *Loc.*—Castell' Gomberto. A *nomen nudum*.
- PINEA, Bronn (*Volvaria*), 1831. Ital. Tert.-Geb., p. 17 (from
 Ergebn. Nat. Reisen, ii). *Loc.*—Castell' Gomberto, near
 Vicenza.
- planulosa*, Sismonda, ex Bonelli MS. (*Marginella*), 1842. Syn. Meth.
 Anim. Invert. Pedemont. Foss., 1st ed., p. 42. *Loc.*—Turin
 (Mioc.). A *nomen nudum*, as also in 2nd ed., p. 47. I cannot

- discover that this name, though much used in literature, has ever been made valid by any author. If this is the case, it must be superseded by BARRANDER, H. & A., which is the same species, *vide* Sacco in Moll. Terr. Terz. Piemonte e Liguria, pt. 15, 62.
- PLICATA, I. Lea (*Marginella*), Nov. 1833. Contrib. Geol., p. 178, pl. vi, f. 189. *Loc.*—Claiborne, Alabama (Tert.).
- PLICIFERA, Ihering (*Marginella*), 1897. Rev. Mus. Paulista, ii, 308, text-figs. 19. *Loc.*—Jegua quemada, Patagonia (Tert.). *Type.*—Mus. S. Paulo, Brazil.
- polyptycta*, Cossmann (var.), 1889. See OVULATA, Lam.
- PORBUS, Oppenheim (*Marginella*), 1906. Zeitschr. Deutsch. geol. Gesell., lviii, 88, pl. ix, f. 14a, b (Foss. Côte des Basques). *Loc.*—Côte des Basques, near Biarritz (Blue Marls).
- POSTI, Dall (*Marginella*), Jan. 21, 1915. U.S. Nat. Mus. Bull., no. 90, p. 56, pl. xii, f. 6. *Loc.*—Tampa silex beds, Florida (Oligoc.). *Type.*—U.S. Nat. Mus., no. 165057.
- PRÆGNANS, Oppenheim (*Marginella*), March, 1901. Palæontographica, xlvii, Lief. 4-6, 222, pl. xix, f. 12, 12a, b. *Loc.*—Via degli Orti (Priabonian). *Types.*—K. Mus. für Naturk. and Coll. Oppenheim. This is the "*M. crassula*, Desh.", of Vinassa de Regny in Palæontogr. Ital., iii, 94.
- PRÆNOMINATA, Cossmann (*Marginella*), April, 1903. Rev. Crit. Paléozool., 1903, no. 2, p. 128. New name for *elevata*, Cossm., non Emmons.
- PRECURSOR, Dall (*Marginella*), Aug. 1890. Trans. Wagn. Free Inst. Sci. Philad., iii, pt. 1, 47, pl. v, f. 4 (Contrib. Tert. Fauna Florida). *Loc.*—Caloosahatchie beds, Florida (Plioc.). *Type.*—U.S. Nat. Mus.
- PROPECYLINDRICA, Gregorio (*Marginella* (*Glabella* ∞ *Cryptospira*)), Nov. 1880. Fauna S. Giov. Ilarione, fasc. i, 73, pl. i, f. 29. *Loc.*—S. Giovanni Ilarione (Parisian). *Type.*—Coll. Gregorio.
- PROPINQUA, Tate (*Marginella*), 1878. Trans. Phil. Soc. Adelaide, S.A., for 1877-8, p. 94 (Foss. Marg. Australia). *Loc.*—Muddy Creek, Victoria; R. Murray cliffs (Mioc.).
- PSEUDOVULATA, Oppenheim (*Marginella*), 1896. Zeitschr. Deutsch. geol. Gesell., xlviii, Heft 1, 75, pl. iii, f. 8 (Alttert. Colli Berici Venet.). *Loc.*—(?) Zovencedo (Eoc.).
- PUSILLA, Edwards (*Marginella*), 1854. Monogr. Eoc. Moll. (Palæont. Soc.), pt. iii, p. 143, pl. xviii, f. 6a-c. *Loc.*—Highcliff sands; Headon Hill. *Type.*—Coll. Edwards in Brit. Mus. (Highcliff). The Headon Hill shell was subsequently recognized as a separate species and named *ÆSTUARINA*, Edw.
- pysum*, Brocchi (?) (*Marginella*). *Voluta pisum*, Brocchi, is thus quoted by Borson in Mem. R. Accad. Sci. Torino, xxv, 1820, 208. Brocchi's figure, Conch. Foss. Subapenn., ii, 642, pl. xv, f. 10, is evidently a *Ringicula* and = *R. auriculata*, Mén., *vide* Sacco.
- quadriplicata*, Böse (var.), 1906. See CINERACEA, Dall.
- QUADRUPLICATA, Brown (Allan) (*Voluta*), 1818. Trans. Roy. Soc. Edinburgh, viii, 461, pl. ix, f. 14. *Loc.*—"Found amongst gravel heaps formed by the detritus of the primitive rocks of

- the Alps," near Nice. This species, with numerous others, is described in an appendix to a paper by Thomas Allan, entitled "Sketch of the Geology of the Environs of Nice". The appendix is stated to be the work of T. Brown. Risso, Hist. Nat. Eur. Mérid., iv, 233, states that his *Volvaria quadruplicata* is not the same as Allan's shell. The figure of the latter shows a Marginellid of the same character as *clandestina*, Broc.
- QUEMADENSIS, Ihering (*Marginella*), 1897. Rev. Mus. Paulista, ii, 307, pl. iii, f. 9; pl. iv, f. 14 (Moll. Terr. Patagonia). *Loc.*—Jegua quemada, Patagonia (Tert.). *Type.*—Mus. S. Paulo, Brazil.
- quinquiesplicata, Oppenheim (*Marginella*), 1896. Zeitschr. Deutsch. geol. Gesell., xlviii, Heft 1, 118, pl. iv, f. 4. *Loc.*—Grancona (Tert.). = OPPENHEIMI, COSSMANN.
- raquizi, Preston, ex COSSMANN (*Marginella*). Error in Zool. Record for 1908, p. 85, for VAQUEZI, COSSMANN.
- REMBANGENSIS, K. Martin (*Marginella*), 1906. Samml. Geol. Reichs-Mus. Leiden, n.ser., i, Heft 10, 299, pl. xliii, f. 713 (Foss. Java). *Loc.*—Pamotan (Tert.). *Type.*—Rijks Geol.-Mineral. Mus., Leiden.
- REUSSI, K. Martin (*Marginella*), 1879. Tertiärschicht. auf Java, p. 25, pl. xiv, f. 3. *Loc.*—Java. *Type.*—Rijks Geol.-Mineral. Mus., Leiden.
- SABATICA, Sacco, ex Bellardi MS. (*Marginella (Persicula)*), 1890. Mem. R. Accad. Sci. Torino, ser. II, xl, 322, pl. ii, f. 19 (Moll. Terr. Terz. Piemonte e Liguria, pt. 6). *Loc.*—Savona, Fornaca (Plioc. Inf.). *Type.*—Coll. Mus. Geol., Torino.
- SANGIRANENSIS, K. Martin (*Marginella (Cryptospira)*), 1906. Samml. Geol. Reichs-Mus. Leiden, n.ser., i, Heft 10, 301, pl. xliii, f. 716. *Loc.*—Kali Tjemoro, Java. *Type.*—Rijks Geol.-Mineral. Mus., Leiden.
- SANURENSIS, Oppenheim (*Marginella (Stazzania)*), Oct. 1906. Palæontographica, xxx, Abt. iii, Lief. ii, 335, pl. xxiv, f. 14a, b (Kenntn. alttert. Faunen Ägypt.). *Loc.*—Wadi Sanur (Ob. Mokattam-Stufe). *Type.*—"Berlin Sammlung."
- SCHMIDTI, Olsson (*Marginella*), July 24, 1916. Bull. Amer. Paleont., v, no. 27, p. 130 (10), pl. ii, f. 13. *Loc.*—Duplin formation, Natural Well, N. Carolina (Mioc.).
- SEGUENZÆ, Tomlin (*Marginella*), 1918. New name here proposed for *ovulæformis*, Seg. (1880), non *ovuliformis*, Orb. (1842).
- SEMEN, I. Lea (*Marginella*), Nov. 1833. Contrib. Geol., p. 178, pl. vi, f. 190. *Loc.*—Claiborne, Alabama (Tert.). This is the shell figured by Conrad in Amer. Journ. Conch., vi, pl. iii, without a number, in the left-hand corner of the plate.
- semenoides, Gabb (*Erato*), Dec. 1860. Journ. Acad. Nat. Sci. Philad., n.ser., iv, pt. 4, 383, pl. lxxvii, f. 49. *Loc.*—Caldwell County and Wheelock, Texas (Tert.). = SEMEN, I. Lea, *vide* Heilprin in Proc. Acad. Nat. Sci. Philad., 1890, p. 397.
- septemPLICATA, Risso (*Volvaria*), 1826. Hist. Nat. Eur. Mérid., iv, 234. *Loc.*—S. Europe ("se trouve subfossile").

- SEMPTEPLICATA, Tate (*Marginella*), 1878. Trans. Phil. Soc. Adelaide, S.A., for 1877-8, p. 95 (Foss. Marg. Australia). *Loc.*—Muddy Creek, Victoria (Mioc.).
- SILICIFLUVIA, Dall (*Marginella*), Dec. 21, 1916. Proc. U.S. Nat. Mus., li, no. 2162, p. 504, pl. lxxxviii, f. 1. *Loc.*—Flint River, Georgia (Oligoc.). *Type.*—U.S. Nat. Mus., no. 166722.
- SIMPLEX, Edwards (*Marginella*), 1854. Monogr. Eoc. Moll. (Palæont. Soc.), pt. 3, p. 143, pl. xviii, f. 8a-c. *Loc.*—Estuary bed at Mead End, near Hordwell. *Type.*—Coll. Edwards in Brit. Mus.
- SIMPLICISSIMA, K. Martin (*Marginella*), 1879. Tertiärschichten Java, p. 24, pl. v, f. 3. *Loc.*—Java. *Type.*—Rijks Geol.-Mineral. Mus., Leiden.
- SOLITARIA, Guppy (*Marginella*), Dec. 30, 1896. Proc. U.S. Nat. Mus., xix, 308, pl. xxix, f. 14 (Descr. Tert. Foss. Antill. Reg.). *Loc.*—Ditrupa bed, Pointapier, Trinidad. *Type.*—U.S. Nat. Mus., no. 170139.
- SOWERBYI, Gabb (*Marginella* (*Glabella*)), 1873. Trans. Amer. Phil. Soc., xv, pt. 1, 221. *Loc.*—Santo Domingo (Oligoc.). *Types.*—Acad. Nat. Sci. Philad. (two), no. 2498. Figured in Quart. Journ. Geol. Soc., xxxii, pl. xxviii, f. 1.
- spiralis*, Doderlein (*Marginella*), 1862. Cenni Geol. Giac. Terr. Mioc. Sup. Ital. Centr., p. 24. *Loc.*—Monte Gibio; S. Agata. A *nomen nudum*. According to Sacco this shell is an *Erato*.
- spirata*, Holl (*Marginella*), ex Brocchi (*Voluta*). Handb. Petrefactenkunde, Bändchen iii, 1830, 263. Described by Brocchi in Conch. Foss. Subapenn., ii, 1814, 644, pl. xv, f. 12. *Loc.*—“Crete Sanesi.” Is a *Cylichna*.
- spirata*, Cossmann (var.), 1889. See OVULATA, Lam.
- SPLENDENS, Grateloup (*Marginella*), Nov. 20, 1834. Actes Soc. Linn. Bordeaux, vi, 301. *Loc.*—Dax (Faluns).
- STAFFI, Böse (*Marginella*), June, 1910. Jahrb. k.k. geol. Reichsanstalt Wien, lx, Heft 2, 264, pl. xiii, f. 14. *Loc.*—Tehuantepec (Oligoc.).
- STAMPINENSIS, Stanislas Meunier (*Marginella*), 1880. Nouv. Arch. Mus. Hist. Nat. Paris, ser. II, iii, 256, pl. xiv, f. 37, 38. *Loc.*—Pierrefitte (Sables Marins). *Type.*—Mus. de Paris, laboratoire de Géologie.
- stephanie*, Pereira da Costa (*Marginella*), 1866. Commiss. Traballos Geol. Portugal, 1866, p. 55, pl. xi, f. 8-19 (Gastérop. Dep. Tert. Portugal). *Loc.*—Cacella, etc. (Tert.). = DESHAYESI, Mich., *vide* Sacco.
- STROMBIFORMIS, Tenison-Woods (*Marginella*), 1877. Papers Roy. Soc. Tasmania for 1876, p. 109. *Loc.*—Table Cape (Tert.).
- STURI, Hoernes (*Marginella*), 1875. Jahrb. k.k. geol. Reichsanstalt Wien, xxv, 347, pl. xi, f. 3, 4. New name for *auris-leporis*, Hoernes, *non* Brocchi.
- subdentata*, Sacco (var.), Aug. 1904. See DESHAYESI, Mich.
- subconca*, Cossmann (var.), 1889. See ACUTISPIRA, Cossm.
- SUBCYPRÆOLA, Orbigny (*Erato*), 1852. Prodr. Paléont. Stratigr., iii, 51. New name for *cypræola*, Bast., *non* Brocchi.

- SUBBURNEA, Orbigny (*Marginella*), 1852. Prodr. Paléont. Stratigr., iii, 9. New name for *eburnea*, Grat., non Lam.
- SUBEXILIS, Orbigny (*Marginella*), 1852. Prodr. Paléont. Stratigr., iii, 51. New name for *exilis*, H. C. Lea, non Gmel.
- SUBGRACILIS, Redfield (*Marginella*), Oct. 6, 1870. Amer. Journ. Conch., vi, 267. New name for *gracilis*, Edw., non C. B. Adams.
- SUBINFLEXA, Redfield (*Marginella*), Oct. 6, 1870. Amer. Journ. Conch., vi, 267. New name for *inflexa*, Emmons, non Sowerby.
- submicula*, Tate (*Marginella*), Sept. 1896. Trans. Roy. Soc. S. Australia, xx, 126. Loc.—Camperdown, etc. (Eoc.). A *nomen nudum*.
- SUBMILIACEA, Orbigny (*Marginella*), 1852. Prodr. Paléont. Stratigr., iii, 51. New name for *miliacea*, Dujardin, non Lam.
- SUBOLIVA, Cossmann (*Marginella*), 1889. Ann. Soc. Roy. Malac. Belg., xxiv, 207, pl. vii, f. 14 (Cat. Illust. Coq. Foss. Eoc. Env. Paris). Loc.—Acy (Eoc. Sup.). Type.—Coll. Bezançon.
- subovoluta*, Sacco, ex Orbigny (*Marginella*), Aug. 1904. Moll. Terr. Terz. Piemonte e Liguria, pt. 30, p. 92. Error for SUBOVULATA, Orb.
- SUBOVULATA, Orbigny (*Marginella*), 1852. Prodr. Paléont. Stratigr., iii, 51. New name for *ovulata*, Grat., non Lam.
- subrectelabiata*, Sacco (var.), Aug. 1904. See DESHAYESI, Mich.
- subwentworthi*, Tate (*Marginella*), Sept. 1896. Trans. Roy. Soc. S. Australia, xx, 126. Loc.—Cape Otway, etc. (Eoc.). A *nomen nudum*.
- subcidens*, Tate (*Marginella*), Sept. 1896. Trans. Roy. Soc. S. Australia, xx, 126. Loc.—Not given (Eoc.). A *nomen nudum*.
- SUTURATA, Cossmann (*Marginella*), Dec. 31, 1896. Bull. Soc. Sci. Nat. Ouest France, sér. I, vi, 224, pl. vii, f. 37, 38 (Moll. Eoc. Loire Inf^e). Loc.—Bois Gouët (Eoc.). Type.—Coll. Cossmann.
- TAMBACANA, K. Martin (*Marginella*), 1884. Samml. geol. Reichs-Mus. Leiden, iii, 95, pl. v, f. 96 (Tiefbohr. Java). Loc.—Tambak Batu, Java. Type.—Rijks Geol.-Mineral. Mus., Leiden.
- TAMPÆ, Dall (*Marginella ballista*, var. ?), Aug. 1890. Trans. Wagn. Free Inst. Sci. Philad., iii, pt. 1, 47 (Contrib. Tert. Fauna Florida). Loc.—Tampa silex beds. Type.—U.S. Nat. Mus. Figured in U.S. Nat. Mus. Bull., no. 90, p. 54, pl. xi, f. 6.
- TAURINENSIS, Michelotti (*Marginella*), 1847. Naturk. Verhand. Holl. Maatsch. Wet. Haarlem, Verzam., ii, Deel. iii, Stuk ii, p. 322 (Descr. Foss. Terr. Mioc. Ital. Septentr.). Loc.—La colline de Turin. Type.—Mus. Zool. Taurin. Var. *depresselabiata*, Sacco, Aug. 1904. Moll. Terr. Terz. Piemonte e Liguria, pt. 30, p. 91.
- TAYLORI, Olsson (*Marginella*), July 24, 1916. Bull. Amer. Paléont., v, no. 27, p. 129 (9), pl. ii, f. 1. Loc.—Yorktown formation, Chocowinity, N. Carolina (Mioc.).
- TECTIFORMIS, Cossmann (*Gibberula*), April, 1899. Essais Paléoconch. Comp., iii, 195, pl. iv, f. 18, 19. Loc.—Karikal (Plioc.). Type.—Coll. Bonnet.
- tenuis*, Reuss (*Volvaria*), 1844. Geogn. Skizze aus Böhmen, ii, 206. Loc.—Luschitz and Priesen (Plänermergeln - Kreidegebilde).

- The specimen on which this species is founded was figured by Geinitz as part of a crustacean claw!
- tetrptycta*, Tomlin (var.), 1918. See CINERACEA, Dall.
- TRANSNOMINATA, Tomlin (*Marginella*), 1918. New name here proposed for *ovum*, Schaffhäutl (1863), non Gmelin (1791).
- TROCHISCUS, Tomlin (*Marginella*), 1918. New name here proposed for *brevispira*, Oppenheim (1906), non Sacco (1890).
- vaqueri*, Cossmann (*Marginella*), Dec. 31, 1906. Bull. Soc. Sci. Nat. Ouest France, ser. II, vi, fasc. iv, 274. Error for VAQUEZI, Cossm.
- VAQUEZI, Cossmann (*Marginella* (*Volvarina*)), Dec. 31, 1906. Bull. Soc. Sci. Nat. Ouest France, sér. II, vi, fasc. iv, 252, pl. xx, f. 34, 36 (Moll. Eoc. Loire Inf^e). *Loc.*—Bois Gouët (Eoc.). *Type.*—Coll. Cossmann.
- velata*, K. Martin (*Marginella*), 1884. Samml. geol. Reichs-Mus. Leiden, iii, 94, pl. v, f. 95 (Tiefbohr. Java). *Loc.*—Tambak Batu, Batavia. *Type.*—Rijks Geol.-Mineral. Mus., Leiden. Acknowledged as a synonym of DACTYLUS, Lam., by its author in Foss. Java, p. 72 (1895).
- VENTRICOSA, G. Fischer (*Marginella*), 1807. A recent species also, for which see these Proceedings, xii, 304. Var. *minor*, K. Martin, 1895 (as *quinqueplicata*, Lam., var.). Samml. geol. Reichs-Mus. Leiden, neue Folge, i, Heft 2-5, 70, pl. x, f. 156-60 (Foss. Java). *Loc.*—Java. *Type.*—Rijks Geol.-Mineral. Mus., Leiden.
- ventricosa*, Hutton (*Marginella*), 1873. Coll. Mus. and Geol. Surv. Dept. Miscel. Publ., no. 9, p. 8 (Cat. Tert. Moll. and Echinod. New Zealand). *Loc.*—Broken River (Lower Tert.). = FRACTA, Tomlin.
- ventricosa*, Cossmann (*Marginella*), Oct. 1, 1882. Journ. de Conch., xxx, 292, pl. xiii, f. 6. *Loc.*—Villiers (Calc. Grossier Moy.). *Type.*—Coll. Cossmann. = CHASTAINGI, Cossmann.
- vicentina*, Cristofori & Jan. (var.), Sept. 1, 1832. See EBURNEA, Lam.
- VIRGINIANA, Conrad (*Prunum*), Oct. 1, 1868. Amer. Journ. Conch., iv, 67, pl. v, f. 4. *Loc.*—Day's Point, James River, Va. (Mioc.). *Types.*—Probably five specimens in Acad. Nat. Sci. Philad., no. 2514.
- VITTATA, Edwards (*Marginella*), 1854. Monogr. Eoc. Moll. (Palæont. Soc.), pt. iii, p. 144, pl. xviii, f. 7a-c. *Loc.*—Headon Hill. *Type.*—Coll. Edwards in Brit. Mus.
- WENTWORTHII, Tenison-Woods (*Marginella*), 1877. Papers Roy. Soc. Tasmania for 1876, p. 109. *Loc.*—Table Cape, Tasmania.
- WILCOXIANA, Dall (*Marginella*), Aug. 1890. Trans. Wagn. Free Inst. Sci. Philad., iii, pt. 1, 50, pl. v, f. 7 (Contrib. Tert. Fauna Florida). *Loc.*—Caloosahatchie beds, Florida (Plioc.). *Type.*—U.S. Nat. Mus. Quoted as *willcoxii*, l.c., p. 57.
- willcoxii*, Dall (*Marginella*), Aug. 1890. See WILCOXIANA, Dall.
- winkleri*, Cossmann, ex Tate (*Marginella*), April, 1899. Essais Paléoconch. Comp., iii, 86, pl. iv, f. 22. Error for WINTERI, Tate, "à cause de la mauvaise écriture de l'auteur" (Cossmann in litt.).
- WINTERI, Tate (*Marginella*), 1878. Trans. Phil. Soc. Adelaide, S.A.,

for 1877-8, p. 94 (Foss. Marg. Australia). *Loc.*—Muddy Creek, Victoria (Mioc.).

WOODSI, Tate (*Marginella*), 1878. Trans. Phil. Soc. Adelaide, S.A., for 1877-8, p. 94 (Foss. Marg. Australia). *Loc.*—Muddy Creek, Victoria (Mioc.).

ZITTELI, Oppenheim (*Marginella*), 1896. Zeitschr. Deutsch. geol. Gesell., xlviii, 120. *Loc.*—Grancona (Muschellumachelle). Oppenheim quotes this species as of Deshayes from Descr. Anim. s. Vert. Bassin Paris, iii, 554, but though Deshayes says, "nous proposons de consacrer à cette espèce le nom de *M. Zittel*," he does not actually give a name to the species. Zittel originally described it as *ovulata*, Lam., var. *nana*.

LIST OF NEW NAMES PROPOSED IN THE FOREGOING.

MICROGLAPHYRA, p. 44, under *brevis*, Sacco.

ORTMANNI, p. 57, under *olivella*, Ortmann.

PARISIENSIS, p. 48, under *cylindracea*, Desh.

SEGUENZÆ, p. 58, under *ovulæformis*, Seg.

TRANSNOMINATA, p. 59, under *ovum*, Schafh.

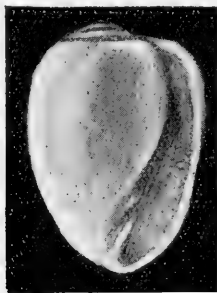
TROCHISCUS, p. 45, under *brevispira*, Oppenheim.

var. *tetrptycta*, p. 45, under CINERACEA, Dall.

Two names in my Systematic List in the last volume of these Proceedings now prove to be preoccupied: For *M. dautzenbergi*, T. & S., *non* Cossmann, I propose the name *M. THOMENSIS*, and for *M. taylori*, Shackelford, *non* Olsson, the name *M. BARNARDI*.

The following corrections of date should be made in the same List:—

| | | |
|---------|----------------------------|------------|
| p. 251. | AUREOCINCTA, Stearns . . . | Aug. 1872. |
| p. 276. | LEPIDA, Gould . . . | Dec. 1860. |
| p. 285. | OPALINA, Stearns . . . | Aug. 1872. |
| p. 292. | PUELLA, Gould . . . | Jan. 1861. |
| p. 297. | SEMINULA, Gould . . . | Dec. 1860. |
| p. 301. | TANTILLA, Gould . . . | Dec. 1860. |



J. D. Dean del.

Volvaria lubrica, Petterd.
(*ex typo*. See *antea*, vol. xii, p. 308.)

ORDINARY MEETING.

FRIDAY, 10TH MAY, 1918.

R. BULLEN NEWTON, F.G.S., Treasurer, in the Chair.

The following candidates were elected to membership of the Society: Messrs. William Falcon, M.A.; Giuseppe Despott; William Greenwood; Harold Muchardt; and Miss Marjorie R. Mestayer.

The following communications were read:—

1. (a) "Description of *Bathytoma regnans*, sp. nov., from the Indian Ocean." (b) "Description of *Morum* (*Oniscidia*) *præclarum*, sp. nov." By J. Cosmo Melvill, M.A., D.Sc.

2. "Biological Notes on *Alcithoë*, H. & A. Adams." By the late Henry Suter.

Mr. G. B. Sowerby exhibited several species of *Labiaxis* and *Coralliobia*.

ORDINARY MEETING.

FRIDAY, 14TH JUNE, 1918.

ALEXANDER REYNELL, Vice-President, in the Chair.

The following communications were read:—

1. "Notes on *Magilus* and allied genera." By G. B. Sowerby, F.L.S.

2. "Note on an unpublished reprint of a paper by J. W. Brazier, published in the *Sydney Mail* of 2nd December, 1871." By H. O. N. Shaw, B.Sc., F.Z.S.

3. "On a supposed new genus of *Pelecypoda* from the Older Tertiaries of Southern Nigeria." By R. Bullen Newton, F.G.S.

Mr. W. T. Webster, F.R.M.S., exhibited living specimens of *Planorbis corneus*, L., var. *rubra*, an albino form taken by him from a very small pond near Barnet.

Mr. Webster also exhibited, on behalf of Mr. Leonard West, M.I.C.E., specimens of *Sphaerium rivicola*, Leach, showing a range of variation in colour.

Mr. H. O. N. Shaw exhibited a copy of the Catalogue of the Sale of the Dennison Collection of Shells, held at Stevens' on 24th April, 1865, and five following days, marked with prices realized.

Mr. A. S. Kennard, F.G.S., exhibited the original drawings by G. B. Sowerby (1) for Dr. W. H. Fitton's paper in the *Geological Transactions*, Ser. II, vol. iv, 1836.

ORDINARY MEETING.

FRIDAY, 8TH NOVEMBER, 1918.

The Rev. Dr. A. H. COOKE, M.A., F.Z.S., Vice-President, in the Chair.

The Chairman announced the death, on 30th July last, of Mr. Henry Suter, member of the Society and author of *A Manual of the New Zealand Mollusca*. A resolution expressing the regret of the Society at the loss of so eminent a malacologist was adopted.

Mr. Kennard exhibited a co-type of *Pupa vetusta*, Dawson, from the Coal-measures of North America.

Mr. G. K. Gude exhibited two sinistral specimens labelled *Helix cantiana*, var., Wiltshire, belonging to the National Museum of Wales, Cardiff, which had been submitted to him for examination by Mr. J. Davy Dean.

Mr. Gude stated that a careful scrutiny had satisfied him that these shells had been wrongly named and that they could not possibly be British specimens. One of them agreed in every respect with *Eulota fortunei*, Pfr., var. *meridionalis*, Mildf., a native of China. He exhibited a specimen from his own collection, received from a dealer as *Helix cantiana sinistrorsa*, Dorset, which agreed with the Cardiff Museum shell. Both distinctly showed the fine wavy impressed spirals of the Chinese species. The other specimen, he stated, was simply an immature albino form of *Ariophanta levipes*, Mull. None of these shells exhibited the slightest trace of the malleated surface characteristic of the *Helix cantiana* group.

The following papers were read:—

1. "On the radula of *Thais*, *Drupa*, *Concholepas*, *Cronia*, *Rapana*, and the allied genera." By the Rev. Dr. A. H. Cooke, M.A., F.Z.S.
2. "Notes on the life-history of *Planorbis corneus*, L., and other freshwater Mollusca." By W. T. Webster, F.R.M.S.

ORDINARY MEETING.

FRIDAY, 13TH DECEMBER, 1918.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. B. O. Wymer was elected to membership of the Society.

The President exhibited several examples of *Eulota fruticum*, Müller, collected near Deal about fifteen years ago by one of his relatives, Mrs. Falloon.

The following papers were read:—

1. "Supplementary Notes on Wood's *Index Testaceologicus*." By A. Reynell.
2. "Some Extinct British Snails." By A. S. Kennard, F.G.S.

ORDINARY MEETING.

FRIDAY, 10TH JANUARY, 1919.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

The Society received with regret the announcement of the death of the Rev. Canon Norman, F.R.S., one of the original members of the Society.

The Rev. E. G. Alderson was elected to membership of the Society. Messrs. Oldham and Iredale were appointed auditors.

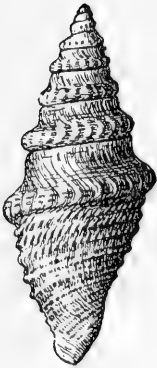
The following papers were read:—

1. "The date of the first finding of *Helicodonta obvoluta* in England." By A. S. Kennard, F.G.S., and B. B. Woodward, F.L.S.
2. "Description of two new Helicoids from China and a new sub-genus." By G. K. Gude, F.Z.S.
3. "Recollections of some of the Old Conchologists." By G. B. Sowerby, F.L.S.

DESCRIPTION OF *BATHYTOMA REGNANS*, N.SP., FROM THE INDIAN OCEAN.

By JAMES COSMO MELVILL, M.A., D.Sc.

Read 10th May, 1918.

BATHYTOMA REGNANS, n.sp.

B. TESTA fusiformi, calcarea, pallide cinereo-straminea, solidula, pulcherrime sculpturata, anfractibus 9, quorum apicales duo globulares, lævissimi, cæteris ad suturas anguste sed profunde canaliculatis, infra, juxta suturas, longitudinaliter irregulariter arcte striatis, deinde apud peripheriam tumide angulatis, spiraliter ad angulum creberrime crescenti-tuberculatis, imbricatulis, ultimo anfractu cæteros exæquante, infra peripheriam spiraliter crebrilirato, liris ad 15, supernis parvi-tuberculatis, simul ac lineis incrementalibus longitudinaliter irregulariter præditis, apertura anguste oblonga, labro unangulato, paullum flexuoso, columella alba, nitidiuscula, ad medium tuberculo-plicata, sinu perobscuro, canali brevi, recurvo.

Long. 30, lat. 12 mm.

Hab.—Indian Ocean. *Investigator* Expedition (Alcock).

A very elaborately sculptured member of the Turridæ, which upon more than one occasion I have closely examined with the late Mr. Edgar Smith, and agreed that the genus *Bathytoma*, Harris & Burrows, was the most fitting for its reception. This was established in 1891, *Murex cataphractus*, Brocchi,¹ a fossil form, being the type. There is, doubtless, a close alliance with *Surcula*, H. & A. Adams.

Dr. W. H. Dall² includes the fine species *Surcula carpenteriana*, Gabb, from California,³ and its near allies, *tryoni*, Gabb, *gabbiana*, Dall, as typical *Bathytomæ*. I consider *B. regnans* is very nearly allied also to *Genotia luhdorfi*, Lischke, from Japan, a fine and still uncommon species, with somewhat similar sculpture, though hardly so elaborated.

The exact locality of this species, dredged at considerable depth during the cruise of S.S. *Investigator*, is unknown, but it probably comes from the Bay of Bengal. It is in dead condition, but fairly perfect, and was given by Dr. Alcock to Mr. F. W. Townsend, who in his turn was kind enough to present it to me in 1910.

¹ Harris & Burrows, Eocene and Oligocene, Paris Basin, p. 113.

² Dall, "Miocene of Astoria and Coos Bay, Oregon": Professional Paper U.S. Geol. Surv., No. 59, 1909, p. 27.

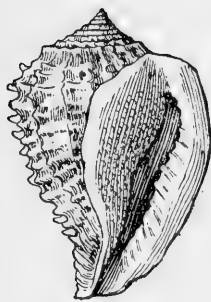
³ Proc. California Acad. Sci., iii, 1865, p. 183.

DESCRIPTION OF *MORUM PRÆCLARUM*, SP. NOV., WITH
REMARKS ON THE RECENT SPECIES OF THE GENUS.

By JAMES COSMO MELVILL, M.A., D.Sc.

Read 10th May, 1918.

MORUM PRÆCLARUM, n.sp.



M. TESTA ovata, paullum compressa, solidiuscula, albo-carnea, ochrobrunneo suffusa et trizonata, anfractibus ad 7, quorum 4 nucleares albo-fusci, minute granati, gradatuli, duo his proximi parvi, depresso-tornati, squamose cancellati, ultimo longitudinaliter acute costato, costis 10 fortibus, regulariter imbricato-echinatis, ad peripheriam fere spinosis, juxta suturas et infra tribus zonis castaneis decorato, et circa basim eodem colore omnino suffuso, interstitiali superficie pulchre pallide carneolata; apertura angusta, flexuosa, labro extus incrassato, albo, intus dentibus vel plicis 12

prædito, columella callosa, expansa, alba, granulis rotundis vel oblongis copiose decorata, canali attenuato, recurvo.

Long. 40, lat. 27 mm.

Hab.—?

This interesting shell was in the collection of the late Mr. J. J. Macandrew, of Ivybridge, Devon; and his wife having generously offered portions of his collection for sale for the benefit of the Red Cross funds, I took the opportunity not only of obtaining this *Oniscidia*, but likewise the original type of *M. macandrewi*, Sow., which differs from it in form, coloration, and other particulars. *M. praeclarum*, indeed, seems nearest to *exquisitum*, Ad. & Reeve, but that species is longer in proportion to its breadth, with more rounded costæ, and with the labral and columellar areas beautifully suffused with pale carnation tint. The much narrowed canal, markedly recurved at the base, of our species is also a marked characteristic.

Since the names proposed in 1798 by J. F. Bolten are now adopted, *Morum* must replace both *Lambidium*, 1807, and *Oniscia*, Sow., 1824.

Dall's exhaustive review of this subject (Professional Paper U.S. Geol. Surv., No. 59, 1909, pp. 67, 68) is based on the study of the various fossil forms of the genus, which seems to appear first in the Eocene formation at Vincentin and Monte Ilario (*Oniscia antiqua*, Bayan), all in the Italian Tertiary.

In America, according to Dr. Dall, the Lower Oligocene at Vicksburg, Missouri, contains the earliest known form, viz. *M.* (*Oniscidia*) *harpulum*, Conrad. In the same strata at St. Domingo, W.I., occurs *M.* (*Herculea*) *domingense*, Sowerby.

The Upper Cretaceous beds of South India provide *M. constellatum*, Stoliczka, a small species with elevated spire, which, from the description, might be allied nearly to the recent *M. strombiforme*, Reeve.

The known recent species, which are but ten in number, with two marked varieties, are as follows:—

MORUM, Bolten, 1798.

Morum, J. F. Bolten, Mus. Boltinianum, 1798, p. 53. Type, *M. purpureum*, Bolt. = *Strombus oniscus* (L.), Gmelin.

Lambidium, Link., Beschreib. Natural.-Samml. Univ. Rostock, 1807, p. 112.

Oniscia, Sowerby, Genera Shells, gen. xxiv, 1824.

Oniscidia, Sowerby, Malac., 1840, p. 299. Type, *O. cancellata*, Sow.

Ersina, Gray, "Syn. Brit. Mus., 1840"; Gray, Proc. Zool. Soc. Lond., xv, 1847, p. 137.

Herculea, Hanley, in H. & A. Adams, Gen. Recent Moll., ii, 1858, p. 621. Type, *O. ponderosa*, Hanley.

Plesioniscia, P. Fischer, Man. de Conch., 1884, p. 660. Type, *O. tuberculosa*, Sow.

§ PLESIONISCIA, P. Fischer, 1884.

1. *Morum tuberosum*, Sow.

Oniscia tuberculosa, G. B. Sowerby (first of the name), Gen. Shells, 1824.

„ „ Reeve, Conch. Icon., v, Aug. 1849, pl. i, figs. 5, 6.

Var. *xanthostoma*, A. Adams.

Oniscia xanthostoma, A. Adams, Proc. Zool. Soc. Lond., 1853, p. 174.

„ *tuberculosa*, Reeve, l.c., fig. 5a.

Hab.—Gulf of California and Gallapagos Isles (the variety).

I can see no structural difference in *xanthostoma*; simply a brilliant colour variety with yellow-orange lip, columellar area, and interior of aperture. The section *Plesioniscia* was never properly characterized by Paul Fischer.

2. *Morum oniscus* (Linn.).

Strombus oniscus, L., Syst. Nat., 12th ed., 1767, p. 1210.

Morum purpureum, Bolten, Mus. Bolt., 1798, p. 53.

„ *oniscus*, H. & A. Adams, Gen. Recent Moll., i, 1853, p. 219.

Oniscia oniscus, Reeve, Conch. Icon., v, pl. i, fig. 1.

Hab.—Jamaica and other West Indian Islands. Florida Keys (H. Hemphill) and others. I myself found it abundantly at Key West, upon the coral reefs to the south of the island, in March–April, 1872.

Var. *lamarckii*, Desh.

Oniscia lamarckii, Deshayes, Anim. s. Vert., x, 1844, p. 12.

„ *oniscus*, Reeve, Conch. Icon., v, Aug. 1849, fig. 1.

Seems only to differ from the normal form in the pale-pink lip and columellar area. The shell is usually slightly larger, and has a more "finished" appearance. This must not be confounded with the *O. lamarckii*, Lesson, which is an unidentified species.

3. *Morum strombiforme* (Ree.).

Oniscia strombiformis, Reeve, Proc. Zool. Soc. Lond., 1842, p. 91.

„ „ Reeve, Conch. System, ii, 1842, p. 210,
pl. ccliii, fig. 1.

Hab.—Honduras. Doubtfully distinct from No. 2, but differing in the sculpture of the body-whorl and the turreted spire. It is also much smaller.

§§ HERCULEA, Hanley, 1858.

4. *Morum ponderosum*, Hanley.

Oniscia ponderosa, Hanley, Proc. Zool. Soc. Lond., 1858, p. 228,
pl. xlii, figs. 9, 10.

Morum ponderosa, H. & A. Adams, Gen. Recent Moll., ii, 1858, p. 621.

Hab.—Japan (Stearns).

A fine and very distinct species, the columellar area suffused often with pink, and otherwise variegated with brown streaked painting. Small papillæ present on the columellar area. As the name implies, it is a massive shell, proportionately speaking, the ribs blunt and rounded, rather after the fashion of *M. oniscus* (L.). There is a deep sulcation posteriorly. In general form this species, separated by Hanley because of the above-mentioned sulcus, serves to unite typical *Morum* with *Oniscidia*.

§§§ ONISCIDIA, G. B. Sowerby, 1824.

5. *Morum præclarum*, Melvill.

Vide supra.

6. *Morum cithara* (Wats.).

Oniscia cithara, Boog Watson, Journ. Linn. Soc. Lond. (Zool.), xv,
p. 266.

„ „ Report H.M.S. *Challenger*, Zoology, xv, 1886, p. 410,
pl. xxxiv, fig. 6.

Hab.—Station 192. September 20th, 1874. Lat. 5° 49' 15" S.,
long. 132° 14' 15" E. Ki Islands, west of Papua, 140 fathoms, blue
mud. The unique type in the British Museum is not quite adult.

The ribs are 17, close, echinate-spinulose, the penultimate whorl
also bearing a coronal of short, regular spines. Allied to
cancellatum, Sow.

7. *M. grande* (A. Ad.).

Oniscia grandis, A. Adams, Proc. Zool. Soc. Lond., 1853, p. 185.

„ *cancellata*, Sow., Reeve, Conch. Icon., v, Aug. 1849, pl. i, fig. 4.

Hab.—China.

Much larger in all its parts than the very similar *cancellatum*;
indeed, Reeve has figured this species under that name. This was
at all events Mr. Edgar Smith's fixed opinion—and that specimen,
being from the Cumingian Collection, is, doubtless, in the British
Museum. I have a very fine example, formerly in Mr. J. J.
Macandrew's possession, 75 × 40 mm. Its principal points of
distinction seem to lie in its size, more frequent longitudinal costæ,
being 18 against 12 in its smaller ally, special ridges thicker and
more markedly imbricate, columellar area more porcellanous in
consistency, and shining white, papillæ not so numerous and close.

BIOLOGICAL NOTES ON *ALCITHOË*, H. & A. ADAMS.

By the late HENRY SUTER.

Read 10th May, 1918.

Ovicapsule and Embryonic Shell.—About ten years ago Captain J. Bollons, of the Government steamer *Kinemoa*, gave me some specimens of *Turritella* and *Struthiolaria*, dredged in 10 fathoms in Queen Charlotte Sound, to each of which was firmly attached a white, calcareous globular body of about 10 mm. diameter, which neither of us had ever seen before. I supposed them to be ovicapsules of some mollusc, but on opening two of the specimens there was no embryo present, only a clear or slightly milky fluid. The only remaining specimen I sent to the late Mr. Edgar A. Smith for examination, but very unfortunately the specimen arrived broken up into small fragments, and there was evidently also no embryo present. Therefore no information was forthcoming.

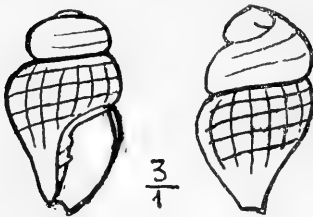
However, during the last few years Mr. Walter Traill, of Stewart Island, kindly sent me a number of shells to which ovicapsules were fixed, similar to those obtained by Captain Bollons. Most of them were attached to dead or live shells of *Myodora striata*, dead shells of *Chione stutchburyi*, *C. mesodesma*, *Mesodesma australe*, *Cantharidus opalus*, *Natica zelandica*, *Hemithyris nigricans*, and even on water-logged pieces of wood. Some of these capsules were empty, but others contained one to three embryonic shells which, on examination, proved to belong to *Alcithoë*, H. & A. Adams. Adult specimens sent by Mr. Traill proved to be *Alcithoë arabica*, sub-sp. *elongata* (Swainson), a good-sized specimen measuring 45 by 120 mm.

As far as I am aware, a few of the South American Volutidæ only have been known to be oviparous, depositing their eggs in a semi-transparent, slightly convex membrane, to the number of three to eight, the ovicapsule having a diameter of from 35 to 100 mm. Duhaut-Cilly was the first to give some interesting particulars concerning the Voluteæ common in Magellan's Strait (*Revue Zoologique*, 1840, p. 167), followed by d'Orbigny (*Voy. Amér. Mérid.*, 1842, p. 424). Dr. W. H. Dall figured the ovicapsule of *Scaphella magellanica*, Sow. (*Proc. U.S. Nat. Mus.*, vol. xii, 1889, p. 311, pl. ix, figs. 5, 6), which, however, I have not seen. Dr. H. Strebel has published good descriptions and figures of the embryonic shells of *Voluta ancilla*, *V. magellanica*, and *V. (?) becki*, also an ovicapsule of *V. ancilla* containing eight embryos (*Zool. Jahrb.*, Abth. für Systematik, etc., vol. xxiv, 1906, p. 104, pl. x, fig. 52). Melvill and Standen mention an ovicapsule of *Voluta ancilla* which had a diameter of 50 mm., and contained six well-developed embryonic shells of 12 by 5 mm., one of which is figured. The locality is Whales Bay, North-West Falklands (*Ann. Mag. Nat. Hist.*, ser. VIII, vol. xiii, 1914, p. 123, pl. vii, fig. 7).

All the ovicapsules of *Alcithoë arabica*, sub-sp. *elongata*, are semi-globose, the surface of attachment being very little less than

the diameter of the ovicapsule, which varies between 10 and 15 mm. The ovicapsule is whitish, calcareous, consisting chiefly of carbonate of lime, with a smooth surface, thickness about .5 mm. The inside is lined all round with a thin, light-brown membrane of conchyolin. Under the microscope the calcareous layer shows numerous minute pores, but these are lacking on the inner membrane.

An interesting fact is that one of these ovicapsules has turned up *fossil* in the Otekaieke limestone, Station Peak, Waitaki Valley, South Island of New Zealand (loc. 477 of the N. Zeal. Geological Survey). The limestone belongs to the Ototaran Stage of the Oamaruan Group. The ovicapsule is fixed on a bivalve shell, semi-globose, diameter 11 mm., height 4 mm. This is the first fossil ovicapsule of *Alcithoë* I have come across.



The embryonic shell, magnified figures of which are here reproduced, of *A. arabica*, sub-sp. *elongata*, is calcareous, thin and fragile, cinereous, sometimes with a few brown zigzag markings near the outer lip, of $2\frac{1}{2}$ convex whorls, the first smooth, the succeeding $1\frac{1}{2}$ volutions with sub-equidistant strong incremental lines, crossed by rather distant linear spiral

grooves. Outer lip sharp, columella with two to four oblique plaits. Base of the short canal faintly notched. Height 8 mm., diameter 4.2 mm.

Mode of procuring food.—Mr. W. Traill made the observation that some specimens of *Alcithoë* when taken out of the water held a small bivalve (*Soletellina*, *Mesodesma*, etc.), retaining the animal tightly between the folds of the foot and close to the mouth. He wanted to know how these bivalves were killed, and asked for information or the suggestion of further experiments. Remembering that all the *Stenoglossa* possess an unpaired œsophageal gland, the gland of Leiblein or poison-gland, which secretes sulphuric acid (in some cases up to $4\frac{1}{2}$ per cent), I sent Mr. Traill some blue litmus paper, and asked him to apply it to the buccal secretions as soon as the *Alcithoë* was taken out of the water. The result was that the litmus paper was turned red at once, proving the presence of an acid. It is held that the sulphuric acid serves to dissolve the calcareous spicules of the animals taken as food, but in this instance it is reasonable to admit that it helps to kill the animal of the bivalve. Suffocation alone is no doubt a somewhat slow process to produce the relaxation of the adductor muscles, followed by opening of the valves and extraction of the animal by means of the radula. In Gastropods such as *Natica*, *Murex*, *Trophon*, *Thais*, etc., which bore holes into the shells of other marine molluscs, the secretion of acid no doubt greatly facilitates the action of the radula.

NOTES ON *MAGILUS* AND ITS ALLIES, SUBSTITUTING THE
 GENERIC NAME *MAGILOPSIS* FOR *LEPTOCONCHUS* LA-
 MARCKI, DESHAYES.

By G. B. SOWERBY, F.L.S.¹

Read 14th June, 1918.

A CAREFUL study of a considerable number of shells of this family has convinced me that the genus *Magilus* is restricted to the one tube-forming species, *M. antiquus*, Montfort.

The shell of *Magilus* is so well known that it would seem scarcely needful for me to describe it here; but in order to justify the conclusion at which I have arrived concerning the undeveloped shells, etc., and the variation in the adults, being the results of circumstances in their position and development, it is needful to recapitulate some facts concerning this remarkable mollusc. The young shell, varying much in form, lodges in a crypt in the coral (*Meandrina*), in which it is quite free from any attachment; subsequently developing with the growth of the coral, quitting the spiral, and forming a long tube, bringing the aperture near the surface of the coral; the spiral whorls (and in some cases several inches of the tube) are filled with a solid heavy mass of shell, whereas the young shell, before forming the tube, is quite thin and fragile.

Magilus antiquus, Montfort, Conch. Syst., tom. ii, 1810, p. 43;
 Lamarck, Animaux sans Vertèbres, vol. v, 1818, p. 374;
 Sowerby, Conch. Icon., vol. xviii, 1872 (*Magilus*), fig. 2.

One specimen in my collection is worthy of notice, showing that in some cases the shell grows faster than the coral. After proceeding vertically for a couple of inches, it suddenly turns off to the right (partly covering the shell of another in the same direction), it then takes a semicircular sweep, bringing its aperture within a quarter of an inch of the top of the coral.

SYNONYMS.

Magilus microcephalus, Sowerby, Reeve, Conch. Icon., vol. xviii, 1872
 (*Magilus*), pl. ii, fig. 3.

I must take upon myself the onus of having introduced this spurious species, described and figured by my revered father. The specimen came from the collection of a great collector in Holland (Mr. van Lennep). I then thought it a distinct species, and suggested the name. I am now, however, convinced that the extreme smallness of the spiral portion is to be accounted for by the early and probably rapid growth of the coral, causing the animal to quit, in very early life, its spiral form to avoid being entombed. I have in my collection a specimen which might, with equal propriety, bear the name "*macrocephalus*". It has five whorls, and measures, from apex

¹ Most of the specimens mentioned were exhibited on the reading of this paper.

to base, nearly an inch and a half, with a diameter of an inch; whereas the specimen called *microcephalus* has only $2\frac{1}{2}$ whorls, and measures only about three-eighths of an inch. Of course, there are many intermediates, differing from each other widely in form, but which cannot be separated on any specific basis.

Magilus costatus, Sowerby, Reeve, Conch. Icon., vol. xviii, 1872 (*Magilus*), pl. ii, fig. 5.

Here again I must deny the validity of my father's species. The type in the British Museum has rough elevated longitudinal ridges, giving it an appearance very different from the ordinary *M. antiquus*; but I have a specimen in which the ridges, though not quite so prominent, are well developed, and others in which the ridges, though comparatively faint, are plainly discernible. I have yet other specimens exhibiting very close sharp transverse ridges without the slightest trace of longitudinal ridges.

The following I take to be simply the young of *M. antiquus*:—

Genus LEPTOCONCHUS, Ruppell, Proc. Zool. Soc. Lond., ii, 1834, p. 105.

Leptoconchus cumingi, Deshayes, in Maillard, I. de la Réunion, ed. 2, ii E, p. 125, pl. xii, figs. 26, 27.

Leptoconchus cuvieri, Deshayes, in Maillard, I. de la Réunion, ed. 2, ii E, p. 128, pl. xiii, figs. 6, 7.

Leptoconchus ellipticus, Sowerby, Genera of Shells; Reeve, Conch. Icon., vol. xviii, 1872 (*Magilus*), pl. iii, fig. 7.

Magilus globulosus, Sowerby, Reeve, Conch. Icon., vol. xviii, 1872 (*Magilus*), pl. iv, fig. 10.

Magilus peronii, Lamarck, Anim. s. Vert., vol. v, 1818, p. 374.

Magilus rostratus, A. Adams, Ann. Mag. Nat. Hist., ser. III, vol. xiii, 1864, p. 310.

Leptoconchus ruppellii, Deshayes, in Maillard, I. de la Réunion, ed. 2, ii E, p. 126, pl. xiii, figs. 4–5; Reeve, Conch. Icon., vol. xviii, 1872 (*Magilus*), pl. iv, fig. 11.

Magilus serratus, Sowerby, Reeve, Conch. Icon., vol. xviii, 1872 (*Magilus*), pl. iii, fig. 8.

Leptoconchus striatus, Ruppell, Trans. Zool. Soc. Lond., i, 1835, p. 259, pl. xxxv, figs. 9, 10.

Magilus solidiusculus, Sowerby, Reeve, Conch. Icon., vol. xviii, 1872 (*Magilus*), pl. iv, fig. 12 (Pease, MS. ? in Brit. Mus.).

Of these forms the first mentioned, *L. cumingi*, is so different in appearance from the others that I had some hesitation in including it. It has a more elevated spire, and the basal keel has scarcely begun to show, but having met with a developed *Magilus* of the same form I hesitate no longer.

Genus CORALLIOBIA, H. & A. Adams, Gen. Shells, vol. i, p. 138.

Type.—*Concholepas (Coralliobia) fimbriata*, A. Adams, Proc. Zool. Soc., 1852, p. 93.

Magilus fimbriatus, Sow., Reeve, Conch. Icon., vol. xviii, 1872 (*Magilus*), pl. iii, fig. 9.

The genus *Corallioba* seems to have little, if any, affinity with *Magilus*. I have a specimen in situ, and instead of occupying a crypt it is firmly fixed on the top of the meandrina, almost appearing to be a part of the coral, and there remains underneath but a small hiatus for the projection of the head and tentacles. There are specimens in the British Museum unattached, but they have the same characters.

CORALLIOBIA ROBILLARDI (Lienard).

Leptoconchus robillardi, Lienard, Journ. de Conch., vol. xviii, 1870, p. 305.

The surface of this shell is strongly elaborately cancellated. The cancellating ridges are closer and less elevated than in *C. fimbriata*. Its anterior end is produced, forming a rostrum and canal.

This species has been called a variety of *C. fimbriata*, but having seen a large number of specimens it appears to me specifically distinct.

Genus *MAGILOPSIS*, nom. nov. Type. — *Leptoconchus lamarcki*, Deshayes, in Maillard, I. de la Réunion, ed. 2, ii E, p. 127, pl. ii, figs. 1-3.

I cannot place this remarkable form with *Magilus*, and since the name *Leptoconchus* cannot now be used a new generic name is necessary.

The shell is an elongated pyriform, with an elate rounded spire and a rather long rostrum at the anterior end. The operculum, which I have seen in many specimens collected by M. V. de Robillard, of Mauritius, is of a thin transparent substance, fitting in, and nearly filling the aperture of the shell; it is finely concentrically laminated, narrowed at each end, with its nucleus near the right-hand side.

M. MAILLARDI, Deshayes, in Maillard, I. de la Réunion, ed. 2, ii E, p. 124 (*Leptoconchus*), pl. xii, figs. 28, 29.

I cannot pronounce with any certainty on the position of this curious shell, but, since it has much the look of an abnormality, I place it here, and it may prove to be an abnormal form of *M. lamarcki*.

In conclusion I note that M. Deshayes¹ informs us that *Magilus* has an operculum, and that *Leptoconchus* has none. Now it is a curious fact that hundreds of specimens having passed through my hands during more than half a century I have never seen the operculum of a *Magilus*; while at least one of M. Deshayes' species of *Leptoconchus* is, as I have shown, distinctly operculate. There are two other species regarded as *Leptoconchus*, viz. *Coralliobia fimbriata* and *C. robillardi*, having opercula. The opercula of these species are very small in comparison with the aperture of the shells, measuring scarcely 4 × 2 mm., very thin and transparent.

¹ Deshayes in Maillard, I. de la Réunion, vol. ii E, p. 118.

NOTE ON AN UNPUBLISHED REPRINT OF A PAPER BY J. W. BRAZIER PUBLISHED IN THE *SYDNEY MAIL*, 2ND DECEMBER, 1871.

By H. O. N. SHAW, B.Sc., F.Z.S., etc.

Read 14th June, 1918.

I HAVE thought it may be of interest to put on record the information which I obtained some years back on a pamphlet by John William Brazier, entitled "Distribution and Geographical Range of Cowries in Australasia".

My attention was first drawn to this paper by a reference to it on p. 90 of the bibliography of J. G. Hidalgo's *Monografía de las especies vivientes del Género Cypræa*, 1906-7. After a fruitless search I could not obtain a copy and wrote to Mr. Charles Hedley, of the Australian Museum, for any information he could give on the subject, and I cannot do better than quote an extract from his letter.

"The pamphlet by Brazier, 'Distribution and Geographical Range of Cowries in Australasia,' cannot, I think, be quoted as a legitimate publication. I have pp. 1-44, which Dr. Cox gave me several years ago, but I think that most of the reprint was destroyed without sale or circulation. Its history was that Brazier wrote the article for a newspaper, and I have a note (which I have not verified) that it appeared in the *Sydney Mail*, December 2nd, 1871, p. 1256. The type was rearranged and reprinted in book form for Dr. Cox. A stray copy seems to have been sent to Hidalgo, whose notice of it probably aroused your curiosity. Probably this newspaper will be available in one of the London libraries, and you will be able to consult the article in the original."

On receiving this reply I wrote to Dr. Cox, who very kindly sent me a copy of pages 1-44 as mentioned by Mr. Hedley.

Though the pamphlet is certainly of interest, I feel bound to agree with Mr. Hedley that it is of little scientific value and in any case cannot be accepted, and should not be quoted in works of reference, as it was never published and should therefore merely rank as a bibliographical oddity.

I may add that I have tried in vain to obtain or even see a copy of the *Sydney Mail* referred to by Mr. Hedley.

ON *RAETOMYA*, A NEW GENUS OF PELECYPODA, FROM THE
TERTIARY ROCKS OF EGYPT AND SOUTHERN NIGERIA.

By R. BULLEN NEWTON, F.G.S.¹

Read 14th June, 1918.

PLATE I.

THE shell described in this paper was originally found in the Upper Mokattam Beds (= Eocene) of Egypt, while further examples of the same have now been identified from Southern Nigerian rocks contained in collections made by Dr. A. E. Kitson, F.G.S., Principal of the Mineral Survey of the Gold Coast, and Sir J. Eaglesome, C.M.G., both of whom have presented their specimens to the Geological Department of the British Museum, Dr. Kitson's having been presented in association with W. Heward Bell, Esq., F.G.S.

A preliminary collection of fossils from the same locality, but containing no remains of the shell in question, was obtained and also presented to that institution by Sir F. Lugard, G.C.M.G. The fossils acquired in this manner between the years 1915 and 1917 were discovered in the same section, which is situated on the Port Harcourt Railway, Ombialla District of Southern Nigeria. They belong chiefly to the invertebrate groups, especially the Mollusca, although relics of some important vertebrates consisting of a zeuglodont, bird and chelonian remains, fishes, etc., are also represented, which have been already partially described by Dr. A. S. Woodward,² F.R.S., and Dr. C. W. Andrews,³ F.R.S., who are both of opinion that they belong to an Eocene age, and probably the older part of that formation as suggested by the second author, on account of some particular characters shown by the zeuglodont remains.

Until further studies are completed on the molluscan fauna it is considered premature to offer too definite a statement as to the geological age of the deposits, although, in the meantime, it may be mentioned that they present a very similar lithological facies which would suggest their reference to one distinct series of beds, and which from their fauna would indicate an estuarine origin. The matrix is a grey and greenish-grey calcareous sandstone of variable degrees of hardness, sometimes assuming the density and appearance of flint which frequently forms the infilling material of the Pelecypod valves, thus rendering it difficult for the development of internal characters. With regard to the specific form, *Lovellia schweinfurthi*, which constitutes the type of the new genus described in this paper, it is only right to state that it fully supports the Eocene age theory for the Nigerian beds as hitherto recognized, on account of its occurrence in the Upper Mokattam deposits of Egypt, which belong to the Lutetian or Middle stage of the European

¹ Published by permission of the Trustees of the British Museum.

² Abstracts Proc. Geol. Soc. London, No. 989, 1916, p. 51.

³ Abstracts Proc. Zool. Soc. London, No. 158, 1916, p. 30, and Proc. Zool. Soc. London, 1916, pp. 519-24, figs. 1-4.

Eocene. In concluding this preliminary statement I wish to thank my friend Mr. B. B. Woodward, F.L.S., for some valuable suggestions during the prosecution of my studies on this shell.

RAETOMYA, gen. nov.

Diagnosis. — Shell inequilateral, obliquely gibbose, thin, concentrically and irregularly plicate, striated and wrinkled; dorsal areas not defined; anterior side deep, long, oblique, depresso-concave, posterior region short,¹ marginally compressed, reflected, slightly gaping; umbonal areas arched, summits opisthogyrous, incurved, oblique, laterally approximate but distant with age, the right elevated above the left; left valve with strong hinge-plate furnished with a horizontally projecting triangular chondrophore marginally grooved each side, deeply excavated anteriorly and striate within, succeeded by an antero-marginal sulcus, the posterior side having a wider marginal sulcus to receive the laminar tooth of the other valve; right valve provided with a shallow oval chondrophore set back in the sub-umbonal cavity, obliquely ridged posteriorly to connect with the postero-lateral groove of the left chondrophore, followed by a narrow sulcus, a posterior laminar tooth, and a widely depressed dorsal furrow; cardinal teeth absent in both valves; pallial impression widely indented by a nearly circular sinus; adductor scars unequal, posterior more or less normal, anterior narrow and elongate.

Type.—*Lovellia schweinfurthi*, Mayer-Eymar, from the Eocene (Upper Mokattam Beds) of Egypt.

Remarks.—The new shell agrees with the mactroid genus *Raeta*,² in most external characters, but differs internally by possessing: (1) dissimilar chondrophores, the left being triangular and projecting outwards, while the right is triangularly ovate, vertical, and well within the sub-umbonal region; (2) no cardinal teeth; (3) a large rounded pallial sinus. The chief external distinction concerns the summits or umbones, which instead of being opposite each other and nearly touching as in *Raeta* are laterally approximate but becoming more or less distant with age, that of the right valve being always in front of the other and rather more elevated, such as is observable in *Corbula gallica*, *C. exarata*, etc., from the European Eocene deposits. In its projecting character the left chondrophore resembles that present in *Mya*, but instead of merging with the postero-dorsal margin as in that genus it radiates outwards, with the other extended elements of the hinge-plate, from a point immediately beneath the umbo. A similarly projecting chondrophore is also apparent in members of the Corbulidæ, otherwise such shells as well as *Mya* are quite distinct from the present genus.

In *Raeta* the chondrophores are of similar construction and

¹ In this respect resembling the genera *Raeta*, *Nucula*, *Pisidium*, etc.

² According to Dr. Dall the true systematic position of *Raeta* is still uncertain, since its soft parts are unknown: Trans. Wagner Free Inst. Sci. Philadelphia, vol. iii, pt. iv, 1898, p. 907.

position in both valves; it has, moreover, cardinal teeth, and a siphonal inflection which is deep, angulate, and sloping downwards from the posterior adductor scar, being nearly parallel with the ventral margin. The adductor scar impressions are of the same design as those of the African shell, while the umbones occupy a more approximate position and are on the same plane.

The new shell has similar dorso-marginal sulci as that of *Raeta*, which it is considered would be for the reception of ligament and therefore *amphidetic*, as expressed in Neumayr's¹ terminology, as opposed to *opisthodetic*, when the ligament is entirely behind the umbones.

Again, there are no paired laminæ to receive the lateral teeth as in the genus *Mactra*; these are also absent in *Raeta*. These and the other distinctions already referred to I consider of sufficient importance for regarding *Raetomya* under the new family designation of Raetomyidæ. In like manner I would suggest that *Raeta*, from its differences to *Mactra*, in contour, its unequal adductor scars, and the possession of a large angulate pallial sinus, should be placed under the family name of Raetidæ instead of Mactridæ.

Dr. Dall,² among other investigators, has largely increased our knowledge on the morphology of the Pelecypod hinge, his earlier studies of the subject having been published in our Society's Proceedings as a preliminary thesis to more extended observations contained in his great memoir on *The Tertiary Fauna of Florida*.

In these works the true "ligament" is regarded as external, while the name "resilium" is given to the "relatively or actually internal bond between the dorsal margins of the valves" which by older authors had been termed "internal cartilage" or ligament, its function being that of separating the valves by "expansional elasticity". Dr. Dall notes the well-recognized difference in the composition of these substances, the ligament proper being of a horny nature and semi-translucent, whereas the resilium is lamellar or composed of parallel fibres, which give a pearly sheen to its broken surface. Such structures are, however, rarely seen in the fossil state, the palæontologist having only calcareous material to guide him, so that the hard chondrophore plates of the present shell between which the resilium formerly resided add greatly to its features of interest.

The genus *Lovellia* was founded by Mayer-Eymar³ on *Lutraria canaliculata* of Say⁴ belonging to the recent fauna of the North Atlantic, which itself was the type of Gray's genus *Raeta*⁵; but objecting to what he termed "noms barbares" Mayer-Eymar set

¹ Denkschr. k. Akad. Wiss. Wien, vol. lviii, 1891, p. 711.

² Proc. Malac. Soc. London, vol. i, 1893, pp. 203-13, and Trans. Wagner Free Inst. Sci. Philadelphia, vol. iii, pts. iii-v, 1895-1900.

³ Vierteljahrsh. Nat. Ges. Zürich, vol. xii, 1867, pp. 275, 286.

⁴ Journ. Acad. Nat. Sci. Philadelphia, vol. ii, pt. ii, 1822, p. 311.

⁵ Ann. Mag. Nat. Hist., ser. II, vol. xi, 1853, p. 43. The origin of the name *Raeta* is unknown; it was probably founded in honour of Sir John Rae, the Arctic traveller.

aside all rules of nomenclature and substituted *Lovellia* for the older name of *Raeta*, a method, needless to say, which was subsequently ignored by all conchologists.

At the time of description this author characterized a fossil form of *Lovellia* under the name of *L. consobrina*, which had been discovered in the Miocene (Helvetian) of Switzerland. Although no dental information was given, he noted the condition of the pallial sinus as *sinu pallii depresso profundo*, which in connexion with the shell's contour enabled him to recognize its close affinity to Say's *Lutraria canaliculata*, and therefore it should have been designated *Raeta*.

Further forms of *Raeta* include *R. gibbosa*, Gabb,¹ from the Upper Tertiaries (= Pliocene of Grzybowski²) of Northern Peru, and Conrad's³ *R. alta* (= *erecta*, Conrad) from the United States Miocene, as also *R. rutimeyeri* of Mayer-Eymar,⁴ from the Swiss Eocene (Bartonian), all of which records furnish evidence that that genus originated in Eocene times, and thence existed through the later Tertiary epoch on to the seas of the present day. So far as is known the new genus *Raetomya* is restricted to the African Eocene deposits, having been first found in Egypt and now in Southern Nigeria.

Family RAETOMYIDÆ.

RAETOMYA SCHWEINFURTHI (Mayer-Eymar).

Lovellia schweinfurthi, Mayer-Eymar, Journ. de Conch., ser. III, vol. xxvii, 1887, pp. 320-2, pl. xi, fig. 6.

Raeta schweinfurthi, Oppenheim, Palæontographica, vol. xxx, pt. iii, 1906, pp. 190, 191, pl. xix, fig. 1, text-fig. 17.

The Nigerian specimens referred to this species, hitherto only known from the Egyptian Eocene, vary considerably in size, the smallest showing a length and height respectively of 25 and 20 mm., while one of maximum size, a natural cast with united and closed valves, measures 113 by 75 mm.; the dimensions of the type being 65 by 54 mm.

The chief features of interest of this Pelecypod are the very inæquilateral and obliquely gibbose valves; the thin test with its sculpture of more or less regular concentric ridges; the narrow, elevated umbonal regions and their laterally approximate incurved beaks; the possession of an elongate, depressed, anterior end region, slightly concave above and rounded at extremity, while the posterior side is short, wide, marginally compressed, reflected, and slightly gaping; pallial sinus widely arcuate; hinge-plate small with an anterior lamellar tooth parallel to the margin, as well as an oblique and strongly lamellar posterior tooth; no cardinal teeth referred to.

¹ American Journ. Conch., vol. v, 1869, p. 30, and Journ. Acad. Nat. Sci. Philadelphia, N.S., vol. viii, pt. iii, 1877, pl. xxxv, fig. 8, p. 333.

² Neues Jahrb. Beil.-Band, vol. xii, 1899, p. 640.

³ Appendix to Kerr's Rept. Geol. Surv. North Carolina, vol. i, 1875, p. 19, pl. iii, fig. 3.

⁴ Beitr. Geol. Karte Schweiz, vol. xxiv, pt. ii, 1887, p. 44, pl. iii, fig. 18.

These characters, mostly mentioned in the original account, are mainly of external interest, very little apparently being known as to those affecting the interior of the valves. The new and better preserved material from Southern Nigeria fortunately supplies some important details of internal structure which contribute to the value of the species, as well as suggesting its recognition as the type of a new genus; the emended specific characters may be set out as follows:—

Umbonal region well elevated and arched; summits resting on the shell margin, opisthogyrous, laterally approximate but divided in age, that of the right valve always slightly raised above the other. *Left valve* with a strong hinge-plate, having all its elements coalescent and radiating from beneath the umbonal region, which embrace:—a horizontally projecting chondrophore of elongate triangular shape and slightly concave surface, bordered by a posterior groove, and followed by a steep, oblique, posterior side which forms part of a wide and deep dorso-marginal sulcus, which probably received the ligament as well as the postero-lamellar tooth of the opposing valve. The chondrophore surface is covered with minute and closely-set concentric striations crossed by radial riblets, and bordering three-fourths of its anterior side (which is longest) is a narrowly elongate, rounded, funnel-shaped cavity marked with fine concentric and radial striations, which is regarded as the receptacle for the anterior part of the resilium. This cavity bears an antero-marginal ridge which may probably represent the so-called anterior lamellar tooth of the original description of the species; then follows the dorso-anterior marginal sulcus which holds the ligament. The basal or underneath surface of the hinge-plate is quite smooth, more or less bulbous, and furrowed. *Right valve* with a slightly excavated, triangularly-oval chondrophore, vertically situated, and merged in the sub-umbonal region, its surface similarly ornamented to that of the other chondrophore, although smoother and less obvious. The posterior border of this cavity is obliquely and roundly ridged to fit the postero-lateral groove of the left chondrophore, this being followed by an oblique sulcus and a prominently oblique, postero-lamellar tooth, to which succeeds a wide and flattened internal dorsal margin. Neither of the valves exhibits any indication of cardinal teeth.

The pallial impression as seen on internal casts shows a large and nearly circular sinus, an adult specimen measuring 85 mm. in length giving the dimensions of this sinus as 25 by 28 mm. in vertical and longitudinal diameters respectively.

The adductor scar impressions are of very unequal position and shape, the posterior being of moderate size, oblong-pyriform, concentrically striated, and well above the middle of the shell margin, while the anterior is narrowly elongate, extending to nearly the antero-ventral curvature of the valves, as in *Raeta*.

The sculpture consists of rounded plications and furrows marked with extremely fine concentric interlineations, together with obscure microscopical radial striations which enter into the texture of the

shell; the surface is also wrinkled, especially posteriorly, caused in all probability by a periostracum which must have originally covered the valves as in *Raeta*. Sometimes the plications are irregular, and occasionally they bifurcate midway across the valve, terminating singly in the posterior region, when they become more distant and consequently fewer.

Smallest example. Largest example.

Dimensions.

| | mm. | mm. |
|--------------------------|-----|-----|
| Length | 25 | 113 |
| Height | 20 | 75 |
| Diameter (closed valves) | 20 | 60 |

Distribution.—The Upper Lutetian beds of Egypt = Eocene formation = Upper Parisian of Europe and the Upper Mokattam deposits of Egypt.

Occurrence.—Cuttings Nos. 1, 5, 6, 10.

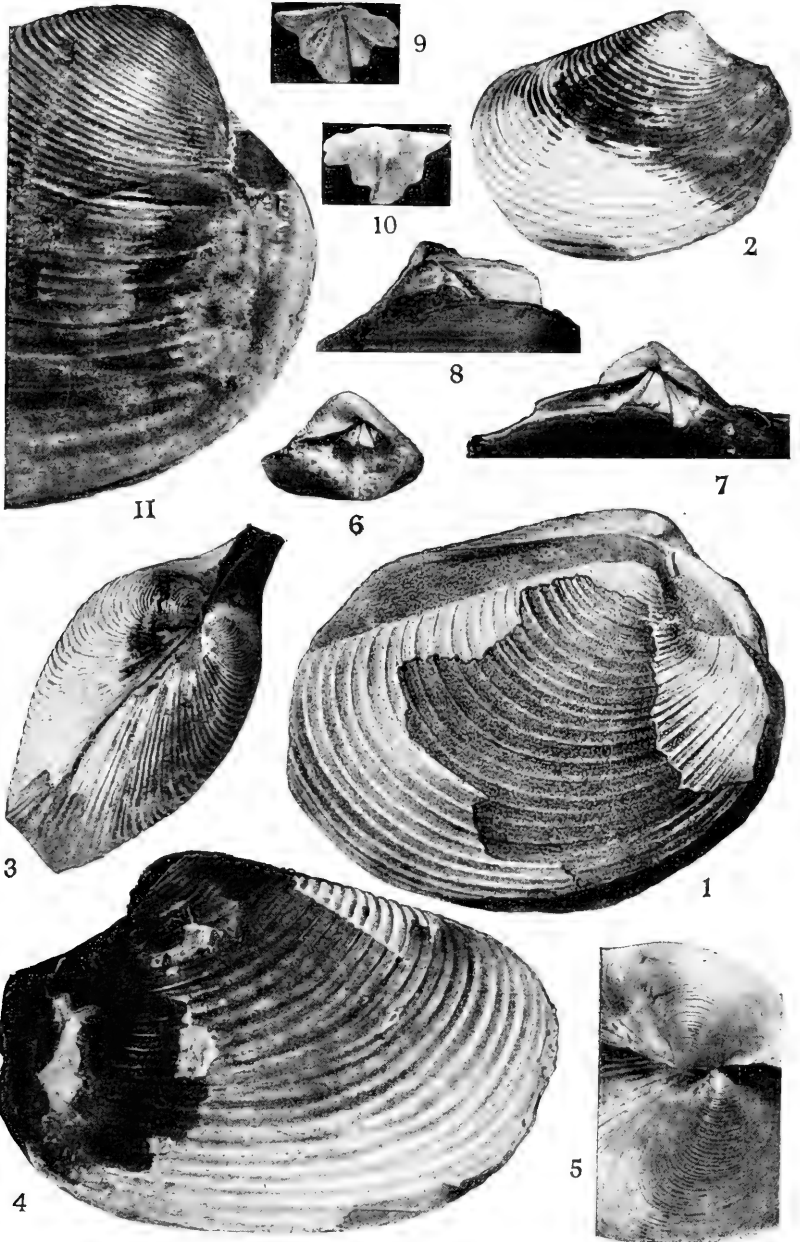
Collectors.—Sir John Eaglesome and Dr. Kitson.

EXPLANATION OF PLATE I.

All figures are photographed natural size with the exception of Fig. 3, which is enlarged by about one-fifth.

RAETOMYA SCHWEINFURTHI (Mayer-Eymar).

- FIG. 1.—Copy of Mayer-Eymar's original figure of the type from the Eocene of Egypt. The remaining figures represent specimens from Southern Nigeria.
- „ 2.—Left lateral view of a pair of closed valves of medium size.
- „ 3.—Dorsal view of same specimen showing the depresso-concave anterior end, the laterally approximate umbones, and the posterior gape. Enlarged one-fifth.
- „ 4.—Right lateral aspect of specimen consisting of a pair of valves of larger size than Fig. 2, showing good testiferous structure and the bifurcation of the costæ in the central part of the shell.
- „ 5.—Dorsal portion of an adult example exhibiting the separation of the umbones. Note that the right-hand side of this figure is posterior.
- „ 6.—Hinge aspect of the smallest example found, representing a left valve with the outwardly projecting chondrophore.
- „ 7.—A disconnected hinge region of a left valve belonging to a moderately large specimen, showing the triangular chondrophore plate with the long funnel-shaped cavity in front, which is supposed to have held the anterior portion of the resilium. The black bases of Figs. 7 and 8 represent the hard flinty matrix which fills the remainder of the valves.
- „ 8.—The opposing hinge of same specimen, showing a differently constituted chondrophore, and which is vertically disposed in the sub-umbonal cavity.
- „ 9.—The upper surface of an isolated chondrophore plate, showing its coalescent elements, and which must have belonged to a very large example.
- „ 10.—Basal surface of same specimen, more or less bulbous and furrowed, and quite smooth.
- „ 11.—Portion of a large internal cast with united valves, showing the postero-lateral surface of the left valve with its extensive and rounded pallial sinus.



P. Dollman phot.

H. B. Newton, direx.

RAETOMYA SCHWEINFURTHI (MAYER-EYMAR).

NOTES ON THE RED VARIETY OF *PLANORBIS CORNEUS*, L.,
AND SOME OTHER FRESHWATER MOLLUSCA.

By W. T. WEBSTER, F.R.M.S.

(Being the substance of communications made 14th June and 8th November,
1918.)

THE specimens of *Planorbis corneus*, var. *rubra* (known in Germany as *Rote posthornschnucken*) here described were collected on Easter Monday, 1918, from a very small pond near Barnet. The type form was exceedingly abundant, while of the red variety about 200 were counted, showing this form to be well established.

This red snail is without doubt a sort of albino, and the deficiency of pigment extends somewhat to the shell, which is lighter than the normal. The shells of those animals which have wintered in the decomposing vegetation have become quite black. This variety interbreeds freely with the ordinary form, and the offspring of the cross are always dark. The young in some cases are, apparently, somewhat lighter in body and shell than the normal, but as they get older they cannot be distinguished from the type form. In a few instances I have noticed little ones very dark, a suspicion of melanism. When found nearly all had been cross-fertilized by ordinary type and produced dark offspring, but later on, having been kept free from contamination, the same individuals bred true to colour, and no dark ones were afterwards produced.

I have in years past had odd specimens of this red variety brought to me as coming from Essex ponds. I formerly had some doubts, but now think these instances may possibly be accepted, and that perhaps this red form is by no means so very rare.

Several specimens have been found with nearly white bodies and normal shells, and some have been discovered with red bodies and white or nearly white shells. Most specimens over one year old are completely perforated in the centre. In many cases the hole is quite small, whilst in others the perforation is large, and only the outer, or body, whorl remained. In the early summer, in all these cases of perforation the remaining extremity of the shell was neatly sealed, and there was nothing to indicate that they had ever possessed any further apex. Later in the season the sealing became ragged as further erosion took place.

On carefully examining the tentacles many peculiarities have been observed. Some have both extremely long, slender, and well matched. Some have one long and one short; the shorter being either left or right indiscriminately. Some have two very short tentacles, stunted and conical. A few were found doing well entirely without, and the places where they should have been were indicated by the merest suggestion. Some specimens have the left tentacles bifurcated, and these having been isolated and mated all the young proved normal. None has been found with a single tentacle.

The mating of the red form with the normal always produces dark offspring, and if two of these dark ones are mated red progeny results. Continual mating of the red considerably improves the brilliance of colour.

For the study of the freshwater snails small aquaria are not to be recommended. I find the best results are obtained with a bell glass nearly 30 inches in diameter, the bottom filled with a mixture of sand and shell grit up to where the sides become vertical, leaving a depth of about 20 inches of water. Such an aquarium should contain well-established and growing plants, *Vallisneria* for choice, and should be capable of being rotated or inspected all round.

During the warm weather *Planorbis corneus* will devour incredible quantities of animal food, and it will grow faster and thrive better on a flesh diet than on vegetation. I have fed it upon animal food exclusively, tough muscular table scraps, and I have made every effort to deprive it of plant food, and in such circumstances it thrived exceedingly well and attained a large size.

The circumstance of thread-spinning can be observed and studied with success if a large aquarium is used. A self-supporting vessel is essential, for the water must not be disturbed, and the growing plants must be in sufficient profusion to keep the water from becoming foul with a snail population of 100 or more adults. When the snails have settled down, put in *one* large piece of meat—more than is likely to be consumed under two or three days—or renew a smaller amount in exactly the same place without disturbing the plants. Soon a vertical thread will be seen reaching from bottom to top, and probably more or less attached at intervals to some upright leaf of *Vallisneria*. This thread will be observed to gradually thicken as each snail in passing along it adds its contribution of slimy matter, and in quite a short time a rope of respectable proportions is formed, leading from the unconsumed meat to the surface of the water, where many ramifications will be found. It is interesting to watch a snail leisurely travelling at the surface come into contact with one of the surface ramification lines. In an instant it becomes alert and quickens its pace; there is never a mistake as to the direction, and in a little time the snail reaches the thick vertical rope and commences its descent.

Planorbis corneus, as is well known, can rise to the surface from the bottom like a cork, or sink like a stone, and it apparently has considerable control over the rate of fall and rise. In a deep aquarium a falling snail will frequently retard its progress very perceptibly as it nears the bottom, and a rising snail will often carry a piece of meat more than its own weight, without any visible difference to the normal rate of ascension, which shows there must be a considerable latitude of power. I was, fortunately, able a few days ago to observe a specimen of *corneus* in its second year gently drop about 9 or 10 inches below the water surface; it came to a momentary halt, and then floated back to the surface. In this instance there was no interference in any way, and the snail had no assistance from a spun thread. This is the only case I have seen.

I have never been able to satisfactorily ascertain the age these snails may reach, as most of my attempts have been more or less upset by the attentions of *Cypris*, nor have I been able to observe the number of eggs a snail may actually produce, for the same reason. Two specimens of *corneus*, two years old, under observation from the 1st to the 22nd of July this year, laid twenty-two batches of eggs, but when hatching began it confused further count.

The statement that freshwater snails are in the habit of creeping out of the water and dying is frequently met with in books, and observers are warned to provide covers for their tanks. This precaution is unnecessary if reasonable care is taken to keep the captives under proper conditions. Snails do not like a new home and will often attempt to escape, but if an escaped snail is put back into its new home it usually accepts the situation if this is not impossible. When snails which have been kept for some time are found above the water-line, suspicion is at once directed to the presence of enemies or foul water.

One species, *Limnaea pereger*, has had a name imposed upon it describing it as a restless creature, and as far as I can see without just cause. Whenever this snail is found out of its element it is almost a certainty that the water, if good, contains predatory fishes. I have experimentally kept a number of specimens of *L. pereger* in a tiny dish, $2\frac{1}{2}$ inches in diameter, containing under 1 inch of water, for some months. When first introduced they all escaped over the edge in the night once, and one individual twice, and then settled down.

L. palustris behaves in much the same way in shallow water. Snails subjected to constant transference from one vessel to another get accustomed to changes, and make no attempt to escape.

Bateman, in his book *Freshwater Aquaria*, says that *Theodoxus fluviatilis* will not live in confinement. I have recently had a letter from a correspondent of repute who tells me this snail has thrived for years in his aquarium. It is highly important that causes of failure should be sought before definite statements are recorded.

Since I have a good many *Planorbis* collected for me I receive quite a number with injured shells, and consequently subjects for observation. Every injured snail I have had has been given a chance to live, and has been observed closely. *P. corneus* is seldom able to repair a serious fracture. Recently I have observed one replace quite a large piece of the outer lip, and in another case an attempt was made to replace nearly the whole of the large whorl. In most cases a *tiny* fracture of the outer lip is given up in despair, and the animal dies. A fracture of the outer whorl, large or small, behind an intact orifice, *corneus* is utterly unable to repair. I have witnessed many attempts, and the animal always dies. A great many of the pond snails are eroded in numerous small spots which in time become perforations, and in some instances mere pinholes. The death of the snail always occurs when the perforation becomes complete—no matter where situated. From this evidence it is very strange to find the eroded apex of the red form so well mended as previously described.

The presence of certain of the Cypridæ in the water seems fatal to the snails: this is a carefully ascertained fact, confirmed by very many experiments, and quite beyond doubt. *Cypris* is almost ubiquitous—it makes its appearance even when the utmost care is taken to guard against it. There are numerous species, and I am not prepared to admit that all are sinners, but in any case the enemy is one of the smaller forms that is nearly always present: the larger kinds seem to be ignored by the snails. It is still a matter of doubt as to what takes place. From observations repeatedly made I find the snails usually imprison any foreign body which gains access into their shells, and perish whilst waiting for the discomfort thereby caused to pass away. Possibly something like this happens in the case of *Cypris* finding an entrance. The larger kinds of snails are the chief victims: *P. vortex*, to some extent, but the smaller snails are able to escape the attentions of *Cypris*—possibly being so small there is little room for an entrance.

ON THE FIRST DISCOVERY IN ENGLAND OF *HELICODONTA*
OBVOLUTA (MÜLL.).

By A. S. KENNARD, F.G.S., and B. B. WOODWARD, F.L.S.

Read 10th January, 1919.

It is generally stated that *Helicodonta obvoluta* was first noticed in England in 1830 by Dr. J. Lindsay, but we would call attention to a possible earlier record. This occurs in a now forgotten work on Natural History by Dr. R. Brookes. The fourth volume is entitled *The Natural History of Insects, with their Properties and Uses in Medicine*, and was published in London in 1768.

In it occurs, on pp. 302–3, the following entry: “The *whitish depressed snail with a dentated mouth* is about half an inch broad and its height no more than the third of an inch. It consists of three or four spiral turns and has a flat clavicle [= spire]. The mouth is about a quarter of an inch long and almost as much broad, which makes the figure nearly roundish. It has a pretty broad lip of a pearly white, and is slightly dentated on each side. The colour of the whole shell is whitish without any variegation. It is said to be met with in *Charlton forest*, in *Sussex*, and is pretty common in Italy.” Charlton is situate $5\frac{1}{4}$ miles south of Midhurst and on the South Downs: it is thus in the “*obvoluta* country”. It would therefore appear that dead examples of *H. obvoluta* had been found in Sussex by some early collector prior to 1768.

WOOD'S *INDEX TESTACEOLOGICUS*.—SUPPLEMENTARY NOTE.

By ALEXANDER REYNELL.

Read 13th December, 1918.

SHORTLY after my paper on the above was published in the last issued part of our Proceedings, Mr. E. R. Sykes kindly sent me a green paper-covered pamphlet entitled "A List | of | the Plates | of the | "Index Testaceologicus". | With the Lamarckian Names adapted to | the Figures in each Plate. | London, | Published by W. Wood, 428 Strand, | 1829 | [price 2s. 6d.]" The pamphlet had no title-page inside this green cover. Wood mentions the above item in the second edition of his Catalogue of Natural History books, but I was unsuccessful in obtaining a sight of it until Mr. E. R. Sykes sent me his copy with the suggestion that I had overlooked it. I have in my possession an uncoloured copy of the 1828 edition of the *Index*, at the end of which a copy of this pamphlet is bound in, minus its green paper cover, and therefore without any date of publication, so I concluded it was issued as part of the book in its complete form.

Apart from the green paper covers the pamphlet consists of thirty-four pages. The heading of page 1 repeats the descriptive part of the title on the green cover.

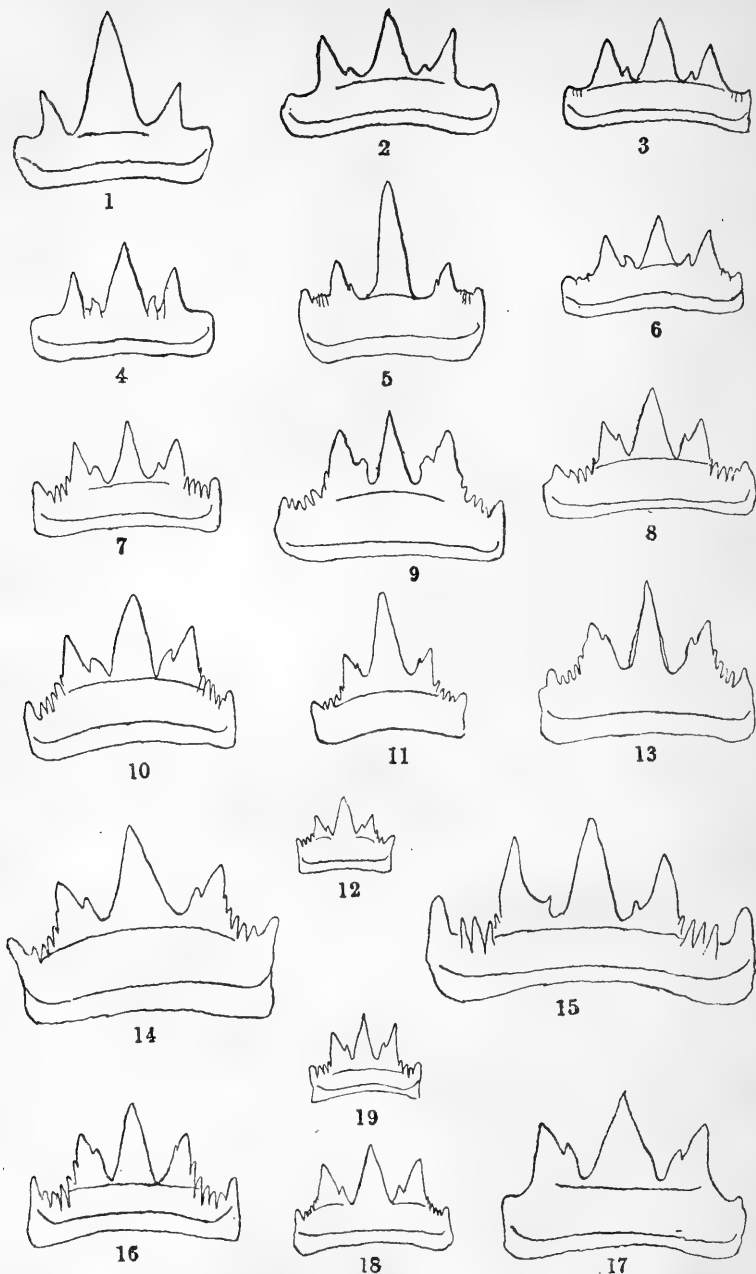


FIG. 1, *Thais gemmulata*; 2, *Th. pica*; 3, *Th. deltoidea*; 4, *Th. hippocastanea*, var. *intermedia*; 5, *Th. echinata*; 6, *Th. melones*; 7, *Th. bronni*; 8, *Th. clavigera*; 9, *Th. bufo*; 10, *Th. armigera*; 11, *Th. coronata* (Guinea); 12, *Th. cingulata*; 13, *Th. bicostalis*; 14, *Th. kiosquiiformis*; 15, *Th. persica*; 16, *Th. haemastoma* (Algiers); 17, *Th. succincta*; 18, *Th. textiliosa*; 19, *Th. aperta*.

THE RADULA IN *THAIS*, *DRUPA*, *MORULA*, *CONCHOLEPAS*,
CRONIA, *IOPAS*, AND THE ALLIED GENERA.

By the Rev. Dr. A. H. COOKE, F.Z.S.

Read 8th November, 1918.

THE materials for the following paper are derived from the collections of the late Professor Gwatkin, now in the British Museum of Natural History, the Cambridge Museum of Zoology, and my own collection. As regards synonymy and the correct naming of species I have thought it best to make but few rectifications, leaving the specimens on the slides to speak for themselves. To nearly all of them is attached the locality and the name of the collector from whom Gwatkin procured them.

THAIS.

An examination of the radula of the various species of *Thais* lends little support to the groupings of that genus, based on the forms of the shell, to which are given the names of *Stramonita*, *Tribulus*, *Polytropa*, *Thalassa*, etc. Certain groupings are indicated, but not in that direction.

The normal type of a *Thais* radula exhibits a rhachidian tooth with three prominent cusps, of which the central is almost always the longest. The two external cusps are each flanked, at the two upper ends of the tooth, by a bluntish knob. This knob is usually inconspicuous and, except in the case of the *Nucella* group, does not approach the cusps in length.

The central cusp is invariably simple; the external or side cusps are (1) simple, which is very rarely the case, or (2) furnished with a single small denticle on the inside, i.e. on the side adjacent to the central cusp. This denticle (there is never more than one) is sometimes placed high on the cusp, sometimes so low that it almost seems to be separate from it. The denticle is usually sharp and thorn-like, but quite simple; occasionally, as in *bufo*, *melones*, it is somewhat irregular in outline; *capensis* exhibits the extreme of variation in this direction.

The space between each external cusp and the knob which ends the upper margin is sometimes quite simple, e.g. in *capensis*, *echinata*, and *gemmulata*. As a rule, however, it is occupied by a number of minute narrow blunt denticles, which are sometimes few, or so small as to be scarcely discernible, sometimes numerous and very conspicuous. Every gradation of form is found in these denticles, in the various species, e.g. in *delloidea* there are about three, scarcely visible with a high power, more like grooves or wrinkles on the surface than actual separate denticles, while e.g. in *hæmastoma*, *persica*, *rudolphi* there are four, five, or six prominent and well marked. In species where these denticles are multiplied the number of them is not quite constant. As a rule one or more of the denticles "climb" up the exterior surface of the cusp, which has the effect, under a high power, of making it appear somewhat serrated; this

feature has been noted in a considerable number of the species examined.

Thus one finds it possible to arrange the greater number of the species of *Thais* in a continuous series, starting from a rhachidian tooth of extreme simplicity, such as that of *gemma*, in which there are no denticles whatever and scarcely any knob, nothing but three bare cusps, through a series in which the development of denticles is observed, first on the inside of the side cusps and afterwards between the side cusps and the knob, and then climbing up the exterior side of the cusps themselves, till the series reaches its extreme of complexity in a rhachidian tooth such as that of *hæmastoma*.

No satisfactory break in the series occurs which would induce one to subdivide it up into groups. On the contrary, the passage from a simple to a complex form is gradual, and one can discern no adequate reason for drawing a line of separation in one place more than in another. If the species in the so-called group *Thalassa*, as listed by Tryon, were picked out of a long series so arranged, it would be found that some of them, e.g. *gemma*, *hippocastanea*, *pica*, were at one end, others, e.g. *armigera*, *bufo*, were at the other, while others, e.g. *melones*, *neritoidea*, would be in the middle.

The lateral teeth throughout the whole group are very similar, and offer little help in determining the relationship of the various forms.

ægrola, Reeve: Safety Bay, W. Austr. Central cusp broad, not very long, side cusps long; faintly denticled very low down on inside, almost behind the cusps; four or five small but well-marked denticles, one at least climbing.

armigera, Chem.: S. Pacific. Central cusp rather broad, but narrowing sharply towards the tip; side cusps exactly the same shape, and about two-thirds the length, set rather distant from the central, conspicuously bluntly denticled low down on inside, denticle almost clear of the cusp, well rooted in the mass of the tooth; outside, six to seven small sharp denticles, three of which climb, giving the outer edge of the cusp quite a serrated appearance; knob conspicuous; base slightly broadly waved in the centre. (Fig. 10.)

A specimen from Mauritius has only five denticles, not climbing so high.

bicostalis, Lam.: Panama. Central cusp long, rather narrow, sharply pointed, a "guard" plainly visible towards the lower part of the sides; side cusps much broader, sharply triangular, prominently denticled very high up on the inside, higher than in any other species of *Thais*, denticle not deeply cut; outside, three to five well-marked sharp denticles, one to two climbing; knob prominent, narrow; base straight. (Fig. 13.)

In another specimen (same locality) the inner denticle is quite close to the tip of the cusp. Troschel's figure is very incorrect.

bitubercularis, Lam.: Karachi. Central cusp prominent, broad at base, narrowing rapidly towards the point, side cusps very broad, conspicuously denticled low down on the inside; outside, two very

small denticles, which in some cases are scarcely more than wrinkles; knob small, blunt.

blanfordi, Melv.: Charbar. Central cusp long, sharply pointed, side cusps much shorter, broadening at the base, a prominent blunt denticle on the inside; outside, three to four inconspicuous denticles, two of which climb; knob prominent, elevated.

brevidentata, Wood: Panama. Central cusp strong, sharply pointed, side cusps sharp, with a strong denticle on the inside, half-way up; outside, three to four small denticles, scarcely climbing; knob prominent.

See Proc. Malac. Soc., xiii, 1918, p. 7, for the reasons for transferring this species from *Acanthina* to *Thais*.

bronni, Dunk.: Japan. Central cusp long, narrow, sharply pointed, side cusps considerably shorter, with a strong broad denticle about half-way down on the inside; outside, 5-7 prominent sharp denticles, 2-3 of which climb, one rather high up; knob prominent; base narrowed in the centre. (Fig. 7.)

In other words, the radula corresponds most closely to that of *clavigera*.

bufo, Lam.: Umkomaas, Natal; Charbar. Central cusp rather long, sharp, and narrow, root deeply set in the upper part of the plate, but not carried through to the base, there are signs of "guards" or side buttresses; side cusps not much shorter but broader, suddenly widening above a broad denticle on the inside, which is always more or less freakish, being markedly turreted in some specimens, in others roughly hewn or humped, often higher up in one cusp than the other; outside, 4-5 climbing denticles, reaching almost to the top of the cusp, continued by 4-5 prominent sharp toothlets often irregular in shape and size; knob prominent, at times bluntly or sharply bifid. (Fig. 9.)

A most characteristic and, as regards the denticles, freakish radula.

capensis, Petit: Natal. Central cusp long, narrow, side cusps three-fourths length of central, sharply pointed, strongly and often irregularly denticled half-way down on inside, sometimes as if a bit had been hacked out and a blunt denticle left above it; in a specimen from Scottburgh the denticle is very rude, blunted or occasionally bifid; nothing outside at all—no regular knob, but margin a little raised.

carinifera, Lam.: Penang. Central cusp very long and narrow, three times as long as the side cusps, which are short, broad, with a sharp denticle high up on inside; three prominent denticles outside, with a fourth which climbs high; knob blunt, conspicuous; base straight.

In a Karachi specimen the length of the central cusp is considerably reduced.

carolensis, Reeve: Panama. Central cusp short, broad and rather blunt, side cusps of nearly equal length, very broadly bluntly denticled inside; outside, two well-marked denticles, one of which is closely adjacent to the side cusp; knob blunt, not conspicuous.

cataracta, Chem.: Cape of Good Hope. Central and side cusps sharp, the side cusps broadening out irregularly above the upper

margin, both on the inside and the outside, the irregularity occasionally taking the form of a rude tubercle inside, more or less separate from the cusp; outside, no denticles.

cingulata, L.: Cape of Good Hope. Central cusp long and thick, the root descending to the base, but not projecting through it, side cusps short, broad, sharply pointed, conspicuously denticled half-way up inside; outside, three well-marked denticles, the inside and largest of which is climbing; knob blunt, prominent. (Fig. 12.)

clavigera, Lischke: Japan. Central cusp long, narrow, sharply pointed, side cusps rather narrow, sharp, and long, sharply denticled about half-way up on inside; outside, 4-5 sharp prominent denticles, two of which climb; knob prominent. (Fig. 8.)

Compare this with *bronni*, Dunk.

coronata, Lam.: Guinea coast. Central cusp very long and rather thick, side cusps sharp, with a small sharp denticle high up on the inside; four prominent toothlets outside, one slightly climbing; knob short and blunt. (Fig. 11.)

A specimen from Demerara shows a transparent central cusp, no denticle on the inside of the side cusps, two deeply cut blunt denticles outside; knob very prominent.

The var. *guatemalensis*, Pils., corresponds to the Guinea form, except that the outer denticles are not quite so prominent, while the knob is more conspicuous. These three forms, from different localities, show conclusively how unstable are the denticles, both in number and shape.

deltoides, Lam.: Barbadoes. Central cusp broadly triangular, one-third as long again as the side cusps; side cusps sharply pointed, with a strong blunt denticle low down on the inside; exterior denticles usually absent, only faint wrinkles; knob blunt, not prominent. (Fig. 3.)

Two other specimens show, in one case two, in the other one tiny denticle, outside the side cusps.

echinata, Blainv.: W. Australia. Central cusp thick, very long and sharply pointed, $2\frac{1}{2}$ times the length of the side cusps, and set in a slight depression of the upper margin; side cusps with a blunt denticle, more a hump than a denticle, on the inside; outside, no denticles; knob fairly prominent; base slightly waved. (Fig. 5.)

echinulata, Lam.: Karachi. Central cusp long, regularly triangular, not thicker than the side cusps; side cusps about half the length of the central, set with a sharp prominent denticle about half-way up on the inside; outside, 4-5 denticles, one or two climbing, very small, the uppermost quite high up, three prominent, largest close to the knob; knob prominent.

fasciata, Reeve: Ascension I. Central cusp long, rather broad; side cusps narrower, moderately long, sharp at point, and broadening out about half-way down; a prominent inside denticle, which is rather deeply cut; outside, one very small climbing denticle, then three well-marked but rather blunt denticles; knob prominent.

In another specimen (Ascension I.) there are five exterior denticles (one climbing); 216 rows in all were counted.

floridana, Conr.: Vera Cruz. Central cusp long, sharp and rather narrow, side cusps about two-thirds the length, broad below, conspicuously denticled high up on the inside, denticle clinging close to the cusp; outside, 3-4 prominent denticles, one climbing; knob elevated and prominent; base straight, as in *hæmastoma*.

gemmulata, Lam. (= *mancinella*, L., pars). Central tooth long, thick, and broad, rather deeply set in the upper margin; side cusps small in comparison, not denticled, but there is a slight broadening of the lower part of the inner edge, as drawn by Troschel; no outside denticles, knob just a raised hump. A Cambridge specimen shows throughout a tiny sharp denticle, closely adherent to the inside of the side cusps at the base. In a specimen from Durban the broadening of the inner edge almost amounts to a blunt denticle; in one from Rotuma the knob is prominent. (Fig. 1.)

hæmastoma, L. The rhachidian tooth of this widely distributed species shows, within limits, certain variations in the position and number of the denticles. The central cusp is always strong, broad, and long-pointed, often expanding broadly at the base; the side cusps are about two-thirds the length of the central, and widen greatly below the denticle, which is always high up, in a specimen from Algiers very high; outside, the denticles are strong, prominent, and deeply cut; one from Cape Verd has four, one very small, climbing high, another adherent and climbing; a Pernambuco specimen has three, one climbing high; a Dominica specimen has four strong denticles, which correspond exactly to those in the Cape Verd specimen, and the same features are repeated in a Bermuda specimen (labelled *fasciata*, Reeve). In a Demerara specimen the denticle inside the side cusps is unusually prominent and thick, there are two climbing denticles on the outside, and 2-3 more beyond. (Fig. 16.)

hippocastanea, Lam.: Funafuti. Central cusp broad, sharply pointed, side cusps about two-thirds its length, bluntly denticled low down inside; outside, 2-3 very minute denticles, mere wrinkles in some specimens; knob small, slightly elevated.

inermis, Reeve: Cape Verd. Central cusp long, thick but rather narrow, side cusps strong, strongly denticled inside; two outer denticles, one of which is climbing, knob rather prominent; blade of laterals rather narrow.

intermedia, Kien.: Hilo, Hawaii; Mauritius. Central cusp broad, side cusps with a prominent well-cut denticle low down on the inside, practically detached from the cusp, seemingly almost half-way between it and the central cusp, the denticle bulges inwards on the inside, while the apex points towards the side cusp, its root is a little sunk in the mass of the tooth; outside, no outer denticles, only some faint wrinkles. Generally regarded as variety of *hippocastanea*, Lam. (Fig. 4.)

kiosquiformis, Ducl.: Panama. Central cusp thin, transparent, twice as long as the side cusps, which incline outwards, and have a strong sharp denticle high up on the inside; outside, 3-5 well-marked denticles, 1-2 of which are climbing; knob strong, prominent. (Fig. 14.)

Troschel's figure is legendary.

luteostoma, Chem.: China. Central cusp strong, broad, and long; side cusps about half as long, sharply pointed, on the inside is a denticle, prominent, sharp or blunt, set at varying heights, but usually low down, sometimes nearly half-way up, and occasionally itself doubled or denticled; outside, one or two small climbing denticles, then 4-5, prominent; knob blunt.

In one specimen there are 7-8 exterior denticles, four of which climb, the upper ones rising near to the apex of the cusp.

melones, Ducl.: Panama. Central cusp about one-third longer than the side cusps, moderately broad, side cusps broad, with a very strong denticle low down, deeply cut, and almost free of the cusps, inclining towards them, and occasionally irregular in shape; outside, 1-2 very faint blunt denticles, not climbing; knob blunt, prominent. (Fig. 6.)

neritoides, L.: St. Vincent, Cape Verd. Central cusp broad and thick, nearly twice as long as the side cusps, side cusps not denticled inside; outside, no denticles, but occasionally a small very blunt hump at the base of the cusps; knob blunt, not prominent.

A specimen of the var. *ascensionis* (Ascension I.) is strongly denticled about half-way up the inside of the side cusps, with two well-marked denticles outside and traces of a third, smaller, climbing.

Compare *coronata* for this divergence, as regards denticles, between the typical form and varieties.

persica, L.: Colombo. Central cusp long and broad, side cusps long, broadening considerably at and below the denticle, denticle small but conspicuous, two-thirds way down; outside, 4-5 strong deeply cut denticles, one of which climbs; knob large and elevated. (Fig. 15.)

petiti, Melv.: Charbar. Central cusp long and thick, side cusps short, rather stumpy, with a strong short denticle on the inside; outside, three rather blunt denticles, one of which is climbing; knob prominent.

pica, Blainv.: Java. Central cusp long, massive, two-thirds longer than the side cusps, which are decidedly narrower, one small denticle between the central and side cusps, but not attached to either; outside, no denticles, but faint symptoms of a few wrinkles; knob rather blunt. (Fig. 2.)

rudolphi, Lam.: Natal. Central cusp long and pointed, often furnished with a guard, broadening at its base, side cusps broadly triangular and pointed, rather shorter than in *persica*, a sharp denticle low down on the inside; outside, 3-4 strong conspicuous denticles, not climbing; knob prominent and high.

Three different specimens have four denticles on one side of the cusps and three on the other; sometimes the knob is bifid.

sacellum, Chem.: Charbar. Central cusp sharp, rather long, broadening rapidly near its base, side cusps blunt and broad, with a rather obscure denticle about half-way up; outside, 3-4 small denticles, one or two of which climb; knob blunt; base waved in the centre.

smithi, Braz.: Lord Howe's I. Central cusp rather short, broad, one-half to one-third longer than side cusps; side cusps short, rather broad, with a strong bluntish denticle scarcely half-way up on the inside; outside, three well-marked prominent denticles, one climbing; knob outside, rather small.

succincta, Mart.; *textiliosa*, Lam.: W. Australia (Albany, Bunbury), Victoria, Tasmania, Sydney, New Zealand. A number of specimens labelled as one or other of these species have been examined. I am not prepared with any positive statement as to the identity or distinctness of the two species, and it is quite possible that specimens given to or labelled by Professor Gwatkin as *succincta* may be *textiliosa*, or vice versa. But what is certain is this: there are two distinct types of rhachidian tooth—(1) cusps all narrow, very sharply pointed, and of equal thickness, so that they can all be brought into focus at once; side cusps about two-thirds length of the central; inside denticle on side cusps often freakish, hooked, or broken; outside, 6-7 small denticles, three climbing high; (2) central cusp thick, more broadly triangular than the side cusps, and longer in proportion; inside denticle not freakish or irregular; outside, no climbing or other denticles, a few obscure wrinkles only. (Figs. 17, 18.)

The evidence strongly points to (1) being *textiliosa* and (2) *succincta*.

trigona, Reeve: China. Central cusp long, sharp, broad at the base, side cusps short and broad, sharply denticled about half-way up on the inside; outside, four strong conspicuous denticles, two of which climb high and stand out from the cusp in a remarkable way; knob sharp and conspicuous.

tumulosa, Reeve: Japan. Central cusp long, sharp, not very thick, side cusps sharp, narrow at the point, broadening below the denticle, which is strong and sharp, set high up on the inside; outside, 5-6 denticles, 1-2 of which are climbing; knob strong.

Var. *problematica*, Baker. Inner denticle very large and prominent, six exterior denticles, deeply rooted, one climbing slightly, one quite half-way up the cusp.

HAUSTRUM, Perry, and LEPSIELLA, Iredale.

The characteristic of the radula of the *haustrum* group is a rhachidian tooth on which are set five prominent cusps, of which the central is always the largest, and sometimes (*haustrum*, *lacunosa*) much the largest. The cusps are more or less equidistant from one another, though there is a tendency for the two outer cusps on each side to draw together, and away from the central. In shape the cusps vary, being (1) all rather sharp and pointed (*haustrum*) or (2) central cusp pointed, side cusps somewhat blunt (all the rest). Instead of being squarely oblong, the mass of the tooth is compressed above and below, making the tooth narrow in depth, in proportion to its width. The knob has varying degrees of prominence. The base is usually doubly waved, with a projection in the centre, opposite to the central cusp; this projection is most prominent in *scobina* and its varieties.

This type of radula occurs in the following species only:—

haustrum, Mart.: New Zealand.

lacunosa, Brug. (= *striata*, Mart.): New Zealand.

scobina, Quoy (+ vars. *albomarginata*, Desh., *tristis*, Dunk.): New Zealand.

adelaidensis, Crosse (" *Ricinula* "): Southern Australia.

It marks them off in a decisive manner both from the *Thais* proper and from the *Nucella* group, which, with their tricuspid rhachidian and numerous minor denticles, stand in much closer relationship to one another than either of them do to the *haustrum* group. At the same time one is inclined to think that there is a distinct analogy between the four side cusps in this group and the two side cusps, each with its strong interior denticle, in *Thais* proper. It seems reasonable to suppose that the two exterior cusps (let us call them cusps 1 and 5, reading from the left when the cusps point away from you) in the *haustrum* group are analogous to the two exterior cusps in the *Thais* group, while the interior denticle which is attached to those cusps in the latter group represents cusps Nos. 2 and 4 in the *haustrum* group, the proximity of the cusps 1 and 2 and of cusps 4 and 5 being significant when regarded in this light. It is conceivable that, in earlier representatives of the group, now extinct, in proportion as the attached denticle became larger, it pushed the cusp to which it adhered away from the central cusp, until it established itself in the place, and with the dimensions it now holds in the *haustrum* group. Or the reverse process may have occurred, and the New Zealand group may be the progenitors of the *Thais* group, cusps 2 and 4 becoming smaller, drawing nearer to cusps 1 and 5, and finally coalescing with them in the form of the denticle now seen on their inner side.

haustrum, Mart. Central cusps decidedly longer than the four side cusps, all the cusps sharply pointed, and equidistant from one another, cusps 1 and 5 broader than 2 and 4; knob fairly prominent; base-line hardly curved, angles of the base decidedly produced. Troschel's figure is accurate, except that the central cusp is not long enough. (Fig. 23.)

lacunosa, Brug. Central cusp decidedly the longest, all the cusps rounded rather than sharp at the apex, knob scarcely showing, base-line nearly straight, not indented, angles of base slightly produced.

scobina, Quoy. Central cusp somewhat sharp, side cusps shorter and blunt; cusps 1 and 2, and 4 and 5, are close together and well away from the central; knob prominent; base-line waved in the centre; basal angles scarcely produced. The same points recur in the varieties *albomarginata*, Desh., and *tristis*, Dunk. (Fig. 24.)

adelaidensis, Crosse. The cusps are somewhat sharper than in *scobina*, and the knob is decidedly more prominent; the base is slightly waved in the middle and the base angles are scarcely produced. Cusps 1, 2, and 4, 5 are close together. In other respects the form of the radula corresponds closely to that of *scobina*. (Fig. 25.)

The occurrence of a group of *Thaidæ* possessing a peculiar type of radula, and so restricted in its distribution, is remarkable. It may be paralleled by the restriction of the *Nucella* group to northern waters. Not all New Zealand *Thaidæ* possess a radula of this type. The exceptions are *T. succincta*, Lam., and *T. smithi*, Braz. Evidently, however, *succincta* is an immigrant from Australian waters, which *smithi*, in view of its general form and restricted geographical distribution, may be confidently regarded as a derivative from the same stock. The fact that the only remaining New Zealand *Thais* (*Agnewia tritoniformis*, Blainv., see p. 100) is also found in Australia, is noteworthy on other grounds, and the species is probably a recent immigrant to Neozelanian waters.

PATELLIPURPURA, Dall.

P. patula, L. Central cusp very long, thick, and sharp, set with a guard at the sides, broadening considerably at its junction with the upper margin, penetrated down the centre by a long hollow tube, which broadens from the apex and almost appears to cut the cusp in halves; at the bottom of this cusp, where it is imbedded in the mass of the tooth, there appears to be a kind of hollow chamber, in which may be stored the poison emitted through the tube; this chamber can only be seen by careful examination of the worn end of the radula, where it is disclosed. The side cusps are much shorter, narrow, and sharp; there is a prominent sharp and narrow denticle very low down, equidistant from the central and side cusps, and not connected with the one more than with the other; no denticles outside, knob broadly blunt. The base is broadly but not prominently waved in the centre by the root of the central cusp; angles of the base produced into short "wings". The whole tooth is very solid, and the upper margin appears to be remarkably thickened. Troschel's figure is inadequate.

These features of the radula afford, on all grounds, abundant reason for separating *patula* from the mass of species referable to *Thais* proper. The position of the intermediate denticle, the winged base, and above all the unique form of the central cusp constitute points of difference which are decisive. The type of rhachidian appears to be primitive, a view which is perhaps supported by the occurrence of the species on both sides of the Isthmus of Panama, a distribution shared by no other member of the family. The locality "Philippines" is an old error, which has already been pointed out (Journ. de Conch., 1887, pp. 228-38), but is still repeated.

CHORUS, Gray.

C. giganteus, Less.: Chili. Central and side cusps long and broad, sharply triangular, almost equal in length, somewhat removed from one another, central not deeply rooted, no denticles or wrinkles on the inside or the outside; angle of upper margin slightly elevated; base straight or gently curved upward, sides scarcely curved. Laterals with a very broad and strong base.

The radula closely resembles that of such species of *Thais* proper as are not furnished with denticles, but have three bare cusps.

CONCHOLEPAS, Lamarek.

The radula of the single species (*peruvianus*, Lam.) is of the normal *Thais* type; central cusp long and rather narrow; side cusps large, almost as long as the central, with a strong, rather blunt denticle low down on the inside; outside, 4-5 rather small denticles, two of which climb; knob strong but prominent; base simple, straight.

The radula is very long; I have counted 260 + nascent rows.

PINAXIA, A. Adams.

The radula of the single species (*coronata*, A. Ad.) is of the normal *Thais* type; cusps short and thick; side cusps strongly singly denticled inside; at least three denticles outside, one of them climbing; knob very prominent; base simple, slightly curved inward. (Fig. 27.)

AGNEWIA, Tenison-Woods.

The radula of the single species, *tritoniformis*, Blainv., is essentially Thaidan; central cusp long, broad and rather thick; side cusps about half the length, broad, with a strong, rather blunt denticle about half-way up on the inside; outside, 3-4 well-marked denticles; knob prominent; base slightly arched. (Fig. 26.)

DRUPA, Bolten.

Conchologically, the precise limits of this genus are somewhat ill-defined, as between *Thais* on the one side and *Morula* on the other. The radula enables us to separate off with confidence, under *Drupa*, a certain number of species as closely allied to *Thais*, and as definitely distinct from *Morula*.

The rachidian cusps are, as a rule, long, but not very thick or prominent, as they often are in *Thais*; the side cusps are not, as a rule, greatly shorter than the central; the denticle on the side cusps is deeply cut, and its point often curves towards the cusp; the small outside denticles are well marked, sometimes climbing, sometimes not; the base, though as a rule slightly waved in the centre, is that of *Thais*, and not that of *Morula*, and is not indented by the prolongation of the root of the central cusp. The blade of the laterals is long and thin.

affinis, Pease (so I regard the species labelled *rugosa*, Quoy, the original shells being in my possession): Funafuti. Rachidian somewhat transparent, all the cusps narrow and sharp, central scarcely longer than the side cusps, which are strongly sharply denticled low down on the inside; outside, 4-5 prominent small denticles, rather deeply cut, the innermost climbing; knob blunt, rather elevated.

clathrata, Lam.: S. Pacific. Median cusp rather short, very broadly triangular, not very much longer than the side cusps, which are narrower and sharply pointed; a prominent but rather blunt

denticle on the inside; outside, 2-3 well-marked blunt denticles, not climbing; knob strong.

Several specimens from Mauritius correspond with this.

digitata, Lam., and var. *lobata*, Blainv.: S. Pacific. General appearance of rhachidian comb-shaped, very obtusely angled in the centre; a short, thick, blunt-pointed central, mounted on a sort of base; the side cusps are replaced by a series of tooth-like denticles set on a frame; that nearest the centre is three-pronged on a broad base, then come five long, prominent, deeply cut denticles, equidistant from one another, inclined slightly outwards; laterals small, thin, somewhat hooked; base obtusely angled in the middle.

dumosa, Conr.: Hilo, Hawaii. A somewhat different type; central cusp rather thick, narrow-pointed; side cusps sharp, much smaller; both central and side cusps appear to be rather deeply rooted in the mass of the tooth, central a little sunk in; a sharp interior denticle adjacent to, but separate from, the side cusp, and deeply rooted; outside, 1-3 small denticles, not climbing; knob bluntly broadly raised; base that of *Thais*, not projecting in the centre.

horrida, Lam.: S. Pacific; Hilo, Hawaii. Central cusp long, sharp, narrow, but scarcely longer than the side cusps; side cusps rather broad, very strongly denticled rather high up inside, point of denticle turning towards the cusp; 3-4 outside denticles, innermost rising somewhat on the side cusp; knob prominent; base curving slightly inward.

hystrix, L.: Mauritius. Central cusp long, narrow, scarcely longer than the side cusps; side cusps long, narrow, strongly denticled on the inside, point of denticle inclining towards the cusp; outside, one small, well-marked denticle close to the outer base of the side cusp, but not climbing; knob prominent; base as in *horridum*; laterals very long and narrow. (Fig. 20.)

iodostoma, Less.: Sandwich Is. Central cusp long, sharp, narrow, side cusps long and sharp, about two-thirds length of central, set inside with a very sharp, long, and prominent denticle, whose point curves slightly inward; outside, 2-3 prominent sharp denticles, one more or less climbing; knob prominent; laterals long and narrow, slightly hooked at the tips. (Fig. 21.)

morris, Lam.: S. Pacific. Rhachidian quite typical of this group; median and side cusps rather sharp, short, and nearly equal in size; at inner base of the side cusps is a large denticle, so deeply cut that it almost appears separate from the cusp; outside, two isolated denticles; knob prominent; laterals rather narrow, slightly hooked at tip.

vicinus, L.: Hilo, Hawaii. Central and side cusps shortish, and rather broad at their base; side cusps three-fourths length of central, with a strong denticle at the inside base, the point inclining somewhat inward; on the outside are three well-marked denticles, two of which are somewhat distant from the base of the cusp, and one, smaller, climbs. (Fig. 22.)

squamosa, Pease: Durban, Scottburgh (H. C. Burnup). Central

cusps long, narrow, twice as long as side cusps; side cusps sharp, broad, a large adherent denticle on inside, close to the base, point turning in, 3-5 well-marked outer denticles, one climbing high; knob fairly prominent.

aperta, Blainv.: Hilo, Hawaii. The three great cusps are nearly equal in length, all rather broadly triangular; central much the thickest, with root carried through to the base, which it causes to project slightly; side cusps with a prominent blunt denticle low down and close to the cusps; outside, three or four small but well-marked denticles, the innermost very small and climbing; knob blunt. (Fig. 19.)

harpa, Conr.: Sandwich Is. Rather a large radula for so small a shell; central cusp strong, one-third as long again as side cusps; side cusps rather blunt and broad, a strong, pointed, slightly incurved denticle rather low down on the inside; outside, 2-4 well-marked denticles, one climbing, while two sometimes combine to form a single strong denticle; knob well marked; base slightly waved in the centre, angles of base sharp, scarcely produced; laterals remarkably hooked at point.

One cannot help being struck by the singular general likeness of the radula to that of the *Drupa* group.

nux, Reeve: South Pacific. Central cusp broad, rather short, rapidly tapering to a sharp point, side cusps broad, sharply pointed, not greatly shorter than the central, peculiarly denticled high up on the inside, denticle slightly angled on the inside; outside, 4-5 sharp, well-marked denticles, the innermost climbing high; knob prominent, rather narrow; base slightly waved in the centre, slightly angled at the corners.

It is a very significant fact that the radulæ of *Thais aperta*, Blainv., *harpa*, Conr., and *nux*, Reeve, all of which species are peculiar to the Pacific islands, the metropolis of *Drupa*, belong distinctly to the *Drupa* type, exhibiting all the characteristics in which that type differs from that of *Thais* proper, under which group these three species have always been hitherto classified.

RAPANA, Schumacher.

R. bulbosa, Sol. Central and side cusps very broad and thick, central only slightly the longer, side cusps sharply denticled high up on the inside, this denticle is in some cases so tiny as to be scarcely visible, a mere nick; no exterior denticles, but a number of wrinkles at the outer base of the side cusps, low down, not in the plane of the upper margin; no knob; sides of the tooth sloping sharply to the base, which is simple, bluntly angled at each side. Troschel's figure needs revision. Specimens from Durban and Karachi agree completely. (Fig. 29.)

R. bezoar, L. Central cusp longer and narrower than in *bulbosa*; side cusps with a strong sharp denticle high up; a number (about half a dozen) of prominent wrinkles or ridges outside the side cusps, but as in *bulbosa*, below the upper margin of the tooth; no knob;

base shaped as in *bulbosa*, but not sloping in quite so sharply at the sides; mass of the tooth decidedly deeper in proportion to its width.

Specimens from the Persian Gulf and Japan agree completely. (Fig. 28.)

For the radula of *NEORAPANA*, and *ACANTHINA*, and *ACANTHINUCELLA*, see *Proc. Malac. Soc.*, xiii, 1918, pp. 6-11.

NUCELLA, Bolten.

The *Nucella* group is characterised by a rhachidian, the central cusp of which is set (as in *Morula*) in a small pit or excavation on the upper margin of the tooth; it is mounted on a strong root or pillar which runs downward through the main mass, and terminates in the base, usually causing a more or less prominent projection. The side cusps are mounted on buttresses, and are denticled inside and outside; the outer denticles descend steeply, far below the upper margin. The base, instead of being rounded, is produced more or less sharply, at the two outer angles. The knobs are very prominent, and a portion of the substructure of the tooth appears to run from one to the other.

These features are reproduced in all the forms of this small group which are known to me, and afford additional evidence of the close connexion of the West American *Thaidæ* (*lima*, Mart., *plicata*, Mart., *emarginata*, Desh., and their varieties; see *Proc. Malac. Soc.*, xi, 1915, pp. 203-4) with the European and East American *Nucella lapillus*. Unfortunately the radula of *Thais freycineti*, Desh., is not included in Professor Gwatkin's collections, otherwise it would have been interesting to determine whether that species has radular affinities with the *Nucella* group, or is a northern representative of the main *Thais* group. The form of shell certainly inclines one to expect the former to be the case, and geographically there seems no reason why the ancestors of the West American *Nucella*, when they reached that district from the north, should not also have reached North Asiatic shores.

The following species have been examined:—

lapillus, L.: Torbay. Central cusp thick, one-third longer than the side cusps, deeply set in a pit below the level of the upper margin, root carried through to the base and sharply projecting; side cusps broad, set on strong buttresses, which descend into the body of the tooth, bluntly denticled low down on the inside and outside; two more small denticles, which are not always present or not always discernible, beyond and below the exterior base of the side cusps; knob strong, much elevated; base angles well produced.

Specimens from Oporto and Nahant, Mass., agree in essentials; frequently there is only one small exterior denticle.

lima, Mart. (as *canaliculata*, Ducl.): Vancouver I. Central cusp thick, long, narrow, considerably longer than the side cusps, sunk very deeply in the upper margin, root carried through to the base, but not causing a marked projection in it; side cusps with a conspicuous bluntish denticle high up on the inside, and another, also blunt, lower down on the outside (this latter is sometimes not

present); one blunt toothlet lower down still; knob strong, prominent above; base angles produced rather broadly.

plicata, Mart.: Vancouver I. Central cusp long, and rather thick, deeply sunk in the upper margin; side cusps not so short as the central, with a rather conspicuous humped denticle half-way up on the inside; outside, one blunt denticle close to the base of the cusp, then two others, further away and lower down; knob elevated, strong; angles of base slightly produced, root of the central cusp projecting slightly in the middle. (Fig. 30.)

emarginata, Desh., var. *saxicola*, auctt.: California. This form stands somewhat apart from the rest. Its general type is the same, but the whole radula is rather small, compressed, and narrowed (the laterals are reduced in size). Central cusp very long, but not very thick, root carried down to the base, but not projecting; side cusps short, and narrower than in other members of the group; the exterior line of the cusp descends, without any broadening, into the mass of the tooth, one strong sharp denticle high up on the inside of the cusp, occasional traces of a tiny denticle low down outside; knob strong, not much elevated, framework of tooth not carried up so high from knob to knob as in the others; angles of base considerably more produced than in any other species of the group; base arched inwardly.

MORULA, Schumacher.

Study of the radulæ of the *Thais* group leads one to think that, whereas hitherto a great deal of stress has been laid on the form, number, etc., of the rhachidian cusps, the shape and formation of the mass of the tooth, and particularly of its base, has an equal claim on our notice. From the fact that the cusps are more prominent, and that the cusps of one tooth overlie the base of the next, the body and base of the tooth are often difficult to observe, and have, in consequence, seldom been observed at all. Troschel, it would appear, lays little stress on this part of his subject. Observation tends to impress upon one the truth that, while the cusps and their attendant denticles are, to a certain extent, variable in different specimens of a species, and even in the same specimen, the form of the base remains constant, and must therefore become an important factor in our estimate of the radula as a whole.

Although, conchologically, *Morula* appears to unite by easy stages with *Drupa*, the radula is framed on a totally different pattern. The base, instead of being straight, or gently curved inwards, curves doubly on the two sides of a central projecting hump, which is in fact the base or bottom of the central cusp of the rhachidian. This cusp is not, as in *Thais* proper, a mere projection from the upper edge of the tooth, but is very thick and solid, and is carried right through the rhachidian like a rounded pillar, producing the hump-like excrescence in the centre of the base itself. This alone would constitute a wide difference of structure. Further, the two side cusps in *Morula* are never denticulate, either on the inside or on the out, the knob is usually flattened, and there are no small denticles between it and the side cusps, nothing but a broad bare

space. Between the central and side cusps on each side there is always one small independent denticle, rather nearer to the side cusps than the central, deeply rooted in the mass of the tooth, and on a lower plane than the side cusps. Rarely a tiny subsidiary denticle may be detected inside this denticle. All the cusps are narrow and sharp, and the side cusps sometimes incline towards the central, sometimes curve away from it. The central cusp, instead of being more or less on a level with the other cusps on the upper edge of the tooth, as in *Thais*, is always depressed in a sort of shallow pit or curve, so that the front edge seems to slope towards the central cusp and rise in the direction of the knobs. The extreme thickness of the central cusp throws it, in the microscope, into quite a different plane of vision to that of the other cusps. The whole tooth is very wide in proportion to its depth; the blade of the laterals is narrow, their base often prolonged. (Fig. 32.)

None of the different species of *Morula* show any variation from this type of rhachidian, the sole difference lying in the relative size and sharpness of the cusps, or the angle of their inclination. Thus, while the rhachidian of *Morula* is an excellent indication of the genus, it is by no means so distinctive, as regards the species, as the radula of *Thais*.

No author seems to have drawn attention to this very characteristic form of radula.

The following species have been examined:—

anaxares, Ducl.: Umkomaas. Central cusp rather short; side cusps blunt and broad; a small bluntish denticle inside the side cusp and close to it.

cancellata, Quoy: Umkomaas. Central cusp very thick; side cusps inclined inwards; a tiny denticle inside, very low down.

chaidea, Ducl.: Tonga. Central cusp very long and sharp; side cusps small, pointed; one small denticle, pointing inwards, low down on interior side (this denticle is not always present; its distance from the side cusp, and therefore from the central, differs in different specimens; in another Tonga specimen it is quite close to the cusp).

chrysostoma, Desh.: Karachi. Central cusp normal; side cusps two-thirds length of central, much broader, point inclining outwards; inside denticle long, narrow, and sharp, inclining towards central cusp.

concatenata, Lam.: Karachi. Central cusp not very long; side cusp broad and humpy, the point turning markedly outwards; a large prominent denticle close to the base of the side cusp, but quite separate from it, and set nearer the upper margin of the tooth than is usual in this group.

On the other hand, a specimen from Umkomaas (H. C. Burnup) is of the *Thais* type; central cusp long, thick, narrow, sharply pointed, side cusps very small, bluntly triangular, with a blunt hump rather than a denticle, at the inner base; outside are 5-6 small denticles, two of which climb; knob prominent; base that of *Thais*. I think this specimen is misidentified, and that the species belongs to the *Morula* group.

elata, Blainv.: Durban. Central cusp long, sharp, thick; side cusps rather short and stout; one short sharp denticle inside the side cusps, singularly variable in size, shape, and position; it becomes sometimes bifid or even trifid on one side, rarely blunt, occasionally so close to the side cusp as almost to touch it; base narrow and much extended.

elongata, Blainv.: Burias I. Central cusp very long, pointed, and narrow; side cusps long and sharp; a tiny blunt denticle (which is often absent altogether) at varying distances from the side cusp; base of laterals much produced.

A specimen from the Cambridge collection (Umkomaas, H. C. Burnup) exhibits a prominent knob and denticles outside the side cusps; it is probably a mistake of identification.

fiscellum, Chem.: Bohol. Central cusp sharp, not very long; side cusps long, sharp; one small sharp denticle well away from the side cusps; a long distance quite bare between the side cusp and the upper angle of the margin; the whole tooth rather shallow in depth, extended in breadth. A variety from Fiji shows, over a certain portion of the radula, two small denticles, or a single bifid denticle, inside the side cusps.

granulata, Ducl.: Isipingo, Natal. Central cusp short, not very thick; side cusps projecting well beyond it, pointing slightly outwards; inside denticle strong, just free of the side cusp; a wrinkle rather than a denticle close to, on the outside; angle of margin raised somewhat, but no knob.

konkanensis, Melv.: Karachi. Side cusps rather large; inside denticle prominent, sharp; whole tooth very wide and shallow.

margariticola, Brod.: Bombay, Karachi. Central cusp normal; side cusps small, sharp, slightly inclined inwards; inside, a very small denticle, which is sometimes far removed from the cusp, sometimes adjacent, and sometimes absent altogether; basal projection very marked.

marginatra, Blainv.: Sydney. Central cusp normal; side cusps short, rather sharp; inside, a prominent denticle, set rather low, and so near the side cusp as almost to seem adherent.

A specimen from Port Jackson (at Cambridge) shows a faint raising of the margin at the upper angles.

muricata, Reeve: Réunion. Central cusp remarkably short, and not very thick; side cusps broad and somewhat blunt; the inside denticle sharp, prominent, very close to the side cusp, at times almost touching.

mutica, Lam.: Umkomaas. Central cusp narrow; side cusps short, blunt; inside, a small, very blunt denticle, close to the side cusp.

ochrostoma, Blainv.: Hilo, Hawaii. Side cusps upright, rather long; inside denticle small, sharp, rather far from the side cusp; a considerable distance between the side cusp and the end of the upper margin, which rises slightly at the angle.

spectrum, Reeve: Tonga. See *Cambridge Natural History*, vol. iii, p. 222, fig. 124.

subnodulosa, Melv.: Bombay. Side cusps blunt, with blunt

denticle close to them on the inside; external part of upper margin curiously raised, almost toothed.

triangulata, Pease: Samoa. Central and side cusps rather short; the interior denticle blunt, well away from the side cusp.

tuberculata, Blainv.: Mauritius. Central cusp remarkably short, blunt, almost equal in length to side cusp; side cusps stumpy, with a large blunt denticle close to their inner base; upper angles of the margin raised and terminating in what is almost a knob.

undata, Chem.: Karachi. Central cusp rather narrow; side cusps large and broad; interior denticle long, prominent, close to the side cusp.

Another specimen from Isipingo shows the side cusps inclining somewhat inward.

CRONIA, H. & A. Adams.

C. amygdalus, Kien.: Torres Str., Port Jackson. General plan of the radula markedly that of *Morula*; central cusp long, thick, and narrow, but not deeply sunk in a pit, root carried through to the base and projecting; side cusps rather smaller, with a small sharp tooth on the inside, close to but separate from the cusp; no denticles outside, no knob; base boldly waved by the projection of the root of the median cusp. The little isolated denticle is not so low down as in *Morula*, being nearly, though not quite in the same plane as the side cusps; base of laterals much prolonged. (Fig. 33.)

Cronia therefore forms another link between *Thais* proper and *Morula*, but its relationship to *Morula* is much closer than is that of *Cymia*. *Cymia* may be regarded as a modified *Thais*, *Cronia* is a scarcely modified *Morula*.

Mr. Hedley, I am told by Mr. Iredale, names *Cronia* from these localities *pseudamygdalus*, restricting *amygdalus* to Sydney and the east coast.

CYMIA, Mörch.

The single species (*tectum*, Wood, see A. H. Cooke in *Journ. of Conch.*, v, pp. 167-72, 1887) of this genus exhibits a central cusp which is long, thick, rather narrow, deeply set in a pit and cut in; side cusps decidedly shorter, broadly triangular, very strongly singly denticled low down on the inside, the inner edge of the denticle descending low and rooted deep, as in *Morula*. On the outside edge of the side cusp, low down, is an obscure blunt denticle or corrugation; this denticle is not a separate toothlet like the exterior denticles in *Thais*, but forms part of the cusp itself; outside this again, as a rule, there is nothing but the knob, but in some specimens there is another tiny blunt denticle close to the knob; knob prominent; base deeply waved, with root of central cusp projecting through. (Fig. 31.)

Cymia thus forms a good link between *Thais* and *Morula*: the attached denticle on the inner side of the side cusps, the symptom of an external denticle, and the prominent knob showing affinity with *Thais*. On the other hand, the narrow thick central cusp, the pit in which it is placed, and above all the carrying of the root right

through to the base of the tooth, making the base-line strongly waved, are characteristics which point to even closer relationship with *Morula*.

IOPAS, H. & A. Adams.

I. sertum, Lam.: Natal. Rhachidian very thick, dark chestnut colour in the adult; central cusp very long, narrow, and thick, with a central tube, deeply set in a shallow pit on the upper margin, in quite a different plane to the two side cusps, root carried through to the base and slightly projecting; side cusps small, sharp, triangular, inclining inwards; they vary greatly in size in different specimens, being sometimes long and sharp (Samoa), sometimes quite small and blunt (Berbera); their inner side and root descend well below the upper margin. Of two specimens from Durban (H. C. Burnup, as *situla*, Reeve), one has side cusps long and prominent, another has scarcely any trace of them at all, and that only in a few rows. No inner or external denticles, no knob. In a specimen from Samoa there is in many of the teeth a small blunt denticle lying close to the inner base of the side cusps; this is quite an irregular growth, and in the specimen concerned occurs sometimes on one side only; in part of the radula it is absent altogether. Of three specimens from Hilo, two show no trace of this smaller denticle, one shows it plainly, in certain portions of the radula only. The base is deep and rounded, with a slight projection—not seen in all specimens—where the root of the central cusp reaches it. (Fig. 34.)

I cannot agree with Troschel in placing this genus near to *patula*, L.

VEXILLA, Swainson.

This genus, as represented in the Gwatkin collections, raises some difficult problems. I simply record the facts, in the hope that the investigation of further material may throw more light.

tæniata, Powis: Sandwich Is. Central cusp very thick and long, a single little denticle in place of a side cusp on each side; no outer denticles, no knob; base oblong, deep, somewhat arched below; laterals extraordinarily long, slightly serrated, serræ numerous, except at tip. A Cambridge specimen from the same source corresponds as far as the laterals go; details of rhachidian are not visible, as it is tipped on one side on the slide. (Fig. 35.)

vexillum, Chem. There are three specimens in the British Museum Collection.

Specimen 1: Mauritius (Sow.). Rhachidian with a very long, thick, and strong median cusp, deeply rooted, close to which, on each side, is a small bluntish denticle, deeply rooted; base somewhat rounded at the sides and arched below, divided crosswise by a continuous line, above which the mass of the tooth is thick, and below it transparent; laterals narrow at the tip, roughly serrated, serræ few. (Fig. 36.)

Specimen 2: Isipingo (H. C. Burnup). Generally similar to specimen 1, except that the median cusp is not so long or thick, the

two side denticles are much smaller, set below the upper margin, and not deeply rooted, base somewhat more broadly oblong, little arched, laterals much shorter, blunted at top, and not serrated. (Fig. 37.)

Specimen 3: Durban (H. C. Burnup). Rhachidian consisting of a single long, broad, sharply triangular tooth, whose sides abut on the upper angles of the margin, and are broken by a single sharp denticle low down; base narrow, arched below; laterals very slender, serrated. (Fig. 38.)

The shell of specimen 1, with others from the same source, is in my possession, and is undoubtedly *vexillum*, Chem. Mr. Burnup used to send Professor Gwatkin the soft parts only, so that for specimens 2 and 3 no shell is present for verification. But the probability is that on the Natal coast there are two more species of *Vexilla*, distinct from one another and from *vexillum*, Chem. Further investigation must settle the point.

Subg. USILLA, H. Adams.

Usilla fusconigra, Pease: Hilo. The single specimen has the radula of a typical *Morula*, and is probably wrongly labelled.

Summing up the general relationships of the group, so far as the radula is concerned, I should be inclined to regard both *Haustrum* and *Patellipurpura* as decidedly primitive forms, widely separated from one another, not necessarily the immediate ancestors of our present generation of Thaidæ, and possibly survivors of groups once more widely spread.

Closely related to *Thais* proper are a number of genera whose shell has become modified in various ways; these are *Concholepas*, *Chorus*, *Agnewia*, *Drupa*, *Rapana*, and *Neorapana*. In all these the radula is of a similar type, and exhibits, in the different groups, divergencies which are not of a fundamental character.

Not far removed from these is *Acanthina*, as restricted by the views expressed in *Proc. Malac. Soc.*, xiii, pp. 6-11, 1918.

Nucella, widely distributed in the northern hemisphere, but restricted in species, exhibits a type of radula which stands apart from all those hitherto mentioned, and is separated by a wide gap of structure from *Thais* and its congeners.

Morula is a group of marked individuality, and, while displaying in the sunken central cusp and waved base, some affinity to *Nucella*, has other points, noted above, which are markedly its own. *Cronia* is, in essence, an offshoot of *Nucella*, while *Cymia* appears to link *Morula* with *Thais*, possessing as it does characteristics of both genera.

Iopas possesses a radula so entirely peculiar that I hesitate to approximate it to any group, while *Vexillum*, until our knowledge of its radula is finally cleared up, must remain in a similar position, though it certainly stands in a relation more or less close to *Iopas*.

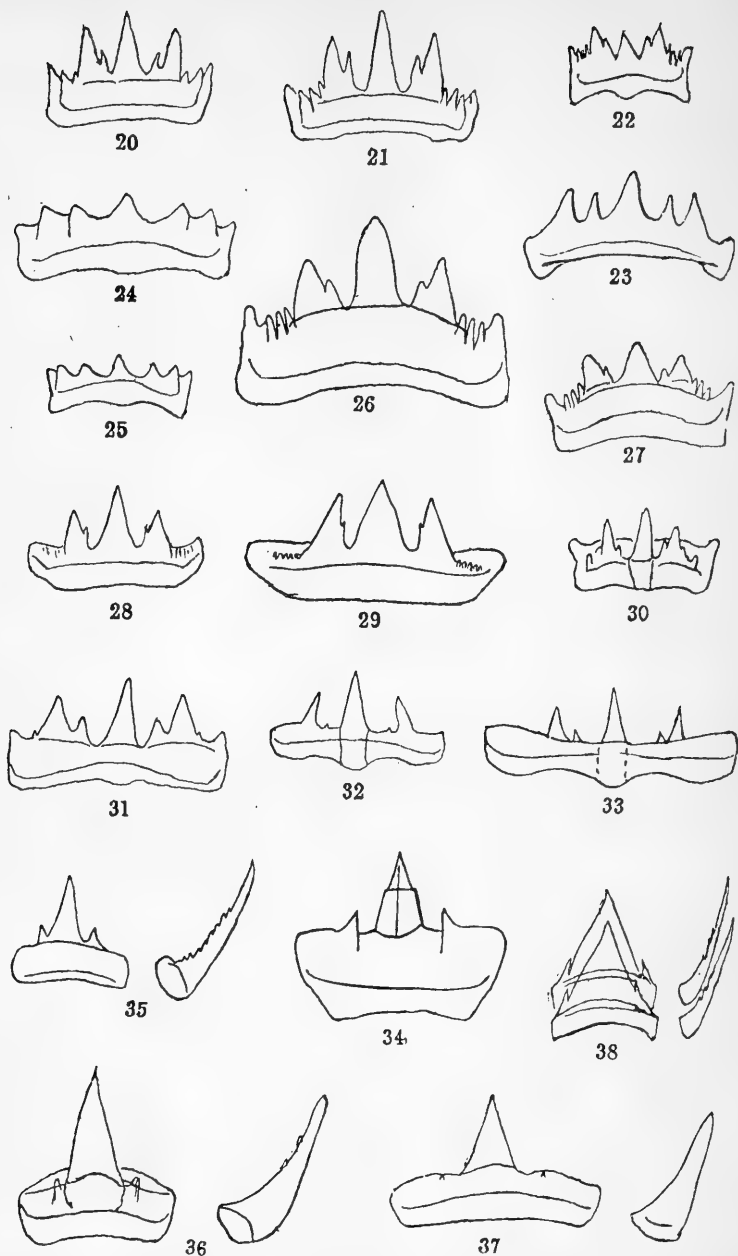


FIG. 20, *Drupa hystrix*; 21, *D. iodostoma*; 22, *D. ricinus*; 23, *Haustrum haustum*; 24, *H. (Lepsiella) scobina*, var. *tristis*; 25, *H. (Lepsiella?) adelaidensis*; 26, *Agnewia tritoniformis*; 27, *Pinaxia coronata*; 28, *Rapana bezoar*; 29, *Rapana bulbosa*; 30, *Nucella plicata*; 31, *Cymia tectum*; 32, *Morula cancellata*; 33, *Cronia amygdalus*; 34, *Iopas sertum*; 35, *Vexilla taniata*; 36, *V. vexillum*, spec. 1 (Mauritius); 37, *V. vexillum*, spec. 2 (Isipingo); 38, *V. vexillum*, spec. 3 (Durban).



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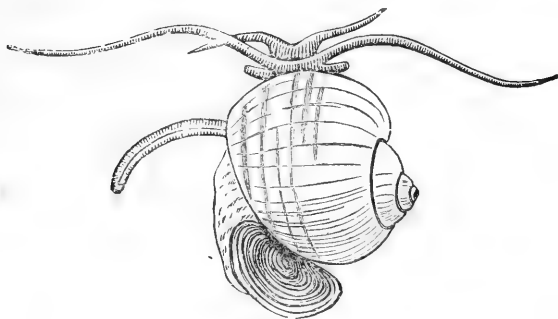
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Meetings are held by kind permission at the MANCHESTER MUSEUM on the SECOND WEDNESDAY in each month from SEPTEMBER TO JUNE.

The Journal of Conchology, the organ of the Society, is issued quarterly to all Members.

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See page iii of this wrapper.

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ANNUAL GENERAL MEETING.

FRIDAY, 14TH FEBRUARY, 1919.

J. R. LE B. TOMLIN, M.A., F.E.S., President, in the Chair.

Mr. H. C. Fulton and Mr. W. R. B. Oliver were appointed scrutineers.

The following report was read:—

“In presenting their twenty-sixth Annual Report, the Council have much satisfaction in recording that the work of the Society has been well maintained, notwithstanding the adverse and difficult conditions arising from the recent war. The monthly meetings have been held as usual, although the attendance has necessarily been affected by the number of members who have been engaged in the National Service; and the communications read have been marked by a high standard of importance.

“Among the losses that the Society has to deplore, the Council would especially mention the death of Mr. Henry Suter, author of ‘A Manual of the New Zealand Mollusca’, and that of the Rev. Canon Norman, a distinguished marine zoologist and one of the original members of the Society.

“Communication with some of the corresponding members of the Society has been rendered uncertain—and in several cases impracticable—of late; but, so far as can be ascertained, the total membership on December 31st, 1918, stood at 133.

“During the past year the financial position of the Society has called for the serious consideration of the Council. Since the early days of the Society it has not been entirely satisfactory, as the cost of the printed ‘Proceedings’ was barely met by the income from annual subscriptions, which had on various occasions to be augmented by private donations. The greatly increased cost of paper and printing, arising from war conditions, brought matters to a crisis, and it became a question of either increasing the Society’s income or drastically curtailing the ‘Proceedings’. As the published Proceedings of the Society are universally acknowledged to be an important contribution to zoological science, the latter alternative could not be seriously considered; and in April last at a Special Meeting of the Society, it was resolved to double the annual subscription.

“The Council are much gratified by the generous approval with which the change has been received by the members generally; and they have now the satisfaction of knowing that when conditions have again become normal it will be practicable to further improve the publication of the ‘Proceedings’ and to develop the general work of the Society without financial embarrassment.

“In this connexion it should be pointed out that the satisfactory balance in hand shown in the statement of accounts for the past year is solely due to special donations, amounting to £63 13s. 6d., privately contributed by a number of members to meet the immediate needs of the Society. Included in this amount were contributions towards illustrating their papers from Mr. G. B. Sowerby and Mr. H. C. Fulton.

“ Appended is a special report from the auditors:—

“ ‘The expenses for the year were defrayed out of income, and there was on December 31st a balance in hand of the comparatively large sum of £88 15s. 1d., but it must be borne in mind that during the year special donations of £63 13s. 6d. were received, and that on the other hand annual subscriptions were paid in advance to the extent of £11 7s., and, owing to enhanced cost, the ‘Proceedings’ were materially reduced in size. It is clear, therefore, that as the receipt of special donations cannot be looked for in the future, the recent increase in the annual subscription was imperative if the Society is to publish ‘Proceedings’ on the same scale as in the past.

“ ‘We still hold £50 Metropolitan 2½ per cent stock, the value of which on December 31st was £31.’

“The Council regret to announce the resignation, owing to the pressure of other engagements, of Mr. G. K. Gude, who has been Honorary Secretary of the Society for the past nine years. During this period Mr. Gude has most ably fulfilled the duties of the office; and the Council desire to place upon record their high appreciation of his untiring and successful endeavours to promote the interests of the Society.

“Acting under Rule XIX, the Council appointed Mr. W. J. Wintle to be Honorary Secretary.

“During the year one double part of the ‘Proceedings’, Vol. XIII, Parts 1 and 2, was issued early in September. It comprised 56 pages of text with 6 sets of text-figures. Drawings or blocks for these were furnished by the Rev. Dr. A. H. Cooke and Mr. J. R. Le B. Tomlin.

“A second double Part, Vol. XIII, Parts 3 and 4, is in course of preparation and will shortly be issued.

“The cordial thanks of the Society are again due to the Council of the Linnean Society, who have kindly permitted the meetings during the past year to be held in their apartments at Burlington House.”

On the motion of the President, seconded by Mr. C. Oldham, the foregoing was adopted as the Annual Report of the Society.

The following were elected Officers and Council for the year 1919:—

President.—G. K. Gude, F.Z.S.

Vice-Presidents.—Rev. A. H. Cooke, M.A., Sc.D., F.Z.S.; Tom Iredale; H. O. N. Shaw, B.Sc., F.Z.S.; J. R. Le B. Tomlin, M.A., F.E.S.

Treasurer.—R. Bullen Newton, F.G.S.

Editor.—B. B. Woodward, F.L.S.

Secretary.—W. J. Wintle, F.Z.S.

Six other Members of the Council.—Major M. Connolly; A. S. Kennard, F.G.S.; C. Oldham, F.L.S.; A. Reynell; G. B. Sowerby, F.L.S.; H. Woods, M.A., F.G.S.

On the motion of Mr. R. Bullen Newton, seconded by Mr. A. S. Kennard, a unanimous vote of thanks was passed to the retiring Officers and members of the Council and to the Scrutineers.

ORDINARY MEETING.

FRIDAY, 14TH FEBRUARY, 1919.

G. K. GUDE, F.Z.S., President, in the Chair.

The evening was devoted to exhibits, a large and valuable series of specimens being shown and commented upon by the President, Mr. A. E. Salisbury, Mr. H. C. Fulton, Mr. A. Reynell, Mr. T. Iredale, Mr. J. R. Le B. Tomlin, Mr. R. Bullen Newton, Mr. A. S. Kennard, and the Secretary, on behalf of Dr. Stanley Smith.

ORDINARY MEETING.

FRIDAY, 14TH MARCH, 1919.

G. K. GUDE, F.Z.S., President, in the Chair.

Mr. E. A. Bacon was elected to membership of the Society.

Dr. A. E. Boycott, F.R.S., exhibited living examples of *Helix hortensis*, Mull., showing remarkable coloration of the aperture.

The following communications were read:—

1. "On *Helix revelata*, Britt. auctt. (*non* Férussac, *neq* Michaud), and the validity of Bellamy's name of *Helix subvirescens* in lieu of it for the British Mollusc." By A. S. Kennard, F.G.S., and B. B. Woodward, F.L.S.

2. "Forbes' Notes on Lovén's *Index*." By Alexander Reynell.

3. "Notes on *Hygromia limbata* (Drap.)." By Sap. Hugh Watson, R.E.

ORDINARY MEETING.

FRIDAY, 11TH APRIL, 1919.

G. K. GUDE, F.Z.S., President, in the Chair.

The following communications were read:—

1. "On *Opeas strigile* (M. & P.) and its allies." By Major M. Connolly.

2. "Addendum to Remarks on the recent species of *Morum*." By James Cosmo Melvill, M.A., D.Sc.

3. "Notes on the non-marine Mollusca observed in East Ross, Orkney and Shetland Isles." By Surgeon-Commander K. H. Jones, R.N., and A. S. Kennard, F.G.S.

ORDINARY MEETING.

FRIDAY, 9TH MAY, 1919.

G. K. GUDE, F.Z.S., President, in the Chair.

Count A. Caruana Gatto was elected to membership of the Society.

Mr. A. Reynell, on behalf of Mr. E. F. Wesley, exhibited a series of coloured drawings of shells, mainly from the Leverian Museum, dating from about 1820 to 1850.

The following communications were read:

1. "On a new species of *Ampullaria* in the Geneva Museum." By G. B. Sowerby, F.L.S.

2. "On Parthenogenesis in *Paludestrina jenkinsi*." By Dr. A. E. Boycott, F.R.S.
3. "Notes on the Mollusca of Lord Howe Island." By Tom Iredale.

ORDINARY MEETING.

FRIDAY, 13TH JUNE, 1919.

G. K. GUDE, F.Z.S., President, in the Chair.

M. Paul Pallary was elected to membership of the Society.

Mr. A. S. Kennard exhibited a copy of the quarto edition of the Tankerville Collection of Shells, published in 1825.

The Secretary exhibited, on behalf of Mr. E. F. Wesley, a Catalogue of the Sale of the Adamson Collection of Shells in March, 1848, priced by Lovell Reeve.

The following communications were read:—

1. "On *Ammonites navicula* (Mantell)." By the late G. C. Crick, F.G.S.
2. "On a Sandstone cast of *Aturia aturi* (Basterot) from the Miocene of Western Australia." By R. Bullen Newton, F.G.S.
3. "On the Generic Names for the two British Ellobiidae [*olim* Auriculidæ] *myosotis*, Draparnaud (= *denticulata*, Montagu) and *bidentata*, Montagu." By A. S. Kennard, F.G.S., and B. B. Woodward, F.L.S.
4. "On the Mollusca of Marsascirocco Harbour, Malta." By G. Despott.
5. "Notes on Polyplacophora (Part II)." By Tom Iredale.

OBITUARY NOTICES.

HENRY SUTER (1841(?)–1918).

HENRY SUTER, who joined this Society in 1894, was born in Zurich, and educated at the University there. He started in life as an analytical chemist, but his father, who was proprietor of a large soap works in the city, wished him to conduct the business, and on his father's death he did so for a few years, subsequently selling the business and reverting to chemistry.

In 1886 or 1887, on the advice of a friend of his boyhood, Dr. Heusler, of Auckland, some time Government geologist of New Zealand, Suter migrated to that country and took up bush land near Eketahuna. Relinquishing farming, he spent some time in Christchurch and at the Mount Cook Hermitage. Thence he went to Auckland, and was appointed honorary curator of the Museum there, while Mr. T. F. Cheesman, the permanent curator, was preparing a work on New Zealand Plants. Thereafter he appears to have resided alternately at Christchurch and Auckland. (See *Lyttleton Times*, 2nd August, 1918.)

Suter was devoted to the study of natural history all his years, especially conchology, which formed his life's work. In Zurich he

was president of a field naturalist's club, and when he removed to New Zealand he found fresh and wider fields ready to hand, at which he worked assiduously, as shown by his numerous contributions to our own "Proceedings", to the "Transactions of the New Zealand Institute", and other scientific publications, frequently illustrated by his own drawings, which were of surpassing excellence.

In 1914 Part I of his second great work, the "Revision of the Tertiary Mollusca, based on type material", was published as "Palæontological Bulletin No. 2" of the New Zealand Geological Survey.

His final and *magnum opus* was the compilation of the "Manual of the New Zealand Mollusca", under the auspices of the Dominion Government. The work was officially begun in 1907, and the volume of text running to 1,120 pages appeared in 1913, being followed in 1915 by the Atlas of 72 quarto plates.

His death on the 31st July, 1918, after a short illness, creates a serious blank, not only in the ranks of Australasian conchologists, but also in the malacological world as a whole.

ALFRED MERLE NORMAN, 1831-1918.

THE REV. CANON MERLE NORMAN, D.C.L., F.R.S., who was an original member of this Society, was the youngest son of John Norman, D.L., of Iwood, Congresbury, and born at Exeter in 1831. He was educated at Winchester and Christ Church, Oxford, where he took his first degree in 1852. He was ordained deacon in 1856 and priest in 1857. After holding several curacies, he was presented to the living of Burnmoor, co. Durham, in 1866, where he spent nearly thirty years, becoming Rector of Houghton-le-Spring in the same county in 1895 and rural dean. He was obliged by illness to retire in 1898, and soon after settled at Berkhamsted, Herts, where he died 26th October, 1918. He had become Hon. Canon of Durham Cathedral in 1885.

When quite a child Norman became interested in Botany, through his brother, the Hon. John Paxton Norman. At Winchester he studied Entomology, and at Oxford devoted his attention to the Mollusca of the county, of which he published an account.

While acting as private tutor in the house of the Dowager Countess of Glasgow, at Cumbræ, in 1854-5, he first seriously took up the study of the marine fauna, and from that time he spent nearly all his summer vacations in dredging round the British Isles, Norway, and Madeira and in the Mediterranean. He thus formed the nucleus of his famous collection of the marine invertebrates of the Arctic circumpolar seas and of the temperate North Atlantic, with the inland representatives of the same classes of animals which inhabit the Palæarctic region. The collection was further enriched by purchase and gift, and was estimated in 1895 to consist of about 10,000 species and named varieties.

A catalogue of this magnificent collection under the title *Museum Normanianum* was printed in twelve parts for private circulation

between 1886 and 1900, part iv being devoted to "Mollusca Marina", and part v with its supplement to "Mollusca Terrestria et Fluviatilia". A second edition of the first three parts appeared in two numbers in 1901 and 1905.

The whole collection was transferred by Canon Norman to the British Museum (Natural History) during his lifetime, while his almost equally noteworthy collection of books and pamphlets was presented to the zoological departments of the University of Cambridge.

In these days of specialization the breadth of Canon Norman's interests may well be considered remarkable. Not only was he an acknowledged authority on Bryozoa and Crustacea, but was equally well acquainted with the Mollusca, Tunicata, Foraminifera, and Sponges. Moreover, he was not merely a describer of new species and a discoverer of interesting forms, for his researches were of real value in enlarging our knowledge of the marine fauna in general; while his definition of the "British area in marine zoology", issued in 1890, has been generally accepted. For an appreciation of him as a man and a naturalist, reference should be made to the article by Dr. S. F. Harmer in "Nature" for November 1919 (p. 188), to which we are indebted for the foregoing facts. Norman's services to science received a fitting acknowledgment by the bestowal on him in 1906 by the Linnean Society of the Linnean Medal.

He became a member of the Conchological Society in September, 1891, was its President in 1892, and Vice-President in 1893-4, and again for the session 1896-7.

His writings on exclusively malacological subjects included the following:—

1853. "Notes on Oxfordshire Shells": Zoologist, xi, pp. 4126-29; xv, 1857, pp. 5609-13.
1857. "Mollusca of the Firth of Clyde": op. cit., xv, pp. 5703-13; xvi, 1858, pp. 5875-87; xviii, 1860, pp. 7202-13, 7238-48.
1860. "The Inland Mollusca of Somersetshire": Proc. Somerset. Archæol. Soc., x, pp. 131-51.
1861. "On the Discovery of *Physa acuta*, Drap., in England, etc.": Zoologist, xix, pp. 7354-56; Ann. Mag. Nat. Hist., vii, pp. 114-16.
1864. "The Boring-snail of the Bois-des-Roches": Zoologist, xxii, pp. 9012-14.
1877. "On two New British Nudibranchiate Mollusca (*Eolis sanguinea* and *Lomonotus hancocki*)": Ann. Mag. Nat. Hist., xx, pp. 517-19.
"Ten Days' Dredging at Oban": Journ. Conch., i, pp. 275-80.
1878. "The Mollusca of the Fiords near Bergen, Norway": op. cit., ii, pp. 8-77.
1879. "On the Occurrence of *Neomenia (Solenopus)* in the British Seas": Ann. Mag. Nat. Hist., iv, pp. 164-6.
1890. "Revision of British Mollusca": Ann. Mag. Nat. Hist., v, pp. 452-84; vi, pp. 60-91, 327-42.
1891. "*Lepton squamosum* (Montagu) a Commensal": Ann. Mag. Nat. Hist., vii, pp. 276-78.
- "The genera *Cyclostoma* and *Pomatias*, and on a misapplied Rule of Zoological Nomenclature": Ann. Nat. Hist., vii, pp. 447-51; viii, pp. 176-80.

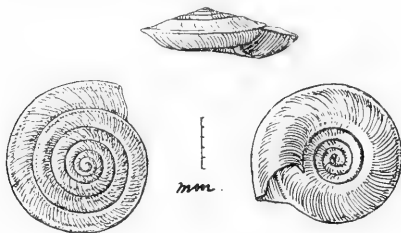
DESCRIPTION OF TWO NEW SPECIES AND A NEW SUB-GENUS
OF LAND SHELLS FROM CHINA.

By G. K. GUDE, F.Z.S.

Read 10th January, 1919.

Two small but very interesting collections of land shells have been submitted to me for examination by Lady Lyons, of Park Mill, Glamorgan, and Dr. E. Le Cronier, Lancaster. These were collected in the Min Valley, Szechuen, by Lady Lyons' daughter, Mrs. Mead, wife of Mr. Edgar Mead, of H.M. Consular Service in China. In addition to two undescribed forms—one the type of a new sub-genus—they comprise the following:—

- Chloritis (Trichochlorites) submissa*, Desh.
Buliminopsis buliminus, Heude.
Eulota phragmitum, Heude.
 — *fortunei*, Pfr., var. *meridionalis*, Mlldff.
 — (*Mastigeulota*) *kiangsinensis*, Mts.
 — (*Platypetasis*) *trochomorpha*, Mlldff.
Cathaica (Eucathaica) brevispira, H. Ad.
 — (*Eucathaica*) *subsimilis*, Desh.
Euhadra pseudocampylea, Mlldff.
 — *haplozona*, Mlldff.
 — *carpochroa*, Mlldff. and var.
 — *amphidroma*, Mlldff.
Buliminus fultoni, Mlldff.
 — *meleagrinus*, Heude.
Clausilia aculus, Bens.
Succinea rubella, Heude.
 — *carectorum*, Heude.



TROCHOMORPHA LANCASTERI, n.sp.

Shell widely umbilicated, sharply keeled, discoid, finely and closely ribbed-striate, the striæ cut into minute granules by close fine spirals, rufous. Spire depressed, suture exserted, apex acute. Whorls 6, increasing slowly and regularly; above slightly convex on the inner side, slightly concave near the suture; below strongly convex on the inner side, concave near the compressed keel. Aperture oblique, subquadrate; peristome straight, thin, acute. Diam. maj. 14·5, min. 13 mm.; alt. 4·25 mm.

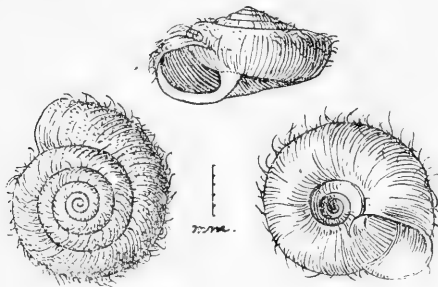
Hab.—Min Valley, Szechuen. Type in my collection.

Hitherto only two species of *Trochomorpha* have been recorded from China, i.e. *T. borealis*, Mlldff.,¹ from Szechuen, and *T. samara*, Heude,² from Talifu.

The new species is larger than either, and differs by the granulated sculpture. One specimen in Lady Lyons' collection measures $14.75 \times 13 \times 4.5$ mm.

TRICHOCATHAICA, n.subg.

Differs from the other sub-genera of *Cathaica* in having a hairy periostracum. Type, *T. Lyonsæ*.



CATHAICA (TRICHOCATHAICA) LYONSÆ, n.sp.

Shell sinistral, rather widely and deeply umbilicated, depressed conoid, finely and closely striate under a granulated periostracum. Spire depressed, suture impressed, apex obtuse. Whorls 6, increasing slowly at first, then rather suddenly, slightly convex above, subangulated around the periphery, strongly convex below, subangulated around the umbilicus; the nucleus shining, the remaining whorls covered with rather long, distant setæ; the last whorl descending in front. Aperture oblique, sub-ovate, peristome white, slightly thickened, the upper margin straight, outer and basal sharply reflexed, columellar slightly overhanging the umbilicus.

Diam. maj. 18, min. 16 mm.; alt. 8.5 mm.

Hab.—Min Valley, Szechuen. Type in my collection.

The new species differs from all the other members of the genus *Cathaica* in the hairy periostracum and the sinistral coiling. A specimen in Lady Lyons' collection measures: $20 \times 17 \times 8.5$ mm.

¹ Nachr. Bl. Deutsch. Malak. Gesell., 1888, p. 39.

² Mém. Hist. Nat. Emp. Chin., i, pt. 4, p. 142, pl. xxxvii, fig. 3, 1890.

NOTES ON *HYGROMIA LIMBATA* (DRAP.).

By HUGH WATSON.

Read 14th March, 1919.

PLATES II AND III.

HYGROMIA LIMBATA has only recently been found to be indigenous to the British Isles,¹ and does not seem to be at all well known to English malacologists; it is therefore hoped that the following notes on this species may be of some interest. They are founded chiefly upon an examination of material collected in Devonshire, for which the writer is deeply indebted to Mr. A. S. Kennard, who first discovered the shell in that county.

NOMENCLATURE.—It has recently been suggested that, since Da Costa used the name *Helix limbata* for a *Planorbis* before Draparnaud gave the same name to this species, Draparnaud's name should be discarded and *odeca* used in its stead; but this course has not been adopted by the writer, because he is doubtful whether the form named *odeca* by Bourguignat and Locard is identical with the present species, and he questions the desirability of discarding well-known names on purely technical grounds.

SIZE.—The average height of the shell in the Devonshire locality seems to be about 8.4 mm., and the average breadth about 12.1 mm. Among twenty full-grown specimens the two largest measured 9.3 × 13 mm., while the smallest was only 7.3 × 11.1 mm. Specimens from France and the North of Spain are usually somewhat larger than this, though varying considerably in size. The two smallest examples that the writer found at Pau, Basses-Pyrénées, measure 7.6 × 11.7 mm. and 8 × 11.3 mm.; while the two largest in his collection, from Salies-de-Béarn in the same Department, are no less than 11 × 16.4 mm. and 13 × 16 mm. respectively.

FORM OF SHELL. (Pl. III, figs. 12, 13, 17–19).—The shell is sub-globose, and usually somewhat depressed, although the height of the spire varies. The most depressed shell among the twenty Devonshire specimens measures 8 × 12.5 mm., and the most conical 9 × 12.2 mm.; but the writer has examples from Salies-de-Béarn varying from 10.1 × 15.5 mm. to 11.3 × 13 mm. (figs. 18 and 19). The last specimen, however, is very unusually conical for the species, and should probably be placed in the variety *trochoides*, Moq. On an average the height of the shell is probably about 70 per cent. of its breadth in both English and French specimens of the species.

The number of whorls in the Devonshire examples is usually between $5\frac{1}{4}$ and $5\frac{1}{2}$, but some of the largest of the Continental shells have as many as $6\frac{1}{2}$ whorls. Young shells are keeled, but the angle disappears completely in the course of the last whorl. Above the periphery the whorls are slightly flattened, below it they are more convex. The suture is shallow, the umbilicus deep but very narrow.

¹ Kennard & Woodward, Proc. Malac. Soc., vol. xiii, 1918, pp. 14, 15.

The last whorl is slightly deflected at the aperture, which is obliquely semi-lunar and a little broader than high. The outer lip is expanded excepting near the suture, and has an internal strengthening rib nearly 1 mm. from its edge. The short columellar lip is almost vertical. The inner lip is extremely thin, and so is the periostracum; the whole shell, in fact, may be described as rather thin.

SCULPTURE OF SHELL.—The shell is moderately glossy, but the whorls are crossed obliquely by coarse striæ corresponding to the lines of growth, and many specimens show distinct traces of malleation on a rather small scale. When viewed under a microscope extremely fine spiral striæ are also seen to be present, as in most species of *Hygromia*; moreover, all the whorls excepting the first two are microscopically granulate. The granules, however, are not round, but take the form of numerous little ridges elongated in a direction parallel to the lines of growth (pl. III, fig. 22). These minute ridges are not all of the same length, and in places their disposition is decidedly irregular; but, as a general rule, they are arranged in oblique rows, and thus tend to give a reticulate appearance to the shell under the microscope. They are usually straight, but often become curved in the peripheral region of the shell near the aperture, forming minute crescents, the points of which are always directed forwards. The thin inner lip, together with the outer lip, is also microscopically granulate; but in this case the granules are round, and are scattered over the surface in a very irregular manner, quite unlike the sculpture of the rest of the shell.

OPACITY AND COLOUR OF SHELL.—Two varieties of opacity occur in this species; in one the shell is entirely translucent except for the labial rib, in the other a narrow opaque white band encircles the periphery. This opaque band, though usually very conspicuous, is often discontinuous, and sometimes only faint traces of it are visible. It is therefore not always easy to draw the line between those individuals that possess the band and those that do not. The two types occur both in England and in France; but whereas the majority of the English shells are without the band, in France the larger number possess it.

This species also exhibits the following interesting series of colour mutations, all of which, with the possible exception of the first, may be combined with either of the two varieties of opacity, some specimens having the opaque band and others being without it.

(A) Shell entirely reddish-brown (excepting for the labial rib, which is always whiter than the rest of the shell). This seems to be a scarce mutation; the writer has only seen one example from the Devonshire locality, and none from abroad.

(B) Shell reddish-brown, excepting for a pale unpigmented zone round the periphery. This mutation differs rather strikingly from the last, since the pale zone is usually well defined—more so than in most specimens of the variety *albocincta* in *Hygromia striolata* or *H. hispida*. At least 40 per cent. of the English examples appear to belong to this mutation, and it probably occurs in France also, although the writer has not himself found it on the Continent.

(C) Shell light yellowish-brown, excepting for a pale unpigmented zone round the periphery. Specimens intermediate in colour between this and the last mutation are not very rare, but a careful examination of a large number of individuals supports the view that the two mutations will probably prove to be distinct. About half the specimens found in Devonshire belong to this form, and it is not uncommon on the Continent. Moquin-Tandon probably united this and the last mutation in his var. *sarratina*¹ (if one is right in assuming that the last also occurs in France), and this name might therefore be given to the vast majority of the English examples.

(D) Shell unpigmented excepting for a brown band just above the periphery. This mutation, which has been figured by Hidalgo,² occurs in many localities on the Continent, although it is a little scarcer than the last. Specimens having the opaque white band in addition to the brown one were named var. *ferussina* by Moquin-Tandon³; perhaps, however, this name might be applied also to those less frequent examples which are without the opaque band.

(E) Shell entirely unpigmented, being white beneath a pale greenish-yellow periostracum; animal pigmented, but usually of a rather lighter colour than in the case of those with brown shells. This is the most abundant mutation in France, and those specimens which have the opaque peripheral band, and which are the commonest, constitute the typical form of the species. In Haute Garonne about 60 per cent. of the specimens appear to belong to this mutation and only about 8 per cent. to the last.⁴ Férussac states that all intermediate stages occur between these pale yellowish-white shells and those belonging to the brown mutations,⁵ but such intermediate shells are not common.

(F) Shell and animal both unpigmented. Some of the Devonshire shells resemble those belonging to the last mutation in being unpigmented, but Mr. Kennard assures me that in them the animal as well as the shell is always white. They must, therefore, belong to a distinct mutation, which may be the var. *albina*, Moq., although in his original description of this variety Moquin-Tandon does not mention that the animal is white as well as the shell.

FOOT, HEAD, AND NECK.—The foot is long, rather narrow, and bluntly pointed at the hinder end. There is no caudal mucous pore. The sole is undivided by longitudinal grooves. The foot-fringe is crossed by transverse grooves, but it is ill-defined, owing to the absence of any peripodial grooves. A median groove runs along the top of the posterior part of the foot, which is very obtusely keeled. Paired dorsal and oblique lateral grooves appear on the neck, but they are not conspicuously differentiated from the general network of grooves which divides the skin into numerous small rugæ

¹ Hist. Nat. des Moll. terr. et fluv. de France, vol. ii, 1856, p. 194.

² Cat. Moll. terr. España Port. y los Baleares, pl. xxiii, figs. 243-5.

³ Op. cit., p. 194.

⁴ Ibid., p. 196.

⁵ Hist. Nat. des Moll. terr. et fluv., vol. i, p. 201.

(pl. II, fig. 2). No vertical facial grooves are present. The skin of the tentacles is fairly granular.

Like the shell, the animal of most of the Devonshire examples seems usually to be more deeply pigmented than in the case of the majority of French specimens. The foot, head, and neck are grey; only the centre of the sole, the lips of the genital opening, and the extremities of the four tentacles being slightly lighter. The tentacular retractors form nearly black bands on the neck, as the skin is semi-translucent, notwithstanding its dark colour.

MANTLE AND VISCERAL HUMP.—The mantle-edge is grey round the respiratory opening, but becomes nearly white lower down. It is furnished with body-lobes, but no shell-lobes are developed. The right body-lobe is cleft into two parts, an inner portion immediately below the respiratory opening and an outer portion to the right of the other. The anus appears to be situated in the upper part of the groove between these two portions. The two left body-lobes are widely separated from each other: one is close to the respiratory opening and arches over it in a peculiar manner; the other is situated low down on the left side of the animal. The form of these lobes will be best seen from the illustration (pl. II, fig. 4).

When the animal is extracted from the shell, the skin over the lung is seen to be nearly black, except for some small whitish spots which are usually scattered over it. In one Devonshire example the kidney was entirely blackish, but it is more often merely outlined with black, the centre being grey. A short band without pigment occurs over the pericardium. The skin of the upper whorls is colourless below the suture, but more or less pigmented above it. In one specimen this part was black, in another grey, and in a third greyish-brown mottled with white.

RESPIRATORY SYSTEM. (Pl. II, fig. 5.)—The mantle-cavity or lung is rather long. Its roof shows a few small transverse veins, chiefly of an afferent nature; but the only conspicuous blood-vessel is the main pulmonary vein, which runs forward from the heart towards the respiratory opening, and is almost without branches except close to its front end. The heart is situated relatively far back, and in the specimens examined the ventricle was much larger than the auricle. The aorta which arises from the ventricle divides, as usual, into two branches, one passing backwards, the other bending round the anterior loop of the intestine and running forwards to supply the cephalic region with oxygenated blood.

EXCRETORY SYSTEM. (Pl. II, fig. 5.)—The kidney is narrow and extends a considerable distance in front of the heart. It is between 6 and 7 mm. in length. Dark specks are sparsely scattered over its lower surface, which is otherwise of a very pale colour.

The ureter arises from the extreme front end of the kidney, passes backwards along its right edge, and then bends round and runs forwards beside the rectum.

In one specimen several small Trematodes or Cercariæ were found in the cavity of the kidney (pl. II, fig. 6). They measured on an average about 1 by $\cdot 4$ mm., and were not encysted, although none of

them had tails. Each had an oral sucker at the anterior end, and a ventral sucker of about the same size just in front of the centre of the lower surface. Stained specimens showed a short but very muscular pharynx behind the oral sucker. Posterior to this the greater part of the parasite seemed to be occupied by the pair of enteric cæca, which appeared to be unusually large. At the hind end a very small vesicle could be discerned in some of the specimens: this was probably the excretory bladder. Along the centre in the posterior part of the animal there were some darkly staining objects, which may have been the rudiments of the reproductive organs. These organs, however, would not be likely to become fully developed until the snail had been eaten by some bird or possibly a small mammal, and the parasite thus transferred to its vertebrate host.

So long ago as 1846 H. Meckel found a young Trematode or Cercaria in the kidney of *Helix pomatia*,¹ and in 1855 Ph. de Filippi read a paper before the Royal Academy of Sciences at Turin describing a form which he had found in *H. aspersa*, and which he named *Distoma renale*.² This also occurred in the kidney, and was not encysted; but it was quite twice the size of the form found in *Hygromia limbata*, and the younger examples had short tails. Nevertheless, Miss M. V. Lebour, who has very kindly examined the specimens that the writer found and mounted, considers that they belong to a form which is probably allied to Filippi's species, but may prove to be new to science.

CENTRAL NERVOUS SYSTEM. (Pl. II, fig. 1.)—The cerebral ganglia were situated above the anterior end of the buccal mass in the specimens examined, and showed distinct anterior and lateral lobes. The length of the cerebral commissure is about equal to the breadth of each ganglion. The small buccal ganglia are transversely elongated, and occupy their usual position just behind the opening of the œsophagus.

The remaining ganglia form a compact group beneath the buccal mass. The pedal ganglia are rather broad, and each bears a conspicuous otocyst towards the posterior edge of its lower surface. The visceral ganglia show a considerable amount of concentration, for not only is the left parietal ganglion fused with the abdominal ganglion, as is usual in the Helicidæ, but the right parietal ganglion is practically united with the right pleural ganglion, as will be seen from the figure.

DIGESTIVE SYSTEM.—The jaw (pl. III, fig. 27) is rather thin, light brown, and about 1·4 mm. in length. It is crescentic in form, but slightly broader than usual. It is crossed by between thirty and thirty-five low and rather inconspicuous ridges or folds, which, however, are slightly more prominent towards the ends of the jaw than in

¹ "Mikrographie einiger Drusenapparate der niederen Thiere": Archiv für Anat. Phys. u. Wiss. Medecin, 1846, p. 5, pl. i, fig. 2.

² "Deuxième Mémoire pour servir à l'Histoire Génétique des Trématodes": Mem. della Reale Accademia delle Scienze di Torino, ser. II, vol. xvi, 1857, p. 435, pl. ii, fig. 21.

the middle. The lower half of the jaw is finely striate along the lines of growth, and very delicate vertical striæ are also present.

The radula (pl. III, fig. 29) measures about $1\frac{1}{2} \times 3\frac{1}{2}$ mm. when flattened out. The central tooth in each row has a prominent but rather short mesocone, flanked by a pair of very low, scarcely developed ectocones. In the inner lateral teeth the ectocones are also very poorly developed, but after about the eighth tooth on each side they gradually become more prominent and more distinctly separate from the mesocones. In the outer marginal teeth the ectocones are divided into two, or occasionally more, distinct cusps. The endocones of the lateral teeth are represented by mere flanges along the inner edges of the mesocones, but in the marginal teeth these become partially separated from the mesocones, acquiring points of their own—points which in some cases may be split into two or even three denticles—although towards their bases they remain united with the mesocones. Indeed, it would perhaps be more correct to say that no true endocones are developed, but that the mesocones of the marginal teeth are bifid. The lateral and marginal teeth are about equal in number, but the transition from one type to the other is very gradual. The basal plates are of the usual quadrate form; they are longer than broad towards the centre of the radula, but very much broader than long towards the margins. The transverse rows of teeth are not quite straight, but curve forwards towards the edges on both sides. The formula of the Devonshire specimen is $(14+14+1+14+15) \times 114$.

In a specimen from Argelès, Hautes-Pyrénées, the teeth are of almost exactly the same shape, but they are more numerous, there being a larger number of marginal teeth and of transverse rows. The formula of this specimen is $(19+13+1+12+20) \times 135$. On the other hand, in an example from Pau, Basses-Pyrénées, while the radula resembles the Devonshire one more closely as regards the number of the teeth, the formula being $(17+14+1+13+18) \times 107$, the shape of the teeth is not so exactly similar, the central and inner lateral teeth being slightly longer and narrower, with scarcely any traces of the ectocones.

The radula-sac projects considerably from the hind end of the buccal mass, and is abruptly curved upwards.

The œsophagus shows two or three longitudinal lines of dark pigment. In the specimens examined it was not dilated to form a distinct crop, but passed straight back into the rather long stomach (pl. II, fig. 10). From the other end of the stomach the intestine passes forwards, and then bends back again, describing the usual S-shaped curve, before finally passing forwards as the rectum.

The salivary glands are rather long and narrow, and are united to each other above the œsophagus excepting at their front ends, where the salivary ducts emerge from the glandular tissue.

The liver consists as usual of two divisions, discharging into the stomach by separate hepatic ducts. The posterior occupies the upper whorls of the spire, while the anterior lies among the loops of the intestine, which divide it into three main lobes, one behind another.

The most posterior of these lobes, however, sends forward a narrow prolongation close to the last portion of the intestine.

MUSCULAR SYSTEM.—The columellar muscle divides not far from its origin into three main divisions lying one above another (pl. II, fig. 3). The most dorsal division is the powerful buccal retractor, which bifurcates just before it reaches the buccal mass, and is inserted low down on each side of the hind end of that organ. Below this another broad muscle runs forward and eventually divides into a right and a left portion. Each of these portions then gives off the retractors of the upper and lower tentacles of that side, and gradually breaks up into numerous narrow muscles inserted in the anterior end of the foot. The retractor of the right upper tentacle passes between the penis and the vagina. The lowest division of the columellar muscle does not become subdivided, but forms the so-called tail retractor, being inserted in the posterior part of the foot.

The penial retractor arises towards the front end of the diaphragm and unites with the epiphallus about 3.5 mm. behind the junction of that organ with the penis. Other slender muscles arise from the anterior part of the epiphallus, a little further forward than the insertion of the penial retractor, and pass across to the genital atrium (pl. II, fig. 7).

REPRODUCTIVE ORGANS. (Pl. II, fig. 7.)—The hermaphrodite gland or ovotestis is embedded in the posterior division of the liver, and consists of numerous small oval follicles arranged in about four clusters, which, however, are not widely separated from one another. The hermaphrodite duct is swollen and much convoluted, except towards its ends. As it approaches the common duct it turns abruptly backwards, and then bends forwards again close to the albumen gland, being enlarged at the second angle to form a vesicula seminalis. The albumen gland and the common duct are of the usual form, the latter organ being sharply divided into the opaque male portion and the female portion with translucent folded walls. The free oviduct is rather short and narrow. Instead of there being a globular receptaculum seminis borne on a slender duct, the spermatheca takes the form of a very long unbranched tube, broader than the usual receptacular duct and extending back at least as far as the albumen gland, but ending blindly without any terminal enlargement.

Just in front of the opening of this organ, eight finger-shaped mucous glands arise from the vagina; they are unbranched and about 3 mm. in length. The dart-sac is rather narrow and degenerate, and arises a considerable distance in front of the mucous glands. It contains a slightly curved hollow calcareous dart, expanded at the base, and about 3.5 mm. long (fig. 9). Wedged in between the dart-sac and the vagina there is an oval accessory sac; the three organs, however, are closely united with one another, only the extreme end of the dart-sac projecting freely. The accessory sac opens into the vagina, and has extremely thick and muscular walls. Its narrow cavity is at first formed by a mere longitudinal groove inside the vagina, but towards the hind end of the accessory sac this

groove becomes separated from the cavity of the vagina, as will be seen from the sections (fig. 11). The outer wall of the vagina is rather thin. Its lining is thrown into longitudinal folds posterior to the opening of the dart-sac. Further forwards the muscles of the accessory sac, etc., converge again to form a large pointed papilla, which is contained in the anterior part of the vagina and can be dimly seen through its thin walls. This papilla is not solid, but contains a narrow central duct, the lumen of which is almost in a line with that of the dart-sac.

The vas deferens is slender and of considerable length, passing forwards near the vagina, and then curving round beneath the retractor of the right upper tentacle, and extending a long way back to unite with the posterior end of the epiphallus at the base of the flagellum. The latter organ is very small, but the epiphallus is remarkably long, attaining a length of 18 or 20 mm. Its walls are longitudinally folded within. The penis scarcely exceeds 3 mm. in length; it is a little broader than the epiphallus, from which it is marked off externally by a slight transverse groove. It contains a large cylindrical penial papilla, obtusely pointed in front, with a crescentic terminal opening. The genital atrium is rather short. As already mentioned, the anterior part of the epiphallus is attached to the genital atrium by a series of slender muscles, and just posterior to these the penial retractor is inserted.

The spermatozoa (pl. II, fig. 8) when mature have narrow heads pointed in front, and extremely long slender tails. The usual spiral structure of the anterior part of the tail can scarcely be discerned even under a $\frac{1}{2}$ in. oil-immersion objective. In the immature spermatozoon the head is broader, and the tail follows a zigzag or irregularly spiral course within the residual protoplasm.

This species forms a remarkable spermatophore of a brownish colour and nearly 20 mm. in length (pl. III, fig. 20). The posterior part is cylindrical, and the extremity is pointed and abruptly curved downwards, being probably secreted in the small flagellum. About the middle of its length, however, the top splits open, so that the anterior part is trough-shaped. Externally the spermatophore is furnished with between ten and fifteen longitudinal ridges, and, with the exception of one or two on the top, these ridges are serrated. The teeth on the ridges are most prominent towards the posterior end of the spermatophore, and although they are rather irregular in form, their points are always directed backwards, their function doubtless being to facilitate the forward movement of the spermatophore. When transferred to another snail this structure occupies the entire length of the unusually elongated spermatheca. Indeed, there can be little doubt that the peculiar form of spermatheca that we find in this species has been evolved in order to accommodate the very long spermatophore, just as the size of this structure is to be correlated with the unusual development of the epiphallus in which it is secreted.

According to Moquin-Tandon¹ the eggs of *Hygromia limbata*

¹ Hist. Nat. Moll. terr. et fluv. de France, vol. ii, 1856, p. 196.

(Drap.) are spherical, 1.75 mm. in diameter, and very delicate. He states that they are laid in clusters of between 30 and 60 during the summer, the young being hatched in about 15 or 20 days.

DISTRIBUTION.—This species is most abundant in the South-West of France, where it seems to take a place similar to that occupied by *Hygromia striolata* (Pfeiff.) in the South of England. It also occurs in the North of Spain, in Central France, and at Dieppe and a few other places in the North of France, where it may possibly have been introduced by man. Férussac said that it was also found in Italy and Sicily,¹ while Gray stated that its distribution extended into Switzerland and Germany,² but these records are possibly erroneous.

The history of the discovery of *Hygromia limbata* (Drap.) in the British Isles has already been given by Kennard & Woodward.³ The species was recorded many years ago on the authority of Sowerby as occurring by the New North Road near Hampstead, but the specimens that were found there had probably been introduced, like a single example more recently found in gardens at Belfast. In Devonshire, however, the species seems to be a native, for since Mr. Kennard discovered it in 1917 at Coombe in Teignhead, near Teignmouth, numerous specimens have been found on roadside banks over a considerable area on both sides of the River Teign. Mr. Kennard informs me that he has found it most commonly amongst ivy on the roots of elms, but that it also occurred under heaps of cut herbage.

AFFINITIES.—There can be no doubt that the snails from Devonshire are rightly assigned to *Hygromia limbata* (Drap.). It is true that there are a few slight differences between their anatomy and Moquin-Tandon's illustrations of the organs of this species, but French specimens that the writer has dissected agree more exactly with the English examples than with the French author's figures. And although the majority of the shells from Devonshire are certainly a little smaller and browner than most of the Continental specimens, the smallest French shells are considerably less than the average size of the British specimens, and the brown variety is not at all uncommon in many parts of France, the percentage of shells belonging to this variety varying in different places. Thus, according to Moquin-Tandon, 26 per cent. belong to the var. *sarratina* at Blagnac near Toulouse, and 37 per cent. near Muret, only thirteen miles away. Probably the darker mutations are favoured by a comparatively cool and moist climate.

Hygromia limbata (Drap.) is very different from any other British species. The English specimens, it is true, resemble *H. striolata* (Pfeiff.) in size and colour, and may have been mistaken for that species when viewed from above in the field. But *H. striolata* (Pfeiff.) differs widely from *H. limbata* (Drap.) in its smaller aperture and much larger umbilicus, in the microscopical sculpture of its shell, in its paired dart-sacs and accessory sacs and its globular

¹ Hist. Nat. Moll. terr. et fluv. de France, vol. i, p. 201.

² Turton's *Man. Land and Freshwater Shells*, 2nd ed., 1840, p. 143.

³ Proc. Mal. Soc., vol. xiii, 1918, pp. 14, 15.

spermatheca, and in the undivided mesocones of its marginal teeth. In all these features *Hygromia limbata* (Drap.) agrees more closely with *H. fusca* (Mont.), which is certainly its nearest ally in the British fauna. Nevertheless, *H. fusca* (Mont.) could never be mistaken for *H. limbata* (Drap.) on account of the much smaller, extremely thin shell of the former species.

Hygromia incarnata (Müll.), a species which is very common in Central Europe and the North-East of France, bears a much closer resemblance to *H. limbata* (Drap.) than do any of the British species (see pl. III, fig. 14); and if it should find its way into England, as *H. umbrosa* (Partsch) has already done, it might easily be mistaken for *H. limbata*, var. *sarratina*, Möq. The shell of *H. incarnata* (Müll.) differs, however, from that of *H. limbata* (Drap.) in the whorls being slightly more rounded, the aperture a little smaller and less oblique, the outer lip slightly thicker, the columellar lip less nearly vertical, the umbilicus not quite so narrow, and the surface slightly less glossy, owing to the microscopical granulation being much coarser than in *H. limbata* (Drap.), as will be seen on comparing figs. 22 and 26. Internally *H. incarnata* (Müll.) differs from *H. limbata* (Drap.) in the undivided mesocones of its marginal teeth (pl. III, fig. 31), as well as in the form of its spermatheca, dart-sac, etc.¹

In its general anatomy *H. cincitella* (Drap.), the type of the genus *Hygromia*, agrees much more closely with *H. limbata* (Drap.) than does either *H. incarnata* (Müll.) or *H. fusca* (Mont.). The shell of *H. cincitella* (Drap.) can easily be distinguished from that of an adult *H. limbata* (Drap.) by its more pronounced keel, and by its simple, scarcely expanded, outer lip; but it is easy to mistake a specimen of *H. cincitella* (Drap.) for a young example of *H. limbata* (Drap.). It will be seen, however, from figs. 15-17 that a young *H. limbata* (Drap.) has a more globular shell with a narrower mouth, *H. cincitella* (Drap.) being more pyramidal in form. Moreover, the microscopical sculpture of the shells is slightly different, the minute ridges being longer, narrower, and less developed in *H. cincitella* (Drap.), in fact not quite so unlike ordinary lines of growth (pl. III, fig. 23). The jaw of *H. cincitella* (Drap.) is slightly larger than that of *H. limbata* (Drap.), notwithstanding that the shell is a little smaller, and the folds upon it are nearly obsolete (pl. III, fig. 28). The marginal teeth of the radula have bifid mesocones, but the ectocones of the lateral teeth are more distinct than in *H. limbata* (Drap.), and all the teeth are rather shorter (pl. III, fig. 30). The reproductive organs are of the same general type as in *H. limbata* (Drap.), (pl. III, fig. 21); but the terminal enlargement of the spermatheca has not entirely disappeared, the epiphallus is not quite so long, the dart-sac is slightly more prominent, and the penis and vagina are both slightly shorter and broader,

¹ See Schmidt, "Der Geschlechtsapparat der Stylommatophoren": Abhandl. Naturwiss. Vereines für Sachsen und Thüringen in Halle, vol. i, 1855, pl. v, fig. 25.

although each contains a large papilla, as in *H. limbata* (Drap.). Thus, while in the form of its shell, and perhaps also in its jaw, *H. cinctella* (Drap.) may be slightly more specialized than *H. limbata* (Drap.), in its radula and reproductive system it appears to be a little more primitive than its ally.

The probable affinities of these species with the other sections of *Hygromia* that are indigenous to the British Isles and France will be most clearly seen from the following classification:—

Sub-genus HYGROMIA, Risso, s.s.

Shell covered with extremely fine microscopical ridges. Marginal teeth with bifid mesocones. Spermatheca elongated. A single dart-sac and accessory sac.

Section 1.¹

Shell very thin and somewhat degenerate. Dart with four blades. Flagellum long; epiphallus normal.

H. fusca (Mont.).

Section 2.

Shell frequently with an opaque white peripheral band. Dart (of *H. limbata*) without blades. Flagellum very small; epiphallus extremely long, its anterior part united to the genital atrium by retractor muscles.

H. cinctella (Drap.).

H. limbata (Drap.).

Sub-genus MONACHA, Fitz.

Shell microscopically granulate, the little ridges being larger than in the last sub-genus. Mesocones of marginal teeth not bifid. Spermatheca globular. A single dart-sac.

H. incarnata (Müll.).

H. glabella (Drap.).

Sub-genus TRICHIA, Hartm.²

Shell hispid (at least when young), not granulate. Mesocones of marginal teeth not bifid. Spermatheca globular. Dart-sacs and accessory sacs paired.

¹ The name *Zenobia*, Gray, has sometimes been used for this section, but Pilsbry has shown that it is preoccupied (Man. Conch., vol. ix, 1894, pp. 264-5).

² Pilsbry has discarded this very appropriate name in favour of *Fruticicola*, Held (restricted), on the grounds that the name *Trichia* was almost certainly preoccupied by de Haan, and that *Fruticicola* was earlier, dating from 1837. But the first two species that Held gives under *Fruticicola* are *H. cinctella* and *H. limbata*, and it might, therefore, seem better to regard *Fruticicola* as a synonym of *Hygromia*, Risso (1826). Moreover, *Trichia*, Hartm., was published in 1840 (*Erd- und Süßwasser-Moll. Schweiz*, p. 41); while *Trichia*, de Haan, appears on a page of the *Fauna Japonica* (vol. v, Crustacea), which is dated 1841.

Section 1 (*Trichia*, s.s.).

Shell depressed or subglobose. Dart-sacs, etc., well developed.

- H. villosa* (Stud.).
- H. plebeia* (Drap.).
- H. liberta* (West.).
- H. hispida* (Lin.).
- H. striolata* (Pfeiff.).
- H. cœlata* (Stud.).

Section 2 (*Perforatella*, Schlüter).

Shell trochoidal. Dart-sacs, etc., fairly well developed.

- H. edentula* (Drap.).
- H. unidentata* (Drap.).

Section 3.

Shell globose, with a deep suture. Dart-sacs, etc., very degenerate.

- H. subvirescens* (Bellamy).
- H. revelata* (Mich.).

Sub-genus *CILIELLA*, MOUSS.

Shell covered with little ridges, which become drawn out into hairs on the periphery. Mesocones of marginal teeth scarcely bifid. Spermatheca slightly elongated. Dart-sacs, mucous glands, etc., absent.

H. ciliata (Ven.).

The affinities of the last sub-genus are a little doubtful, but the others seem to be fairly closely allied to one another: *H. (Monacha) incarnata* (Müll.), for example, does not differ very profoundly from *H. limbata* (Drap.), and some of the Central European species, such as *H. rubiginosa* (Schm.), appear to form links between *Trichia* and *Monacha*. The species that we used to call *Hygromia granulata* (Alder) has rightly been removed by Taylor to a separate genus, *Ashfordia*¹; but there would seem to be no justification for placing any of the remaining British species of *Hygromia* in other genera.

It is not improbable that the bifid mesocones of the marginal teeth found in *Hygromia*, s.s., are a primitive feature, as they also occur in most of the allied genera, and occasionally a few of the outer marginal teeth in *H. incarnata* (Müll.), *H. striolata* (Pfeiff.), etc., are still of this type.

It is interesting to notice that the minute microscopical ridges on the shell are, in *H. cinctella* (Drap.), not very different from mere lines of growth, from which they may have been evolved (pl. III, fig. 23). In *H. limbata* (Drap.) they are more distinct, though still very minute, and tend to be arranged in rows and to form a definite granulation (fig. 22). In the sub-genus *Monacha* the little ridges become bigger and the granulation pronounced (figs. 25 and 26). *H. ciliata* (Ven.) bears a similar granulation near the apex of the shell, but towards the periphery the ridges become much larger still,

¹ *Monogr. Brit. Land and F.W. Moll.*, vol. iv, 1917, p. 69.

and are then drawn out into hairs; and it seems possible that the hairs found in the sub-genus *Trichia* may have been evolved from granular sculpture in a somewhat similar manner. Lastly, we find in this sub-genus a tendency to get rid of these hairs, full-grown shells of *H. striolata* (Pfeiff.) and *H. calata* (Stud.) being quite smooth, excepting for the extremely fine striæ and the ordinary lines of growth.

EXPLANATION OF PLATES.

PLATE II.

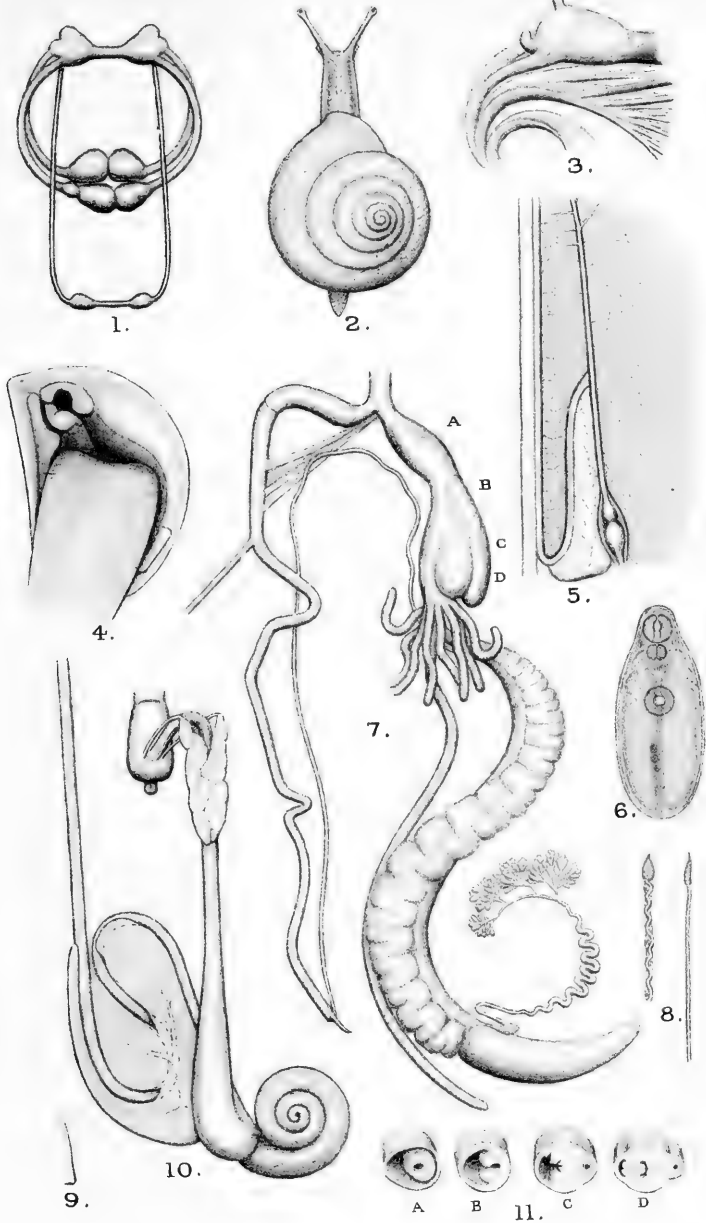
Hygromia limbata (Drap.); Coombe in Teignhead, S. Devon.

FIG.

1. Central nervous system. $\times 12$.
2. Living animal. $\times 2$.
3. Side view of retractor muscles and buccal mass. $\times 4\frac{1}{2}$.
4. Mantle-edge, with pallial lobes and part of foot. $\times 5\frac{2}{3}$.
5. Roof of mantle-cavity viewed from below, with heart, kidney, etc. $\times 4$.
6. Trematode from cavity of kidney, viewed from below. $\times 30$.
7. Reproductive organs. $\times 5$.
8. Anterior ends of spermatozoa, that on the left being immature. $\times 700$.
9. Dart. $\times 3$.
10. Digestive organs. $\times 4$.
11. Transverse sections through vagina, dart-sac, and accessory sac, at the levels shown by the letters A, B, C, and D in fig. 7.

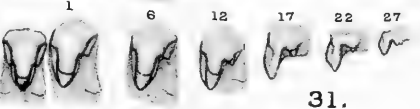
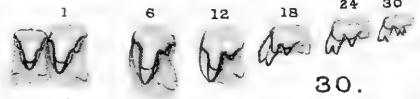
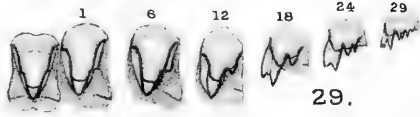
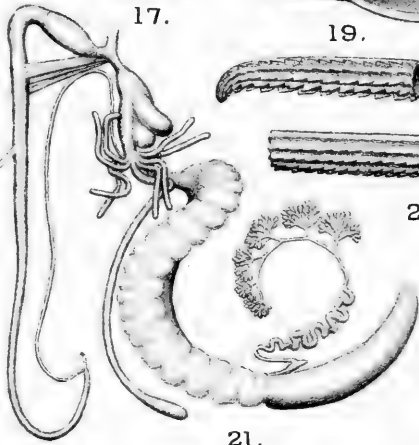
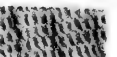
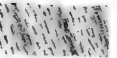
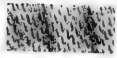
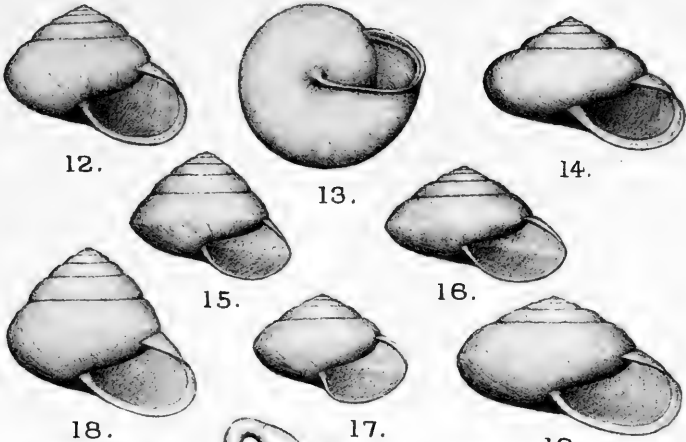
PLATE III.

12. Shell of *Hygromia limbata* (Drap.), S. Devon. $\times 2$.
13. The same shell viewed from below. $\times 2$.
14. Shell of *H. incarnata* (Müll.), Bex, Switzerland. $\times 2$.
15. Shell of *H. cincitella* (Drap.), Ciboure, Basses-Pyrénées; a conical specimen. $\times 2$.
16. Shell of *H. cincitella* (Drap.), Ciboure, Basses-Pyrénées; a depressed specimen. $\times 2$.
17. Shell of young *H. limbata* (Drap.), Ciboure, Basses-Pyrénées. $\times 2$.
18. Shell of *H. limbata* var. *trochoides*, Moq., Salies-de-Béarn, Basses-Pyrénées. $\times 2$.
19. Shell of *H. limbata* (Drap.), Salies-de-Béarn, Basses-Pyrénées; a depressed specimen. $\times 2$.
20. Posterior end and a piece from near the anterior end of the spermatophore of *H. limbata* (Drap.), Argelès, Hautes-Pyrénées. $\times 14$.
21. Reproductive organs of *H. cincitella* (Drap.), Ciboure, Basses-Pyrénées. $\times 4$.
22. Microscopical sculpture of shell of *H. limbata* (Drap.), S. Devon. $\times 40$.
23. Microscopical sculpture of shell of *H. cincitella* (Drap.), Ciboure, Basses-Pyrénées. $\times 40$.
24. Microscopical sculpture of shell of *H. fusca* (Mont.), Corbridge, South Northumberland. $\times 40$.
25. Microscopical sculpture of shell of *H. glabella* (Drap.), Basses-Alpes. $\times 40$.
26. Microscopical sculpture of shell of *H. incarnata* (Müll.), Bex, Switzerland. $\times 40$.
27. Jaw of *H. limbata* (Drap.), S. Devon. $\times 14$.
28. Jaw of *H. cincitella* (Drap.), Ciboure, Basses-Pyrénées. $\times 13\frac{1}{2}$.
29. Representative teeth from the radula of *H. limbata* (Drap.), S. Devon. $\times 300$.
30. Representative teeth from the radula of *H. cincitella* (Drap.), Ciboure, Basses-Pyrénées. $\times 300$.
31. Representative teeth from the radula of *H. incarnata* (Müll.), Bex, Switzerland. $\times 300$.

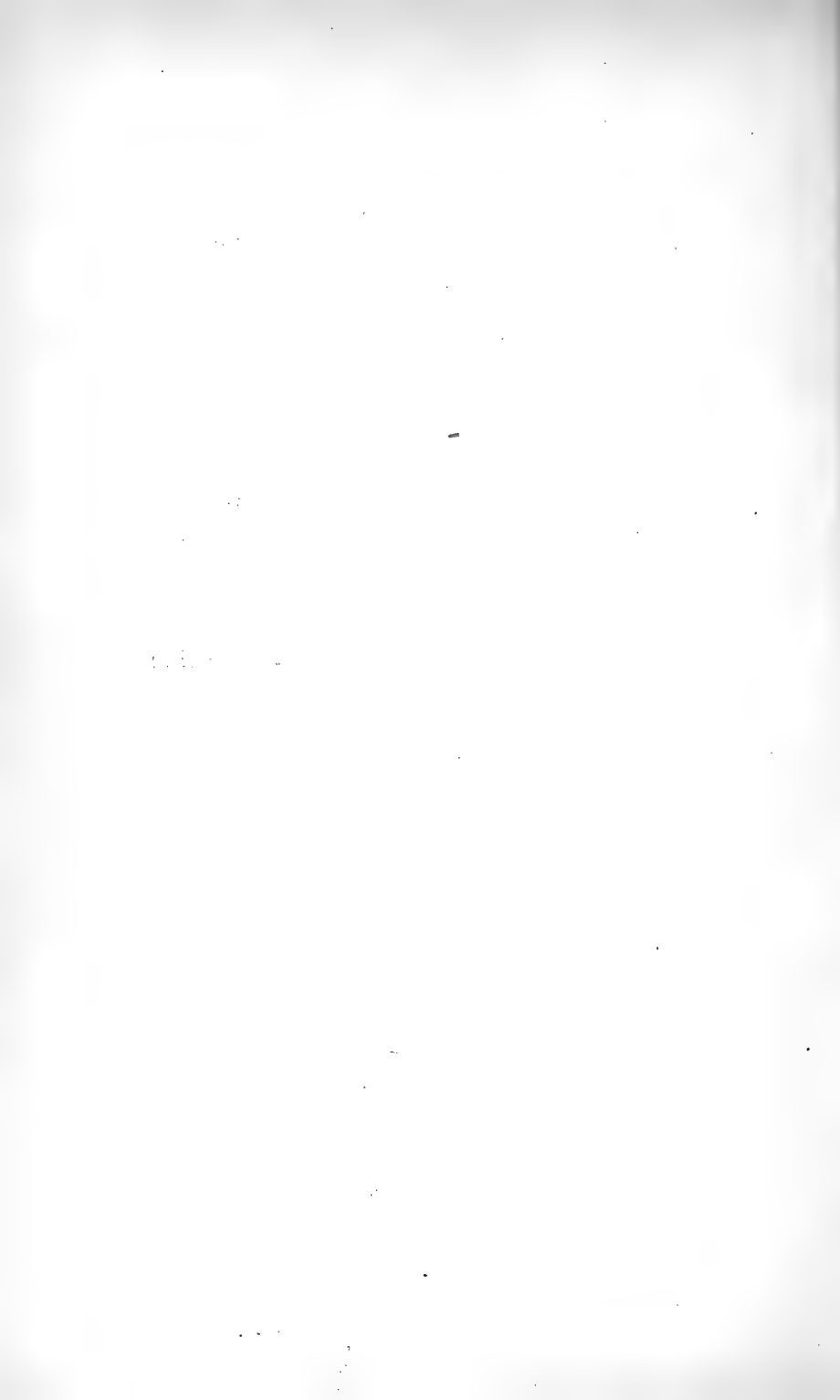


HYGROMIA LIMBATA (Drap.), S. Devon.





HYGROMIA LIMBATA (Drap), etc.



ON *HELIX REVELATA*, BRITT. AUCT. (NON FÉRUSSAC, NEC MICHAUD), AND THE VALIDITY OF BELLAMY'S NAME OF *HELIX SUBVIRESCENS* IN LIEU OF IT FOR THE BRITISH MOLLUSC.

By A. S. KENNARD, F.G.S., and B. B. WOODWARD, F.L.S.

Read 14th March, 1919.

REGRETTABLE as the supersession of a familiar and long-established molluscan name is, it is unavoidable when that name proves to have been based on an original misidentification. Such was the case with *Helix sericea*, Drap., and *H. rufescens*, Penn., whilst now *H. revelata*, Férussac (or Michaud) has similarly to be removed from the British list, and the same fate awaits yet a few others to be dealt with later.

The case concerning the specific name in question stands as follows:—

Férussac in his *Tableau de la famille des Limaçons*, 1821, January edition, p. 48 (June edition, p. 44), under *Helix*, sub-gen. *Helicella*, "3e, groupe Les Hygromanes, Hygromanes," cites:

"No. 273, REVELATA, nobis.

Habit. La France, les environs de Paris et d'Angers."

Neither figure nor description is given.

In 1831 Michaud in his *Complément de l'Histoire naturelle des Mollusques. . . de la France, de J. P. R. Draparnaud*, describes (pp. 27-28) and figures (pl. xv, f. 6-8) what he considered to be Férussac's shell, giving as additional locality "Les valons des Alpes", and adding "Elle est rare".

Gray, and after him Brown, Forbes & Hanley, and Reeve, determined the British shell as being identical with Férussac's, guided thereto obviously by Michaud's description and figures. Jeffreys, however, considered Férussac's species to be probably identical with his "*H. sericea*, Müller", i.e. *H. granulata*, Alder (*Brit. Conch.*, i, pp. 202-204), which we now know is not represented on the Continent. He therefore described the English shell as *H. revelata*, Michaud, and in this he has been followed by Taylor (*Monograph* [iii], p. 36).

Michaud's brief description applies in many respects to our form which has so long passed under the name he adopted, but his species, while tallying in size with ours, has a whorl more (5 instead of 4) and is higher in the spire as the measurements and figures given show. Moreover, the localities cited are not among those in which our shell occurs. Michaud's species is, therefore, not identical with the British form, which has been misidentified with it. Anyhow, the name *revelata* cannot stand because the shell it was proposed for is unknown, and Michaud's adoption of it does not make it valid.

Bouchard-Chantereux next, in 1837 (*Mém. Soc. Agric. Boulogne*, sér. II, tom. i, p. 180), quoted the species, as of Férussac and Michaud, in his "Catalogue des Mollusques . . . observés . . . dans

le département du Pas-de-Calais". The British mollusc is a stranger to this locality also, and Bouchard's shells were probably, as suggested by Moquin-Tandon (*Hist. Nat. Moll. France*, ii, p. 212) and subsequently by Jeffreys (*Brit. Conch.*, i, p. 204), referable to *H. fusca*.

To *H. fusca*, also, may be referred the examples figured by Captain T. Brown in the first edition (1827) of his *Illustrations of the Conchology of Great Britain and Ireland* (pl. xl, f. 3-5) under the name of *Vitrina membranacea*, but which in the second edition (1837-44) and the subsequent *Illustrations of the Land and Fresh Water Conchology of Great Britain and Ireland* he described as *H. revelata*.

In October, 1839, J. C. Bellamy found near Mevagissy, Cornwall, a helix new to him for which he proposed the trivial name of *subvirescens* (Bellamy's *Nat. Hist. South Devon*, p. 420, fig. "Tab. xviii").

In the same year (and according to Couch a little later) Edward Forbes brought to Dr. Gray specimens from near Doyle's monument, Guernsey, which they identified, probably as already remarked, through Michaud's description and figures, with *H. revelata*, Férussac (Turton's *Manual*, new ed. by J. E. Gray, 1840, pp. 53, 152-153).

Bellamy exhibited his shell to the meeting of the British Association at Plymouth in 1841, but its name does not appear in the "Report".¹ However, Couch in his *Cornish Fauna* (Pt. ii, p. 47) under *Helix revelata* remarks: "Mr. Bellamy discovered this species near Mevagissy, and it has been since found by Mr. Forbes in Guernsey. Mr. Bellamy's original specimen was examined by the eminent naturalists present at the meeting . . . and especially by Mr. Gray."

From the foregoing it becomes apparent that our British shell has been misidentified with the *H. revelata* of Férussac and of Michaud, and should bear the name bestowed on it by Bellamy of *H. subvirescens*.

Mention may appropriately be made here of certain Continental forms closely allied to the one in question which have sometimes been associated with it in synonymy.

In 1845 Morelet (*Descript. Moll. Portugal*, p. 65, pl. vi, f. 4) described and figured under the name of *H. ponentina*² a somewhat larger form, obscurely bifasciate, having a reflexed lip furnished with an internal white riblet. Récluz, reviewing Morelet's work the same year in the *Revue Zoologique* (p. 311), changed the name to *occidentalis* on the ground that *ponentina* was an improperly formed word.

The following year, Pfeiffer founded on a specimen in the Cuming

¹ Gray's reference in synonymy (Turton's *Manual*, new ed., 1857, p. 139) to "*Helix subviridis*, Bellamy, Brit. Assoc., 1841, South Devon" is consequently a delightful and characteristic Grayism.

² From the Portuguese *ponente* or *poente*, meaning "west".

collection his *H. lisbonensis* (*Symb. Hist. Helic.*, iii, 1846, p. 68), but subsequently (*Mon. Helic.*, i, 1848, p. 131) acknowledged it to be a synonym of Morelet's species which he accepted under Récluz's amended name of *occidentalis*. Under *H. revelata*, Fér., Pfeiffer (*Mon. Helic.*, i, p. 65) placed Michaud's shell as well as the British *revelata* of Gray, adding *H. badiella*, Ziegl. In a later volume he further included Brown's record, thus showing that he had not carefully discriminated the several forms.

Dupuy (*Hist. Nat. Moll. France*, p. 189, 1848, pl. viii, f. 9) adopts Morelet's species and, overlooking the fact that both were described as having five whorls, considers (p. 191) Michaud's *revelata* to be the young form with incomplete peristome. He adds in a note (p. 192) Michaud's description in full followed by that of Gray for the British shell, which he evidently, with a certain amount of doubt, thought might be the same.

Moquin-Tandon (*Hist. Nat. Moll. France*, ii, p. 221, 1856, pl. xvii, f. 10-13) cites Morelet's species under Récluz' name of *occidentalis*, and considers the *revelata* of Michaud, but not that of Férussac or of Bouchard-Chantereaux, to be a synonym. He takes no note of the British shell.

Bourguignat's *Helix ptilota* (*Malac. Bretagne*, 1860, p. 55, pl. i, f. 5-8), save for its black apex, agrees closely with the British form, of which it is in all probability only a local variation.

Servain in 1880 (*Études Moll. Espagne & Port.*) added (p. 54) *H. salmurina* and (p. 56) the new var. *martigenopsis* of *revelata*, while Locard in 1882 (*Prod. Malac. Franç.*, i, pp. 316-317) published Bourguignat's manuscript names, *H. venetorum* and *H. villula*.

Silva e Castro in 1887 (*Jorn. Acad. R. Sci. Lisbon*, xi, pp. 232-237) increased the number of the group by five: *H. nevesiana*, *H. conimbricensis*, *H. platylasia*, Bourg. MS., *H. rosai*, and *H. aporina*. These were summarized and *H. atachypora*, Bourg. MS., added by Locard in his "Conchyliologie Portugaise" (*Arch. Mus. Lyon*, vii, mém. 1, 1899). No grouping is, however, attempted in these papers.

Westerlund (*Fauna Palæarct. Region Binnenconch.*, *Helix*, p. 61, 1889) seems to have placed most of these forms together under *revelata*, Fér., while at the same time he detected and named *H. montivaga* out of a gathering of *H. ponentina* sent him by Morelet.

Pilsbry (*Manual*, ser. II, vol. ix, p. 274, 1895) recognizes the *revelata* of Férussac, including the British shell, with *ponentina*, Dup., and *martigena*, Fér. (which is a *nomen nudum*), as synonyms, and associates with it *conimbricensis*, Silv., *venetorum*, Bgt., *nevesiana*, Silv., *villula*, Bgt., *platylasia*, Bgt., whilst as a variety he places *occidentalis*, Récluz, with its synonym *lisbonensis*, Pfr. Bourguignat's *H. ptylota* [*sic*] he treats as a distinct species. The other named forms appear to have been passed over by him.

Germain (*Moll. France*, ii, 1913, p. 128) also accepts Férussac's *H. revelata*, with *H. venetorum*, Bgt., and *H. villula*, Bgt., as synonyms. He regards (p. 129) *H. ptilota*, Bgt., as a separate species, and makes no allusion to Morelet's shell, nor to the British form.

In the absence of authenticated specimens and adequate descriptions

it is impossible to allocate all these various forms to their proper relative positions, nor are we at all certain at present to which helicoid genus they rightly belong; but so far as concerns those with which we are more immediately dealing just now, the following general arrangement may be hazarded:—

A. Sharp-lipped Group: without internal riblet.

H. revelata, Fér., of Michaud: a rare Alpine form for which, when rediscovered, a name will be wanted, the present one being invalid, Férussac's species being indeterminate.

H. subvirescens, Bellamy, for the British shell.

Syn. *H. ptilota*, Bourgt., and possibly a few others.

B. Everted, white-lipped group, with internal, white riblet.

H. montivaga, Westerlund.

Syn. *H. salmuriina*, Serv.

H. ponentina, Morel. (= *occidentalis*, Récluz).

Syn. *H. lisbonensis*, Pfr., and probably the majority of the named continental forms.

ON THE GENERIC NAMES FOR THE TWO BRITISH ELLOBIIDÆ
[OLIM AURICULIDÆ], MYOSOTIS, DRAPARNAUD (= DENTICULATUS, MONTAGU) AND BIDENTATA, MONTAGU.

By A. S. KENNARD, F.G.S., and B. B. WOODWARD, F.L.S.

Read 13th June, 1919.

THESE two species of mollusca are to-day considered to represent genera quite distinct from any of the following, to one or other of which they have in the past been referred, viz.: *Carychium*, Müller, 1774 (altered to *Carichium* by Férussac in 1807), *Pythia*, Bolten, 1798, *Ellobium*, Bolten, 1798 (= *Auricula*, Lamarck, 1799), *Volvaria*, Lamarck, 1801, *Acteon* and *Melampus*, Montfort, 1810, and *Conovula*, Schweigger, 1820 (= *Conovulus*, auctt., founded on Lamarck's "Conovule?" of 1812).

Incidentally their history begins with that of a shell which does not belong to their group, but which at first was confounded with them. A small *Voluta* was depicted in Boys & Walker's *Testacea minuta rariores* [1784], fig. 61; this was copied in Kanmacher's edition of Adams' *Essays on the Microscope*, 1798, pl. xiv, fig. 27, and on p. 639 of the text given Jacob's name of *Voluta alba*. It was adopted under that name by Turton in his edition of *A General System of Nature*, by Linnæus, vol. iv, 1802, p. 361, and again by Montagu in his *Testacea Britannica*, 1803, p. 235. Montagu reverts to this shell in his *Supplement*, 1808, p. 101, à propos of a very similar specimen which he describes, and suggests that the original example sent by Boys may have been a young *Bulla obtusa* [= *Retusa alba olim*, *Tornatina obtusa* (Mont.)¹]. From his description of the second specimen, Forbes & Hanley were led to infer, *Hist. Brit. Moll.*,

¹ Proc. Malac. Soc. Lond., xi, pp. 300-301.

vol. iv, p. 192, that this was "probably a minute foreign *Marginella*". It was in his *Supplement*, too, p. 100, pl. xxx, fig. 2, that Montagu established the *Voluta bidentata*, which is one of the two species under present discussion.

According to Moquin-Tandon, Jurine (*Helvetischer Almanach*, 1817, p. 34) included under the name *Auricella*, an *A. myosotis* and *A. lineata*. The authors of the species are not given by Moquin-Tandon, but if, as seems to be inferred from his citations, they were Draparnaud's species, the association of two such diverse animals without indication of a type renders the name useless, and it may be safely disregarded, even though Moquin-Tandon adopts it as a sectional name for the latter of the two.

In 1819 Turton, in his *Conchological Dictionary* (p. 250), quite oblivious of his *Voluta alba* in the *General System of Nature* cited above, described under the same name a shell manifestly identical with Montagu's *V. bidentata*.

Leach, the same year, in the proofs of his *Molluscorum Britannicæ Synopsis*, proposes *Jaminia* (p. 134) for *bidentata* and *Alexia* (p. 135) for *denticulata*. The *Voluta alba* does not seem to have received his attention.

Gray in 1821 (*London Medical Repository*, xv, p. 231) used *Phytia* (probably a misspelling for *Pythia* which he adopts in 1847) for *V. denticulata*; whilst in 1825 (*Annals of Philosophy*, xxv, p. 415) he refers *bidentata* and *alba*, both of Montagu, to *Auricula*.

Brown in 1827 (*Illustrations of the Conchology of Great Britain and Ireland*, 1st ed., p. iv) used Leach's name *Jaminia* (which he wrongfully attributed to Bruguière, who never employed it) for a group in which the molluscs in question were included.

Fleming in 1828 (*History of British Animals*, p. 333) referred "*V. alba*, Mont., Test. Brit., 235. Turton's *Conch. Dict.* 250" (thus mixing two distinct forms) to Lamarek's *Volværia*, whilst putting under *Acteon* the *denticulatus* and *bidentatus* of Montagu.

Jeffreys followed Fleming as to *alba* in 1830 (*Trans. Linn. Soc. Lond.*, xvi, p. 369), but put a "?" to the reference to Montagu and placed the species under "*Auricula*, Drap."

Bivona Bernardi in 1832 (*Effemeridi scientifiche e letteraire per la Sicilia*, i, p. 58) founded the genus *Ovatella* for *O. punctata* (which is akin to our *denticulata*) and another species belonging to quite another type of shell; whilst a little later (op. cit., ii, p. 18) he adds an *O. bidentata*, which is distinct from the British species of that name and which was renamed *bivonæ* by Philippi (*Enumeratio Molluscorum Siciliæ*, ii, 1844, p. 118). We have been indebted, and hereby return our grateful thanks, to the Marchese di Monterosato for the opportunity of examining these species of Bivona with other Mediterranean forms.

In 1840 Gray (Turton's *Manual*, new edition, pp. 224-228) put the three species under *Conorulus*, which he divided into *Ovatella* (Bivona) for *C. denticulatus* and a new section *Leuconia* for *C. bidentatus* and *albus*.

This he changed in 1847 (*Proc. Zool. Soc. Lond.*, xv, p. 179).

“*Alexia*, Leach MSS., 1819,” was there proposed for *Vol. denticulata*, *Phytia*, respelt *Pythia*, and “*Jaminia*, Brown, not Risso”, ranking as synonyms; whilst for the following genus he gave:—

“*Leuconia*, Gray, 1840. *Volvaria*, sp., Flem. *Voluta alba*.

Jaminea [sic], Leach MSS. *Vol. bidentata*.

Ovatilla [sic], sp. Bivon, 1832. *Ovat. bidentata*.”

Forbes & Hanley (*Hist. Brit. Moll.*, iv, 1852, pp. 190–197) referred these molluscs to *Conovulus*, making *alba* of the *Conch. Dict.* a synonym of *bidentatus*, and ignoring Gray’s sectional names.

Moquin-Tandon in 1856 (*Hist. nat. Moll. France*, ii, pp. 415–20) included these shells under *Carychium*, putting *denticulatum* in the section *Ovatella* (which he misquotes as *Conulus*, sect. *Ovatella*, Gray) and *bidentata*, which he misidentified with *myosotis* of Draparnaud, under the section *Phytia* of Gray. He took no note of *alba*.

In 1857 (Turton’s *Manual*, new edition, pp. 192–196) Gray reverted to his arrangement of 1840, making *alba*, however, a variety of *bidentatus* and restricting it to that of Turton’s *Conch. Dict.*

Gwyn Jeffreys (*Brit. Conch.*, v, 1869, pp. 103–109) elected to put these snails under the genus *Melampus* of Montfort, making *alba* of the *Conch. Dict.* a variety of *bidentatus*.

Of the most recent writers of the group, the Marchese di Monterosato (*Nat. Sicil.*, xviii, 1906, pp. 125–130) has adopted *Alexia* of Leach for *denticulatus*, Mont., put *myosotis*, Drap., in a new genus *Myosotella*, and *bidentatus*, Mont., under *Leuconia* of Gray.

Such being the literary history of the question, it remains to determine the available generic names for the two forms. It is a pity that Leach’s original manuscript names of *Jaminia* and *Alexia* cannot be revived. Unfortunately the former was used by Risso through an error of misinterpretation in 1826 (*Hist. Europ. merid.*, iv, p. 88) for certain of the Pupillidæ before Brown in 1827 revived it for a mixed group that included the present shells. Bivona’s *Ovatella* appears conchologically more closely allied to the *myosotis* section and so not available. Hence recourse must be had to Gray’s name *Leuconia*. For the other section Leach’s original *Alexia* was only made valid by Gray’s publication of it in 1847, by which time it had been anticipated by Stephens, who in 1835 employed it for a genus of Coleoptera, so that, as pointed out by one of us in 1903, Gray’s *Phytia* is the only choice.

The essential synonymy is, therefore, as follows:—

PHYTIA, Gray, 1821.

1801. *Auricula myosotis*, Draparnaud, Tabl. Moll. France, p. 53 ;
— id. *Hist. Moll. France*, p. 56, pl. iii, f. 16 and 17.
1803. *Voluta denticulata*, Montagu, Test. Brit., p. 234, pl. xx, f. 5.
1807. *Carichium myosotis*, Férussac, Essai méthod. Conch., p. 54.
1817. *Auricella myosotis*, Jurine, Helvet. Alman., p. 34.
Carychium myosotis, Blainville, Dict. Sci. Nat., vii, p. 188.
1819. *Alexia denticulata*, Leach, Moll. Brit. Synop. (proofs), p. 135.
1821. *Phytia denticulata*, Gray, Lond. Med. Repos., xv, p. 231.

1823. *Turbo denticulatus*, Brown, Ency. Brit., ed. 6, vi, p. 455.
 1827. *Jaminiæ denticulata*, Brown, Illust. Conch. Brit., ed. 1, p. iv,
 pl. li, f. 6.
 1828. *Acteon denticulatus*, Fleming, Hist. Brit. Anim., p. 337.
 1837. *Pythia denticulata*, Beck, Index Moll., p. 103.
 — *myosotis*, " " " p. 304.
 1840. *Conovulus (Ovatella) denticulatus*, Gray, Turton's Manual, new
 ed., p. 225, pl. xii, f. 144.
 1842. — *myosotis*, Wood, Ann. Mag. Nat. Hist., ix, p. 462.
 1847. *Alexia denticulata*, Gray, Proc. Zool. Soc. Lond., xv, p. 179.
 1869. *Melampus myosotis*, Jeffreys, Brit. Conch., v, p. 106, pl. xcvi,
 f. 2.
 1906. *Myosotella myosotis*, Monterosato, Nat. Sicil., xviii, p. 126.

LEUCONIA, Gray, 1840.

1808. *Voluta bidentata*, Montagu, Test. Brit., Suppt., p. 100,
 pl. xxx, f. 2.
 1819. — *alba*, Turton, Conch. Dict., p. 250.
Iaminiæ bidentata, Leach, Moll. Brit. Synop. (proofs), p. 134.
 1821. *Auricula bidentata*, Férussac, Tabl. Syst. Limaçons, Jan. ed.,
 p. 107 (June ed., p. 103).
 1827. *Jaminiæ bidentata*, Brown, Illust. Brit. Conch., ed. 1, p. iv,
 pl. li, f. 7.
 1828. *Volvaria alba* [pars], Fleming, Hist. Brit. Anim., p. 333.
Acteon bidentatus " " " " p. 337.
 1840. *Conovulus (Leuconia) bidentatus*, Gray, Turton's Manual, new
 ed., p. 227, pl. xii, f. 145.
Conovulus (Leuconia) albus, Gray, Turton's Manual, new ed.,
 p. 227, pl. xii, f. 146.
 1856. *Carychium (Phytia) myosotis*, Moquin-Tandon, Hist. Moll.
 France, ii, p. 417, pl. xxix, f. 33-39; pl. xxx, f. 1-4.
 1869. *Melampus bidentatus*, Jeffreys, Brit. Conch., v, p. 104,
 pl. xcvi, f. 1.
 1883. *Leuconia bidentata*, Fischer, Manuel de Conch., p. 501.
 1903. *Ovatella bidentata*, B. B. Woodward, Journ. of Conch., x,
 p. 355.

E. FORBES' NOTES IN HIS COPY OF S. LOVÉN'S INDEX MOLLUSCORUM SCANDINAVIÆ OCCIDENTALIA HABITANTIUM.

By A. REYNELL, Esq.

Read 14th March, 1919.

HAVING come by the copy of the above-named paper sent to E. Forbes by S. Lovén himself, in which the former has made several notes, it seemed worth while making a permanent record of those which are at all readable.

| Lovén's <i>Index</i> . | Forbes' Notes in Lovén's <i>Index</i> . | Remarks F. & H.'s <i>Brit. Moll.</i> |
|--|---|--|
| <i>Spiralis</i> (p. 4). <i>S. stenogyra</i> (<i>Scæa</i>), Phil. | <i>flemingii</i> . | = <i>stenogyra</i> probably. |
| <i>Scaphander</i> (p. 10). <i>S. librarius</i> , n. | var. of <i>lignarius</i> ? | |
| <i>Amphiophyra</i> , n.g. (p. 10). <i>A. globosa</i> , n. | sp. . . . ? | |
| <i>Acteon</i> . <i>A. tenellus</i> , n. (p. 11). | young of <i>tornatilis</i> , L. | |
| <i>Tritonium</i> (p. 11). <i>T. islandicum</i> , Chem. | = <i>sabini</i> , Forbes. | <i>F. sabini</i> , Forbes = <i>F. propinquus</i> , Alder. |
| <i>T. ? nanum</i> , n. (p. 12). | = <i>albus</i> , Forbes. | <i>Mangelia nana</i> , Lovén = <i>Fusus albus</i> , Forbes. |
| <i>T. cyaneum</i> (Bucc.), Brug. <i>T. humphreyianum</i> . | var. of <i>undatum</i> . | " <i>T. humphreyianum</i> , Lovén, Index Moll. Scand., p. 12, from specimen " = <i>Buccinum undatum</i> . |
| <i>T. turricula</i> , Mont. (p. 12). <i>T. harpularia</i> , Couth. (p. 12). <i>T. roseum</i> , Sars MS. (p. 12). | } Bracketed together. | |
| <i>Mangilia</i> (p. 14). <i>M. tiarula</i> , n. | <i>P. brachystoma</i> , Brit. auct. | " <i>M. tiarula</i> , Lovén, Index Moll. Scand., p. 14 (from type) " = <i>M. brachystoma</i> , Phil. |
| <i>Pleurotoma</i> . <i>P. boreale</i> , Phil. MS. | = <i>P. teres</i> , Forbes. | <i>P. teres</i> , Forbes = " <i>P. boreale</i> , Lovén, Index Moll. Scand., p. 14 probably " = <i>Mangelia teres</i> , Forbes. |
| <i>Cancellaria</i> (p. 15). } <i>Trichotropis</i> (p. 15). } | Forbes says "one genus". | |

| Lovén's <i>Index</i> . | Forbes' Notes in Lovén's <i>Index</i> . | Remarks F. & H.'s <i>Brit. Moll.</i> |
|---|---|---|
| <i>Turbonilla</i> (p. 18). <i>T. rufa</i> (Chem.), Phil. | = <i>fulvocincta</i> . | " <i>Turbonilla crenatus</i> , Lovén, Index Moll. Scandinav., p. 18 (probably) " = <i>Chemnitzia rufa</i> , Phil. (F. & H. iii, p. 245). " <i>Turbonilla rufa</i> (by typographical error in our synonymy as <i>T. crenata</i>), Lovén " = <i>Chemnitzia fulvocincta</i> , Thompson (F. & H. iv, p. 276). |
| <i>T. interrupta</i> (Tott). | = <i>rufescens</i> . | " <i>T. interrupta</i> , Lovén, Index Moll. Scandinav., p. 18 " = <i>Chemnitzia rufescens</i> , Forbes. |
| <i>T. clavula</i> , n. | Brit. | <i>Eulimella clavula</i> , Lovén (?). |
| <i>Lacuna</i> (p. 22). | | |
| <i>L. albella</i> , n. (p. 23). | = <i>montagui</i> . | |
| <i>Cerithium</i> (p. 23). | | |
| <i>C. metula</i> , n. | Zetland. | " First dredged in 50 fathoms between Fair Island and the mainland of Zetland, E. F. & R. McAndrew, also in 82 fathoms off the E. Coast of Zetland." |
| <i>Chiton</i> (p. 27). | | |
| <i>C. ruber</i> . | Syn . . . | Synonym of <i>C. marmoreus</i> , Fabric. |
| <i>Pecten</i> . | | |
| <i>P. sulcatus</i> . | var. of <i>opercularis</i> . | |
| <i>P. furtivus</i> , n. | young of <i>tigrinus</i> . | |
| <i>Cardium</i> (p. 35). | | |
| <i>C. fasciatum</i> , "Mont." | = <i>C. elongatum</i> . | <i>C. fasciatum</i> , Lovén, Index, p. 351, from specimens. |
| <i>Artemis</i> (p. 39). | | |
| <i>A. comta</i> , n. | var. of <i>A. tinctoria</i> . | |
| <i>Embla</i> , n.g. (p. 46). | <i>Poromya</i> ? | Vol. iv, p. 250, <i>P. granulata</i> . " The examination of a second less equilateral specimen of this rare shell induces us to surmise its identity with the <i>Embla koreni</i> of Lovén (Ind. Moll. Scand., p. 46)." |

ON *OPEAS STRIGILE* (M. & P.) AND ITS ALLIES.

By M. CONNOLLY.

Read 11th April, 1919.

THE receipt from Mr. Burnup of several small forms of *Opeas* from Natal rendered it necessary to make search in the Natural History Museum for the type of *O. strigile* (M. & P.) which was supposed to have been deposited there recently with the remainder of the late Mr. Ponsonby-Fane's South African type-specimens.

There exists, however, written evidence which proves that the shell in question was in a more or less broken condition many years ago, about the time of its description, and whatever remained of it seems to have disappeared in course of transfer, for the box labelled "Type" now contains nothing but a scrap of paper, mounted on blue wool and bearing the words "accidentally lost".

Next to this box is another, labelled "*strigilis*, M. & P., S. Africa, J. H. Ponsonby", with a label beneath, in the late owner's handwriting, "seems to be *E. strigilis*, M. & P." This contains two shells from Dargle, but as they are almost devoid of strigilation it became advisable to compare them with an authentic example of Melvill and Ponsonby's species.

The original lot were collected at Karkloof by J. McBean and consisted of four specimens, one being retained by the authors as type, two by the finder, and the fourth presented to H. C. Burnup and placed by him in the Natal Museum. Thanks to his kindness and the courtesy of the Museum authorities, this co-type has now been forwarded to me for the purpose of comparison. It is distinct from the Dargle specimens, being slightly more highly sculptured and less attenuate. Although rather differing from the authors' original figure it agrees well with their description and is quite proportionate to their measurements, and there appears to be no reason against its acceptance as typical of *O. strigile* (M. & P.).

I am therefore describing as new the Dargle species, as well as another small race which has been found in company with, and sometimes mistaken for, *strigile*, though quite distinct therefrom. I also give a fresh description and figure of the last-named, and of yet another new species, of rather a different character, which has recently been collected by Dr. F. G. Cawston at Verulam, Natal.

OPEAS STRIGILE (M. & P.). Fig. 1.

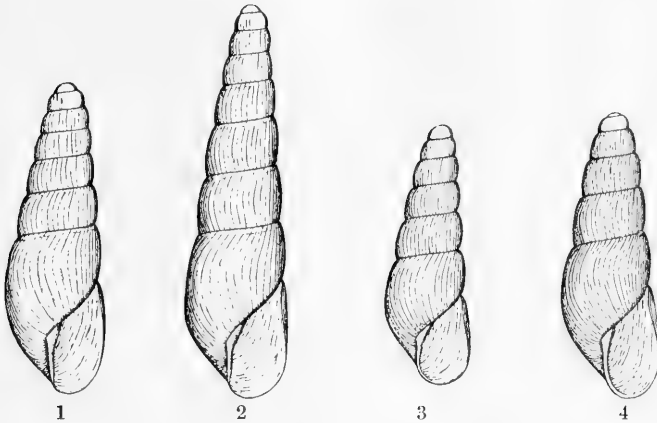
Shell small, narrowly rimate, elongate-turritiform, thin, glossy, transparent, pale olivaceous. Spire produced, sides almost imperceptibly convex, apex rounded. Whorls 6, moderately convex, regularly and gradually increasing, the apical whorl smooth, remainder covered with fairly close, curved, transverse striæ of rather irregular depth, hardly visible to the naked eye. Suture sub-filiform, well defined. Aperture ovate, peristome thin, simple, outer lip broken in co-type, but normally curved forward and

slightly outward, base narrowly rounded; columella nearly straight, margin triangularly reflexed, nearly covering the rima.

Shell, 5.3×1.7 ; apert. 2.0×0.8 ; last whorl, 2.9 mm. The type measured 7.25×2.0 mm.

Hab.—*Natal.* Type locality, Karkloof (McBean). Since collected at Karkloof and Fort Nottingham (Burnup).

Except for very slight variation in depth of sculpture and reflexion of columellar margin, all the specimens which I have examined agree closely with the co-type. Another shell from Karkloof measures 6.5×2.0 ; apert. 2.1×0.8 ; last whorl, 3.1 mm.



All the figures are enlarged seven times.

OPEAS FANEI, sp. nov. Fig. 2.

Shell small, rimate, acuminate, thin, smooth, glossy, transparent, pale olivaceous. Spire much produced, sides regularly and very gradually tapering, apex narrowly rounded. Whorls 8, nearly flat, regularly and gradually increasing, the two apical smooth, remainder covered with close, faint, regular, curved, transverse striæ, which are only visible under a lens. Suture becoming sub-filiform about the 6th whorl. Aperture small, ovate; peristome thin, simple; outer lip curved forward but not outward; base rounded; columella straight, margin narrowly reflexed.

Shell, 7.5×1.7 ; apert. 2.0×0.6 ; last whorl, 3.3 mm.

Hab.—*Natal.* Pietermaritzburg; Dargle (Burnup).

Smoother and more attenuate than *O. strigile*, with flatter whorls. The type, which is selected from a series collected at Pietermaritzburg, shows the utmost growth that may be expected in this species, being fully a millimetre longer than the generality of specimens. The Dargle shells differ slightly in contour from those from Pietermaritzburg, but are not varietally separable.

OPEAS BURNUPI, sp. nov. Fig. 3.

Shell very small, narrowly rimate, acuminate-turiform, thin, transparent, moderately glossy, pale olivaceous. Spire much produced, sides regular, apex rounded. Whorls $6\frac{1}{4}$, rather convex, gradually and regularly increasing, apical $1\frac{1}{4}$ smooth, remainder covered with close, prominent, regular, curved transverse striæ. Suture moderately impressed. Aperture acuminate-ovate, rounded at base, peristome thin, simple, outer lip hardly outcurved, moderately arcuate forward; columella nearly straight, margin thickly and very narrowly reflexed, forming a minute rima.

Shell, 5.4×1.8 ; apert. 1.5×1.0 ; last whorl, 2.9 mm.

Hab.—*Cape Province*. The Gorge, Somerset East. *Natal*. Karkloof; Nottingham Road; Bulwer; Inhluzani; Fort Nottingham (Burnup).

Smaller than either of the foregoing and easily distinguishable from most South African members of the genus by its more prominent sculpture.

I have much pleasure in dedicating this very distinct species to the distinguished conchologist to whose efforts the present paper is due.

OPEAS ANNIPACIS, sp. nov. Fig. 4.

Shell small, perforate, elongate-turiform, thin, rather dull, transparent, pale olivaceous. Spire much produced, sides evenly tapering, apex rounded. Whorls $5\frac{1}{2}$, rather flat, regularly increasing, the $1\frac{1}{2}$ apical smooth, remainder covered with rather prominent, close, curved, slightly irregular transverse striæ. Suture sub-filiform. Aperture acuminate-ovate, peristome thin, simple; outer lip curved well forward, and somewhat inward about a third of its length below the suture; base rounded; columella nearly straight, margin moderately reflexed, forming a narrow umbilicus.

Shell 5.7×1.8 ; apert. 2.0×0.8 ; last whorl, 3.3 mm.

Hab.—*Natal*. Verulam (Cawston).

The outer lip is sharply curved forward immediately below the suture, almost resembling that of *Hypolysia*, and distinguishing the present species from any other *Opeas* known to me from South Africa.

ADDENDUM TO REMARKS ON THE RECENT SPECIES OF
MORUM, BOLTON.

By JAMES COSMO MELVILL, M.A., D.Sc., F.L.S.

Read 11th April, 1919.

OWING to an oversight, an important species of *Morum* was left out of the enumeration just published,¹ viz.:

MORUM MACANDREWI (Sowb.).

Oniscia macandrewi, G. Sowerby (?). Proc. Zool. Soc. Lond., Dec. 1888, pp. 557-8, pl. xxviii, figs. 1, 2.

Hab.—Japan (Hungerford, Stearns, Hirase). Type in collection Melvill.

The author remarks of this interesting and fine species, as compared with its nearest ally, *M. ponderosum* (Hanley), that it is much higher in the spire, the nodules on the body-whorl also being smaller and less prominent. From *M. cancellatum* (Sowb.) it differs in being more pyriform, with greater degree of gibbosity, the transverse ridges not raised into echinations on the ribs, while the coloration consists in variegation of white and brown marking. It was discovered by Dr. Hungerford, in whose collection were two specimens. It will probably be found not infrequent in Japanese waters, several examples having been dredged by Mr. Hirase during the past few years. With this addition, the number of recent species of this circumscribed genus only totals eleven altogether.

Regarding the locality of *Morum dennisoni* (Reeve) as given *antea*, p. 72, "Reported from Guadaloupe, but most probably an Eastern species," Dr. Dall has kindly communicated with me recently on this subject, and considers the West Indian habitat undoubtedly the correct one; the species having been dredged recently off the Central American coast, though only in very small quantity.

¹ *Antea*, p. 69.

NOTES ON THE NON-MARINE MOLLUSCA OBSERVED IN EAST ROSS AND THE ORKNEY AND SHETLAND ISLANDS.

By Surgeon-Commander K. H. JONES, M.A., Ch.B., R.N., F.Z.S.,
and A. S. KENNARD, F.G.S.

Read 11th April, 1919.

SINCE the non-marine mollusca of these three comital divisions have not been collected extensively, we have thought it advisable to put on record the results of the collecting by one of us (K. H. J.) therein during the past few years.

EAST ROSS.

In this vice-comital division only a small area in the immediate vicinity of Cromarty Firth was examined in 1912-13, and again in 1915-16. Owing to the conditions, collecting was only possible for short and broken periods, but a fair number of species were obtained. At Cromarty areas of rich and well-cultivated alluvial soil surround much of the Firth, but a few miles inland these give place to rough moorland and heather-clad hills. At Alness and Invergordon, both on the Firth, are woods of deciduous trees, for the most part of considerable size; but on the hills conifers alone seem able to maintain themselves. At Alness the woods are chiefly situate on the banks of the river of the same name.

The species obtained in East Ross are :—

- * *Limax maximus*, Linn., Cromarty.
- *arborum*, Bouch.-Chant., Cromarty.
- Agriolimax agrestis* (Linn.), Cromarty.
- Vitrina pellucida* (Müll.), Invergordon.
- Vitrea crystallina* (Müll.), Cromarty, Alness.
- Polita cellaria* (Müll.), Alness, Invergordon.
- *alliaris* (Mill.), Cromarty, Invergordon.
- *nitidula* (Drap.), Alness, Invergordon.
- *pura* (Ald.), Cromarty.
- Euconulus fulvus* (Müll.), Alness, Invergordon.
- Arion ater* (Linn.), Cromarty.
- *subfuscus* (Drap.), Cromarty.
- *intermedius*, Norm., Cromarty.
- *circumscriptus*, John., Cromarty.
- Pyramidula rotundata* (Müll.), Invergordon.
- Helicella caperata* (Mont.), Alness, Invergordon.
- Helix hortensis*, Müll., Alness, Invergordon, Cromarty.
- Cochlicopa lubrica* (Müll.), Cromarty.
- Lauria cylindracea* (Da C.), Cromarty, Invergordon.
- *anglica* (Fér.), Cromarty.
- Columella edentula* (Drap.), Cromarty.
- Carychium minimum*, Müll., Cromarty.
- Limnæa pereger* (Müll.), Invergordon.
- *truncatula* (Müll.), Invergordon.

- Pisidium casertanum* (Poli), Invergordon.
 — *personatum*, Malm, Invergordon.
 — *obtusale*, Jenyns, Invergordon.

THE ORKNEYS.

In the Orkneys collecting was confined to some of the southern islands. Mainland or Pomona, the largest island of the group, was visited at various points of its southern coast, but only a few of its many lochs could be examined. Flotta was well explored, while Hoy, South Ronaldshay, and South Walls were visited on several occasions. Switha and Burray were visited once and Stroma twice. This last is fairly close to the mainland of Scotland, and is separated by the larger part of the Pentland Firth from the other islands above mentioned. Politically, Stroma is a part of Caithness, and perhaps zoologically it may be similarly placed, for a frog (*Rana temporaria*) was seen, and this animal is not known to occur in the Orkneys proper.

The Orkneys are for the most part rounded and low-lying, largely well cultivated, yet with considerable areas of rough moorland. The hills on Hoy rise to over 1,500 feet and on Mainland to between 800 and 900 feet. A feature of the landscape in some parts is the number of mill dams, and these harboured great numbers of very large *Limnæa truncatula*. On Mainland, Loch Kirbister is of considerable size, situate close to the southern coast of the island, with a good deal of sand and mud on its bottom and in summer greatly overgrown with aquatic vegetation. Loch Harray is larger than Loch Kirbister, and is in close connexion with the brackish Loch Stennes.

Further to the east is Loch Græmeshall, a piece of shallow water of moderate extent with a sandy bottom much overgrown with reeds in many places. In this loch *Pisidia* were exceptionally abundant.

On South Ronaldshay there are several small lochs, which are, however, conchologically disappointing, since their bottoms of hard boulder-clay do not appear to suit the freshwater mollusca.

Echna Loch on Burray was visited once, but only a few examples of *Planorbis crista* were obtained. The majority of the terrestrial mollusca were found in the stone heaps or on walls in the cultivated parts of the island, but several interesting species, notably *Helix hortensis*, occur chiefly if not entirely on the sea cliffs.

The species obtained were:—

- Limax arborum*, Bouch.-Chant., S.R., St., F.
Agriolimax agrestis (Linn.), S.R., St., H., F., C., Sw., M.
 — *lævis* (Müll.), S.R., F., M.
Vitrina pellucida (Müll.), S.R., St., F., Sw., M.
Vitrea crystallina (Müll.), S.R., B., M., Honton.
Polita cellaria (Müll.), S.R., F., M., Holm, St. Mary's.
 — *alliarum* (Mill.), S.R., St., F., C., B., Sw., M., Holm,
 Honton, St. Mary's.
 — *nitidula* (Drap.), S.R., F., M., Honton.

- Arion ater* (Linn.), S.R., St., H., F., C., Sw., M.
 — *intermedius*, Norm., S.R., St., H., F., M.
 — *circumscriptus*, John., S.R., St.
Pyramidula rotundata (Müll.), S.R., St., M., Holm.
Arianta arbustorum (Linn.), S.R., F.
Helix hortensis, Müll., F., M., Holm.
Cochlicopa lubrica (Müll.), S.R., St., F., M., Holm, Honton,
 St. Mary's.
Pupilla muscorum (Linn.), M., Holm.
Lauria cylindracea (Da C.), S.R., St., F., B., M., Honton,
 St. Mary's.
 — *anglica* (Fér.), S.R., M., Holm.
Balea perversa (Linn.), M., Holm.
Succinea Pfeifferi, Rossm., S.R., M., Holm, Honton.
Ancylus fluviatilis (Müll.), H., M., Greenigo.
Limnæa pereger (Müll.), S.R., St., H., M.
 — *truncatula* (Müll.), S.R., St., F., M., Holm, Honton.
Planorbis levis, Ald., M., Loch Harray.
 — *crista* (Linn.), B., M., L. Harray, L. Græmeshall.
Theodoxus fluviatilis (Linn.), M., L. Harray.
Pisidium casertanum (Poli), S.R., H., F., M., L. Græmeshall.
 — *nitidum*, Jenyns, M., L. Græmeshall.
 — *personatum*, Malm, S.R., St., H., F., M., Honton, L.
 Græmeshall.
 — *pusillum*, Jenyns, M., L. Harray.
 — *milium*, Held, S.R., M., L. Harray.
 — *subtruncatum*, Malm, S.R., H., M., L. Græmeshall.
 — *lilljeborgii*, Cless., M., L. Kirbister, L. Græmeshall.
Sphærium corneum (Linn.), M., L. Kirbister.

S.R. = South Ronaldshay, St. = Stroma, B. = Burray, H. = Hoy, F. = Flotta, C. = Cava, Sw. = Switha, M. = Mainland, where we have given the exact localities in many cases.

SHETLAND.

In Shetland the area examined was more restricted than in Orkney. Collections were made in the neighbourhood of Olna Firth, Busta Voe, Sollum Voe, and Voe, all in the parish of Delting on Mainland, whilst a single visit to Lerwick provided a few species.

In Shetland there is much less cultivated land than in Orkney, and it consists usually of small walled-in patches. Lochs and streams abound, but the former with their stony bottoms do not as a rule suit *Pisidia*, whilst the latter are so rapid and turbulent that *Limnæa* are not usually to be found in them. Both these genera are probably present in parts of most of the lochs, but time did not allow of much investigation. In the many little ponds, pools, and small ditches, and even in the smallest trickles of water, *Pisidia* often abound and occasionally *Limnæa pereger* was present. Given a muddy bottom, *Pisidia* seem able to maintain themselves anywhere. The species obtained were:—

MUCKLE ROE.

- Agriolimax agrestis* (Linn.).
Polita alliaria (Mill.).
Arion ater (Linn.).
Limnæa pereger (Müll.).
 — *truncatula* (Müll.).
Pisidium casertanum (Poli).
 — *personatum*, Malm.

MAINLAND.

- Agriolimax agrestis* (Linn.), Voe, Gonfirth.
Vitrina pellucida (Müll.), Voe, Busta, etc.
Vitrea crystallina (Müll.), Voe.
Polita cellaria (Müll.), Clickamin Broch.
 — *alliaria* (Mill.), about Soe Water, Voe, Voxter, Busta, etc.
Arion ater (Linn.), common.
 — *intermedius*, Norm., Voe.
Arianta arbustorum (Linn.), Ellwick, Voe, Lerwick.
Lauria cylindracea (Da C.), Voe.
Limnæa pereger (Müll.), Smerla Water, Busta Loch, Mangaster Voe, Olna, Mill-Lake, Gonfirth.
 — *truncatula* (Müll.), Voe, Foulawick.
Pisidium casertanum (Poli), Olna, Voe, Mangaster Voe, Foulawick, Petta Water, Boys Water at Busta.
 — *personatum*, Malm, Foulawick, Boys Water, Mangaster Voe.
 — *pusillum*, Jenyns, Boys Water.
 — *milium*, Held., Voe.
 — *liljeborgii*, Cless., Busta, Boys Water, Mangaster Voe.

NOTES ON THE SPECIES.

Agriolimax agrestis (Linn.).—A common species in all the districts visited. It occurs from the hill-tops to the sea in Shetland, and is especially abundant in and around ruinous buildings in both Orkney and Shetland.

Agriolimax levis (Müll.).—Not at all uncommon at Widewall Bay, South Ronaldshay, on Flotta, and at Honton and St. Mary's on the Mainland of Orkney.

Vitrina pellucida (Müll.).—Common in Orkney and Shetland and not uncommon about Cromarty. Examples from Orkney have been examined anatomically by E. W. Howell and found to be this species.

Vitrea crystallina (Müll.).—Found at Widewall Bay, South Ronaldshay, and not uncommon on Burray. In Shetland, only at Voe in the ruins of the old kirk. All the examples were immature; they may be referred to the var. *contracta*, West.

Polita cellaria (Müll.).—Sparsely at Flotta kirkyard, and in some abundance amongst heaps of stones on a sandy beach at Hoxa, South Ronaldshay. On Mainland a few examples were found at St. Mary's and near Holm. In Shetland, only at Clickamin Broch near Lerwick. The shells are fairly large and somewhat dark-coloured.

P. alliaria (Mill.).—The commonest Helicoid in both groups of

islands. Many white examples occurred. All the examples are the small northern form.

P. nitidula (Drap.).—Not uncommon on Flotta and South Ronaldshay. The examples are small, the largest being 8 mm. in diameter.

Arion ater (Linn.).—Very common in Orkney and Shetland. In the former group it varied considerably, but in Shetland most examples are typical. Abundant round Cromarty Firth.

A. intermedius, Norm.—Abundant in Orkney, scarce in East Ross, and in Shetland only at the ruined kirk at Voe.

Pyramidula rotundata (Müll.).—At Invergordon only at the back of Kin Craig House. On South Ronaldshay it occurred under boulders near the seashore at Sandwick and at Hoxa Broch. On Mainland it was abundant on the wall of Holm kirkyard. In all the examples the costulations are less pronounced than those of the South of England.

Helicella caperata (Mont.).—This species occurred only on the road from Alness to Invergordon, where it was abundant. The examples are fairly large, 6 × 10 mm. Possibly an accidental introduction.

Arianta arbustorum (Linn.).—In Orkney it was found on Flotta, where it is apparently restricted to the north-east corner of the kirkyard, where it is abundant. In size the shells range from 15 × 19.5 mm. to 18 × 23 mm. They are fairly solid and all, save one example, were banded.

At Water Sound, South Ronaldshay, a fair number of examples were found in beds of nettles, and these were rather large, very thin shelled, and almost all were bandless and very light in colour (the var. *virescens*, Tayl.). A young scalariform example was also obtained thence.

In Shetland examples were obtained at Ellwick, at the head of Sollum Voe, in the ruins of the old kirk at Voe, and in the broch of Clickamin near Lerwick. The Shetland shells are fairly large in size and typical in colour. This species is probably widely but sparingly distributed in suitable localities.

Helix hortensis, Müll.—In East Ross this species occurred very abundantly on a wall bordering the road from Alness to Invergordon, and a few examples were also seen at Cromarty and Nigg.

On Flotta the species was only found in one spot on the sea-cliffs facing South Ronaldshay; the examples were thin shelled and weather beaten. On Mainland, Orkney, it was plentiful near Holm.

The examples from Orkney exhibit less variation both as to banding and coloration than those from East Ross.

EAST ROSS.

Band formulæ.

| | | | |
|-------------------|--------------|-------------------|-------------|
| 1 2 3 4 5 . . | 25 examples. | 1 (2 3 4 5) . . | 8 examples. |
| 1 2 3 (4 5) . . | 25 „ | (1 2) (3 4 5) . . | 1 „ |
| (1 2 3) (4 5) . . | 8 „ | (1 2) (3 4 5) . . | 1 „ |
| (1 2 3 4 5) . . | 20 „ | 0 2 (3 4 5) . . | 1 „ |
| (1 2 3) 4 5 . . | 2 „ | 0 0 3 (4 5) . . | 1 „ |
| (1 2) 3 (4 5) . . | 7 „ | 1 2 0 4 5 . . | 1 „ |
| 1 (2 3) (4 5) . . | 3 „ | | |

The colour forms noted were: *arenicola*, *lutea*, cf. *fagorum*, and a form palm fawn above and much darker beneath.

There was a total absence of the unbanded *lutea* form so common in the south.

FLOTTA

| | | | |
|---------------------|-------------|---------------------|-------------|
| (1 2 3 4 5) . . . | 3 examples. | 1 2 3 (4 5) . . . | 4 examples. |
| 1 (2 3) 4 5 . . . | 5 ,, | 1 2 3 4 5 . . . | 4 ,, |
| (1 2 3) (4 5) . . . | 14 ,, | (1 2) 3 (4 5) . . . | 4 ,, |
| 1 (2 3) (4 5) . . . | 6 ,, | | |

MAINLAND

| | | | |
|---------------------|-------|-------------------|------|
| 1 2 3 4 5 . . . | 12 ,, | (1 2 3 4 5) . . . | 3 ,, |
| (1 2 3) (4 5) . . . | 16 ,, | 1 2 3 (4 5) . . . | 1 ,, |
| (1 2) 3 (4 5) . . . | 10 ,, | (1 2) 3 4 5 . . . | 1 ,, |

Cochlicopa lubrica (Müll.).—The white form of this species occurred at Stroma.

Pupilla muscorum (Linn.).—A single example taken at St. Mary's. Hitherto unrecorded from Orkney.

Lauria cylindracea (Da C.).—In Orkney this species is widely distributed, and was taken commonly on Mainland in various localities. On South Ronaldshay it was observed at Widewall Bay, Hoxa Broch, Sandwick Bay, and Water Sound.

On Flotta it occurred near Neb, on the sea-cliffs near Quoyness, and was common on the kirkyard wall. It was common on Burray and Stroma. In Shetland it was only taken on a pile of stones opposite Voe House at Voe. These examples were a dwarfed form with a long body-whorl, the peristome but little developed and the tooth absent. Some of the Orkney examples approach this form, but the East Ross specimens are normal.

Balea perversa (Linn.).—From Græmeshall Loch on Mainland a small stream flows into the sea and near the mouth a low bridge carries the road across it. To the east of this an old lichen-covered rough wall skirts a large tumulus, and on the wall examples of *Balea perversa* were obtained: at present it is the only known locality for the species in Orkney.

Limnæa pereger (Müll.).—Common in East Ross. Absent from Cava and Flotta, fairly large examples on Stroma and South Ronaldshay, and quite large ones at Loch Kirbister on Mainland. In the larger Shetland lochs specimens as a rule were small. In almost every trickle of water in Shetland small fragile specimens were found.

Limnæa truncatula (Müll.).—In Shetland and East Ross this species occurred sparingly and the examples were small.

In Orkney and on Stroma this species attained a large size, 11·5 mm.

Theodoxus fluviatilis (Linn.).—Occurs abundantly in Loch Harray, Mainland, Orkney. The examples are much eroded.

The occurrence of the species in Orkney is interesting, since it is unknown in Scotland. Is it possible that it is an accidental introduction?

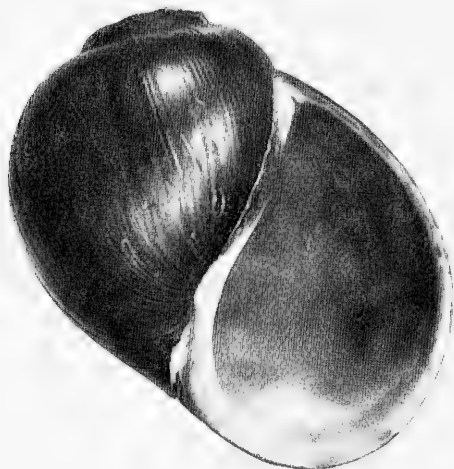
Pisidia.—*Pisidium lilljeborgii*, Cless., from Orkney, was the only known species from the three comital divisions, so that the new records are a considerable extension of our knowledge. We are greatly indebted to Mr. B. B. Woodward for his kindly determination of the species of this genus.

DESCRIPTION OF *AMPULLARIA MERMODI*, N.SP.

By G. B. SOWERBY, F.L.S.

Read 9th May, 1919.

In the Proceedings of this Society (vol. viii, p. 345; ix, p. 56; and xii, p. 65) I gave a synopsis of the family Ampullariidæ, terminated with an index that formed a list of the 350 names that have been given to supposed species. Of these only 190 were actual species; the remainder were placed, either as mere synonyms, or as varietal names.



In order to complete my catalogue, as far as possible, I am constrained to add a species of which photographs have been kindly sent me by Monsieur Mermod, of the Geneva Natural History Museum. Believing it to be a species hitherto undescribed, I propose to name it in his honour.

AMPULLARIA MERMODI, n.sp.

Testa ovata, solidiuscula, vix umbilicata; spira breviter conica; anfractus $3\frac{1}{2}$ convexi rotundati, sutura anguste canaliculata sejuncti; anfractus ultimus convexus, longitudinaliter irregulariter tenuiter

plicatus, fusco-olivaceus; apertura ampla, verticalis, intus violacea, versus marginem alba; peristoma tenue, postice leviter incrassata; columella albo-callosa, tenuita depressa. Long. 66, lat. 53 mm.; apertura long. 48, lat. 57 mm.

Hab.—Central America (ex coll. Delessert).

This shell bears some resemblance to *Amp. urceus* (Müller) = *rugosa* (Lamk.), especially in the character of its outer surface, which is longitudinally rather roughly, irregularly, and thinly plicate, or fibrous; but it differs from that species in form, and particularly in its narrow sutural canal and scarcely visible umbilicus. The white columella callus is flattened over the umbilical region. The aperture is ample, and the interior suffused with a violet tint.

ON *AMMONITES NAVICULARIS*, MANTELL.

By the late G. C. CRICK, F.G.S.

Read 13th June, 1919.

PLATE IV.

1822. *Ammonites navicularis*, G. A. Mantell, *Foss. S. Downs*, p. 198, pl. xxii, fig. 5.
1827. *A. navicularis*, J. de C. Sowerby, *Min. Conch.*, vol. vi, p. 105, pl. DLV, fig. 2.
1856. *A. navicularis*, D. Sharpe, *Foss. Moll. Chalk of England* (Mon. Pal. Soc.), pt. iii, 1856, p. 39, pl. xviii, figs. 1-2.
1900. *Calycocheras naviculare*, A. Hyatt in Eastman's translation of Zittel's "Text-book of Palæontology", vol. i, p. 589, and *Mon. U.S. Geol. Surv.*, vol. xlv, 1903, p. 113.

[* * The following specimens in the National Collection seem to belong to this species, viz.: 5680, Mantell coll., loc. ?; 5681, Mantell coll., Upper Chalk, Offham; 30856-58, Dixon Coll., Sussex.]

The imperfection of Mantell's type-specimen of *Ammonites navicularis*, its assignment by its author to the Upper Chalk, and the poorness of the figure accompanying the author's description, have given rise to various interpretations of the species. Thus Pictet regarded it as an Upper Chalk Ammonite having broad whorls, ornamented with very coarse rounded ribs wider than the interspaces between them, and quite distinct from the specimens which Sowerby and Sharpe subsequently figured under the same name.

Mantell's description¹ of the species is as follows:—

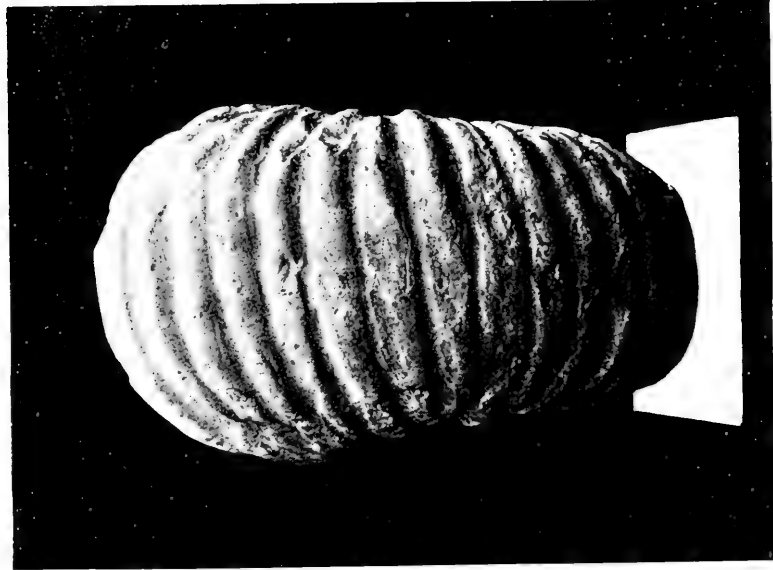
"Elliptical? umbilicate, volutions narrow, compressed, deeply inserted, rapidly enlarging; ambit convex, very broad, transversely costated; costæ numerous, smooth, rounded.

"The specimen figured is the only known example of this species, and this is unfortunately imperfect; it is, however, remarkably characterized by its navicular form, the width of the ambit, large rounded costæ, and sudden increase of the outer volution. The ribs are perfectly smooth, and so numerous, as almost to expand into each other; with but few exceptions, they extend entirely across the ambit, forming a tuberculated margin on each side the wreaths. The form of the septa, aperture, and umbilicus is unknown. The drawing is diminished to one-half the size of the original.

"*Locality*.—Upper Chalk, Offham."

Mantell's figure of the type-specimen is very misleading. The fossil, which is now in the British Museum collection [register number 5681], is very much depressed, having been distorted by pressure; its longest diameter is 149 mm.; many of the ribs are very much worn, but some that are well-preserved show that

¹ G. A. Mantell, *Foss. S. Downs*, 1822, p. 198, pl. xxii, fig. 5. Named by error *A. catinus* in the explanation of the plates.



J. H. Leonard, phot.

Ammonites navicularis, Mantell.

Ventral and lateral views of type-specimen about one-half of the natural size.

originally they were narrowly rounded and of the same width as, or even a little narrower than, the intervening spaces; the ribs are straight, and as a rule alternately longer and shorter, but towards the anterior end of the specimen there are irregularities in this respect. As a rule each longer rib commences at the suture of the shell and, increasing in strength as it passes across the inner area of the whorl, is raised into a more or less prominent compressed tubercle on the umbilical margin, whence the rib passes straight across the broadly-rounded whorls without any indications of tubercles. In one instance one of the longer ribs bifurcates at the tubercle on the umbilical margin, the two divisions being continued thence across the whorl. The earliest part—about the first third—of the outer whorl is very imperfect, nearly one-half of the whorl being broken away, but even here, so far as one can see, there are no traces of a row of tubercles on each margin of the periphery.

The imperfection of the earliest portion of the outer whorl is not clearly shown in Mantell's figure, which, therefore, causes the shell to appear to expand much more rapidly than it actually does. Unfortunately the [septal] sutures are not visible.

Respecting the pit at Offham, where the specimen was found, Mantell writes (op. cit., p. 100): "This excavation lies on the roadside, between Offham and Cooksbridge; it produces *ammonites*, *nautili*, *turrilites*, *scaphites*, etc."

The road from Offham ($1\frac{3}{4}$ miles north-west of Lewes in Sussex) to Cooksbridge, about a mile distant, passes almost due north from Offham, and, according to the map of the Geological Survey, the portion of the Chalk traversed by it is referred to the Lower Chalk only.¹ In neither of the two volumes of the Memoirs of the Geological Survey on the Cretaceous Rocks of Britain, dealing with the Lower and Middle Chalk (vol. ii, 1903) and with the Upper Chalk (vol. iii, 1904) respectively, is there any reference to a chalk-pit on the roadside; but in the volume devoted to the Upper Chalk mention is made of the large quarries south of Offham; these are stated (vol. iii, p. 46) to "exhibit a fine section through the zones of *Micraster cortestudinarium* and *Holaster planus* into the *Terebratulina* zone", and a measured section of the quarries is given. It is also recorded in the same work (p. 47) that "The highest part of the zone of *M. cortestudinarium* appears to be exposed in the upper pit on Offham Hill now disused". There is no record of any pit to the north of Offham.

In 1827 J. de C. Sowerby² figured an example which he referred to Mantell's species, and characterized the species as follows: "Umbilicated, costated; costæ large, numerous, annular, simple; whorls ventricose, very few; the inner ones half exposed; aperture transversely oblong."

¹ The Survey include in the Lower Chalk the zone of *Schloenbachia varians* and the zone of *Holaster subglobosus* (having at its top the marls with *Actinocamax plenus*, that are regarded as constituting a subzone).

² J. de C. Sowerby, Min. Conch., vol. vi, 1827, p. 105, pl. Dlv, fig. 2.

To this description he adds the following remarks:—

“About three whorls, rapidly increasing, compose this Ammonite: all the costæ reach the edge of the umbilicus, half or more of them turn into it, and at the same time are rather enlarged; the costæ and the spaces between them are nearly equal.

“From the lower chalk at Guildford: presented to Mrs. Murchison by Mr. Mantell. It is only half the size of the one figured in the Geology of Sussex, where it is spoken of as a very rare shell.”

It is unfortunate that the precise locality of Sowerby's figured specimen is not recorded, since several zones of the Chalk are represented in the neighbourhood of Guildford. Thus, according to the Memoirs of the Geological Survey on the Cretaceous Rocks of Britain (vol. ii, Lower and Middle Chalk of England, p. 55), a quarry $1\frac{1}{2}$ miles south-east of Guildford exposes Lower Chalk with the Belemnite Marls, whilst in quarries to the west of Guildford the Melbourn Rock (zone of *Rhynchonella cuvieri*) is exposed (vol. ii, Lower and Middle Chalk of England, p. 386). The upper part of the *Terebratulina* zone is seen in the Shalford quarries south of Guildford (vol. ii, Lower and Middle Chalk of England, p. 387), and an old disused quarry, about a mile to the south-east of Guildford, presenting a perpendicular face of about 100 feet, exhibits the succession of the chalk from, and including, the upper part of the *Terebratulina* zone (vol. ii, Lower and Middle Chalk of England, p. 387) “through the zone of *Holaster planus* to the Upper Chalk” (vol. iii, the Upper Chalk of England, p. 175). At Monkshatch, about 5 miles west of Guildford, there is a large disused quarry showing about 42 feet of the *Holaster planus* zone resting upon about 30 feet of the *Terebratulina* zone (vol. iii, the Upper Chalk of England, p. 176), whilst Dr. Barrois thought he recognized the Marsupite zone on the north side of the Hog's Back, near Guildford, in 1876 (*Recherches sur le Terrain Crétacé supérieur*, 1876, p. 139). In the absence, therefore, of precise information as to the pit from which the fossil was obtained, it is not possible to say from what horizon Sowerby's figured specimen came. Further, the present location of this fossil is unknown to the writer, so that an actual comparison with Mantell's type-specimen is not possible.

We think, however, that there is great reason for believing Pictet¹ to be right in considering this specimen as specifically distinct from Mantell's type-specimen. He considered it to be without doubt the adult of a slightly compressed form of Brongniart's *Ammonites gentoni*.²

In his *Description of the Fossil Remains of Mollusca found in the Chalk of England* (Mon. Pal. Soc.), Sharpe figured four specimens (pl. xviii, figs. 1, 2, 3, and 5, and the suture-line fig. 8) as *Ammonites navicularis*. These are now in the British Museum collection. His largest example [B.M. No. 36834], the original of his fig. 1, has

¹ F. J. Pictet, *Mélanges paléontologiques*, vol. i, livr. 1, 1863, p. 33.

² A. Brongniart, *Descr. des environs de Paris*, in Cuvier's *Recherches Ossements foss.*, 4me éd., tom. iv, 1834, p. 150, pl. N, fig. 6).

the following dimensions: diameter of shell, 117 mm. (1); height of outer whorl, 50 mm. (0.43); thickness of outer whorl, about 58 mm. (0.49); width of umbilicus, 35 mm. (0.30). The fossil is fairly well represented (but reversed) of the natural size in his fig. 1. The ribs are alternately longer and shorter; the longer commence at the suture of the shell, cross the inner or umbilical area of the whorl, and increasing in strength form a tubercle at the edge of the umbilicus, and sometimes bear a second tubercle on each side of the whorl at about one-third of the width of the lateral area from this umbilical margin; the shorter ribs rise on the side of the whorl, nearer the umbilicus than the periphery; all the ribs cross the periphery, but are slightly angular or feebly tuberculated at each margin of the periphery, even at the anterior end of the specimen, *i.e.* at a diameter of 117 mm. Between the two tubercles near the umbilical margin the longer ribs are straight and have an almost radial direction or are but feebly reclined, but between the second row of tubercles and the row at the margin of the periphery, both the longer ribs and the intervening shorter ribs have a slight forwardly concave curve, and at a point rather nearer the tubercle at the margin of the periphery than the tubercle in the second row from the umbilicus each rib is angular and feebly raised, and in the earliest part of the outer whorl bears a small but distinct tubercle; all the ribs are straight on the periphery. The ribs are prominent, rounded, and at the commencement of the outer whorl not quite so wide as the interspaces, whilst near the anterior end of the specimen they are only one-half the width of the interspaces. Thus there are differences between this fossil and Mantell's type-specimen, differences which we think must be regarded as of specific value.

The specimen has been labelled "Grey Chalk: Dover". According to the Museum register, the fossil was obtained from Mr. Mackie, but both the horizon and locality of the fossil are unrecorded. Upon the specimen is written in ink (apparently in the handwriting of Daniel Sharpe), "Fig. 1, Pl. 18. Mr. Mackie." Although Sharpe's figure is reversed and a little restored, there can be no doubt about its being the figured example. Sharpe does not specially refer to the fossil in the text of his work, but in the explanation of the plate he states that the specimen is "from the Grey Chalk of White Nore, Dorsetshire" and that it is "in the collection of E. H. Bunbury, Esq." He cites the species as being "common in the Lower Chalk of the South of England".

In the explanation of his figures Sharpe states that the original of fig. 2 came "from the Grey Chalk near Lewes.", and that it was "in the collection of Henry Catt [afterwards Willett], Esq." This collection is now in the Brighton Museum, and in the Catalogue of Types and Figured Specimens in that Museum, published in the Museum Report for the years 1891-2, a specimen in the Willett collection is recorded (p. 16) as the original of Sharpe's figure. Although this specimen, for the loan of which we are indebted to the Chairman and Committee of the Brighton Museum, has been labelled as having been described and figured by Sharpe in "Pal.

Soc., 1856, p. 39, pl. xviii, fig. 2¹”, it is to be observed that it bears an old and very much faded label stating that it came “From the edge of the Chalk [?strata] Sutton Veny . . .” Now Sutton Veny or Veney is in Wiltshire, about three miles south-east of Warminster, whilst Sharpe states that the original came “from the Grey Chalk near Lewes”. Further, the fossil is not only larger than Sharpe’s figure, its greatest diameter being 78·5 mm., but compared with that figure the specimen is somewhat distorted and less inflated, the cross-section of the whorls is less quadrate and relatively narrower, and on each side the limits of the umbilicus are obscured by matrix; whilst the tubercle on each margin of the peripheral area is more obscure. It seems, therefore, very doubtful if this is actually the example figured by Sharpe. More especially so, since there is in the British Museum collection [register number C. 5027] a fossil from the Chalk-marl of Lewes in Sussex, that has been labelled as the original of Sharpe’s fig. 2, and that agrees in form and dimensions with Sharpe’s figure. It is marked in ink (in what is believed to be D. Sharpe’s handwriting, and in the same manner as several other figured specimens), “Fig. 2, Pl. 18.” The fossil shows the dimensions of the umbilicus on each side, but the imperfection of the earliest part of the outer whorl is not indicated in Sharpe’s figure. Still, the specimen agrees so well with the figure on the whole that there appears to be every reason for regarding it as the figured example, rather than the fossil in the Brighton Museum. It has the following dimensions:—Diameter of shell, 59 mm. (1); height of outer whorl, 25·5 mm. (0·46); thickness of outer whorl, 35 mm. (0·59); width of umbilicus, 16 mm. (0·27); and width of periphery between marginal tubercles, 15 mm. (0·25). It agrees very well with the earlier whorls of the original of Sharpe’s fig. 1, but is, if anything, a little more inflated. It shows, however, the same slight curvature of the ribs on the lateral area. The principal ribs commence at the suture of the shell; each bears a tubercle at the umbilical margin, and a second at a short distance therefrom on the lateral area; each is ornamented with a small tubercle at each margin of the periphery, and at about half-way between the row of tubercles at the margin of the periphery and the second (counting from the umbilicus) tubercle on the lateral area each rib is raised into a feeble angular prominence. The tubercles at the margin of the periphery are quite distinct at the anterior end of the specimen. The suture-line is not shown. Although a little more inflated than the original of Sharpe’s fig. 1, this example seems to be specifically identical therewith.

The specimen depicted in Sharpe’s fig. 3¹ is a more compressed shell than the original of his fig. 1. It now forms part of the British Museum collection [register number 50287]; it has the following dimensions, fully one-third of the outer whorl being

¹ The compression of the shell is represented in fig. 3a, but is not so well indicated in fig. 3b.

occupied by the body-chamber:—Diameter of shell, 66 mm. (1); height of outer whorl, 29 mm. (0.44); thickness of outer whorl, 32 mm. (0.48); width of umbilicus, 18 mm. (0.27). The ribs are as a rule alternately longer and shorter, but there is some irregularity in this respect, there being sometimes two smaller ones interpolated between a pair of longer ribs; the ribs have a nearly radial direction, they are straight up to a point about two-thirds of the width of the lateral area from the umbilical margin, where they bend feebly forward as far as the margin of the periphery, and then pass straight across the latter. In passing up the inner area of the whorl each longer rib gradually increases in strength up to the umbilical margin, where it is raised into a distinct elongated compressed tubercle; each of these ribs, therefore, lacks the distinct bituberculate character of the longer ribs on the originals of Sharpe's figs. 1 and 2. Up to a diameter of about 57 mm. each rib is slightly angular at the margin of the periphery, but cannot be described as tuberculated; beyond this diameter the angularity gradually disappears. At a point nearly in the middle of the lateral area, but a little nearer the periphery than the umbilical margin, each rib is also slightly angular up to about the same diameter, the angularity being more distinct and elevated, and even amounting almost to a tubercle, on the younger portion of the outer whorl. The inner whorls are not displayed.

The specimen is from the Lower Chalk of Chardstock, Somerset, and was formerly in the collection of Professor John Morris. It is marked in ink (apparently in the handwriting of Daniel Sharpe). "Chardstock, J. Morris, Pl. 18, Figs. 3*a* and *b*," and there can be no doubt whatever about its being the figured specimen.

The original of Sharpe's fig. 5*a* has the following dimensions:—Diameter of shell, 40 mm. (1); height of outer whorl, 17 mm. (0.42); thickness of outer whorl, 21 mm. (0.52); and width of umbilicus, 12 mm. (0.30). It is an entirely septate specimen with thirty-one ribs in the outer whorl. As a rule the ribs are alternately longer and shorter; the longer arise from the suture of the shell and increasing in strength as they cross the inner area (or umbilical wall) of the whorl are raised at the umbilical margin into a prominent compressed tubercle, thence each rib has an almost radial direction as far as the middle of the lateral area, where each rib is raised into a transversely compressed tubercle, the rib then turning slightly forward and crossing the periphery in a feeble forwardly-convex curve. Near the commencement of the outer whorl, *i.e.* where the shell has a diameter of about 17 mm., the row of tubercles on each margin of the periphery and the median row of tubercles gradually disappear, as shown in Sharpe's fig. 5*b*, but better still in the view of the inner whorls represented in his fig. 5*c*. Beyond this point there is on either margin of the periphery only a very feeble angularity, which soon disappears. Unfortunately the inner whorls of the original of his fig. 3 are not shown, but so far as can be seen the original of his fig. 5 closely resembles that specimen, but differs in having slightly more inflated whorls, a little coarser ornamentation, with

a few of the larger ribs more prominent than the rest and provided with relatively larger tubercles at the middle of the lateral area.

This specimen is also from the Lower Chalk of Chardstock, Somerset, and formerly belonged to the collection of Professor John Morris. To it is attached a small white label marked in ink (in apparently the handwriting of Daniel Sharpe), "Pl. 18, Fig. 5." Although reversed and a little restored, Sharpe's figure has undoubtedly been taken from this fossil.

Whether Sharpe's specimens are correctly referred to Mantell's species, and also whether they are belong to one and the same species, there is some reason to doubt. Probably the originals of his figs. 1 and 2 are specifically identical, whilst the original of his fig. 5 may be the inner whorls of a somewhat more spiny and rather more coarsely-ornamented example of the form represented in his fig. 3.

ON A SANDSTONE CAST OF *ATURIA ATURI* (BASTEROT), FROM
THE MIOCENE OF WESTERN AUSTRALIA.

By R. BULLEN NEWTON, F.G.S.

Read 13th June, 1919.

(Published by permission of the Trustees of the British Museum.)

PLATES V AND VI.

ON account of its wide geographical distribution and its restriction to Miocene seas, *Aturia aturi* ranks as one of the most interesting Cephalopods of Tertiary times.

The specimen forming the subject of this notice was collected some years ago by Mr. Harry W. Field in the vicinity of Albany, Western Australia, during a prospecting survey for coal. It was found as a natural cast in a sandstone deposit, accompanied by some other fossils, similarly preserved and determinable, as *Rostellaria*, *Glycymeris* cf. *laticostatus* (Quoy & Gaimard), and a *Pecten*, besides Echinoid remains which Dr. F. A. Bather recognizes as belonging to either *Linthia* or *Schizaster*.

ATURIA ATURI (Basterot).¹

Nautilite de Dax, Montfort, "Suite à Buffon" (Hist. Nat. Moll., An. x), vol. iv, 1802, p. 240, pl. xlvii, fig. 1.

Nautilus aturi, Basterot, Mém. Soc. Hist. Nat. Paris, vol. ii, pt. i, 1825, p. 17; Bronn, *Lethæa Geognostica*, vol. ii, 1838, pp. 1122-3, pl. xlii, fig. 17.

— *zigzag*, Forbes, Proc. Geol. Soc. London, vol. iv, 1844, pp. 230-1.

Aturia aturi, Bronn, *Lethæa Geognostica*, vol. iii, 1856, p. 595.

¹ For a fuller synonymy of this species previous to 1890 see Dr. A. H. Foord's *Catalogue of the Fossil Cephalopoda in the British Museum (Natural History)*, pt. ii, pp. 351, 352, 1891, dealing with European forms.

- Nautilus ziczac*, J. E. [Tenison] Woods, "Geological Observations in South Australia," 1862, p. 83, text-figure.
- Aturia australis*, McCoy, Ann. Mag. Nat. Hist., ser. III, vol. XX, 1867, pp. 191-2.
- *aturi*, Bellardi, Moll. Terz. Piemonte, vol. I, 1872, pp. 23-4; Hoernes, Jahrb. Geol. Reichs., vol. XXV, 1875, p. 344, pl. XII, figs. 5, 6.
- *ziczac* (Sowerby, sp.), var. *australis*, McCoy, Prod. Pal. Victoria, Geol. Surv. Victoria, dec. III, 1876, pp. 21-2, pl. XXIV, figs. 1-5.
- Nautilus (Aturia) aturi*, Fuchs, Sitz. k. Akad. Wiss. Wien, vol. LXXIII, 1876, p. 68, pl. I, figs. 8, 9.
- Aturia ziczac*, Johnston, Geology of Tasmania, 1888, p. 261.
- *aturi* and var. *australis*, Foord, Cat. Foss. Cephalopoda Brit. Mus. (Nat. Hist), 1891, pt. II, pp. 351-5.
- cf. *aturi*, Mörnicke, Neues Jahrb., Beil.-Bd. X, 1896, p. 553.
- *australis*, Dennant & Kitson, Rec. Geol. Surv. Victoria, vol. I, 1903, p. 94.
- *aturi*, Sacco, Moll. Terz. Piemonte, vol. XXX, 1904, pp. 6-7, pl. I, figs. 15-18, pl. II, figs. 1-3.
- *ziczac*, var. *australis*, Hamilton, Trans. New Zealand Inst., vol. XXXVI, 1904, p. 466, pls. XXXVII and XXXVIII.
- cf. *aturi*, Lemoine, Etudes Géol. Nord Madagascar, 1906, p. 267.
- *australis*, Chapman, Mem. Nat. Mus. Melbourne, No. 5, 1914, p. 15.
- *aturi*, R. B. Newton, 84th Rept. Brit. Assoc. Australia, 1914 (1915), p. 375.
- *australis*, Chapman, Proc. R. Soc. Victoria, n.s., vol. XXVII, 1915, pp. 351-53, pl. III, fig. 2.
- *australis*, Jutson & Simpson, Ann. Progr. Rept. [1915] Geol. Surv. W. Australia, 1916, p. 124.
- *aturi*, Fourtau, Rep. Geol. Surv. Dept. Egypt, 1916, p. 94, pl. XI, fig. 7.

The fossil consists of a natural cast in a yellowish sandstone of a completely involute shell, thus resembling the *Nautilus* of modern seas.

It exhibits the contour of an almost complete body-whorl with an imperfect septal region, which on one side shows some effects of crushing during the process of fossilization. It belonged to a shell that was discoid, flattened, narrowly rounded at the periphery, and possessed an aperture of greater height than width. The marginal sides of the aperture just above the central region have a slightly elevated curvature beneath a shallow area of excavation containing the umbilical centre. The body-chamber is extensive, its height being about one-third in excess of the width measurement, while the central lateral region is depressed until the deeply sloping curvature is reached, which leads to the rounded peripheral margin.

The septal region is so imperfect that only one or two septa immediately contiguous to the body-chamber are preserved, although they possess the strongly curved sutures, characteristic of the genus *Aturia*, while one of the angular lateral lobes is distinctly marked

by an inverted V-shaped line directed obliquely outwards to the shell-wall. It is unfortunate that through bad preservation there is no evidence of the large invaginated siphuncle. The testiferous structure which once covered the cast must have been extremely thin, as the finely semicircular surface striations are very distinct, being closely arranged, regular, and parallel with the rounded margin of the aperture; certain growth periods appear to be also represented by a few more or less obscure, distant, and strongly curved ridges. There is besides what is supposed to be an impression of the annular band, which would indicate the position of the shell-muscle by which the animal was attached. It is represented by two parallel, nearly contiguous, curved lines, which bend over to the umbilical centre in front, and in the other direction pursues an obliquely downward course to the periphery, differing from the true *Nautilus*, which shows a similar marking but of greater elevation and more ovally arched. Some distance below, another line can be traced which is more or less parallel with the upper curvature marking, while the space between would represent the area of attachment of the shell-muscle. Still further down, there appear to be traces of the septal band, which takes a sinuous course across the body-chamber.

According to the terminology adopted by Mr. L. E. Griffin¹ in connexion with muscle-markings on the inner surface of the body-chamber of the recent *Nautilus*, it is stated that there are three "aponeurotic bands" extending from the deeply arched attachment area of the shell-muscle, viz. one dorsal connecting with the surface of the central chambered region, and two ventral, the upper of which is known as the "anterior ventral aponeurotic band", while a distant lower one is named the "posterior ventral aponeurotic band", both being directed across from the umbilical wall to the inner surface of the peripheral region. It would seem, therefore, that the terms "annular" and "septal" bands formerly in use for specifying these muscle-markings should now be superseded by regarding them as "aponeurotic" bands, which refers to the membrane surrounding the muscular organs.

Our lately deceased member, Mr. G. C. Crick,² carried out some valuable researches on the muscle-markings observed in the Ammonoid group of the Cephalopoda, which have been of wide interest. The reference on the present occasion to corresponding markings in the genus *Aturia* appears to be made for the first time.

The less complete lateral aspect of this fossil discloses a large cavity near the peripheral margin of the upper part of the body-chamber and well below its surface, containing what appears to resemble a depressed sub-oval Ostreiform valve with evidence of

¹ "The Anatomy of *Nautilus pompilius*": Mem. Nat. Acad. Sci. (Washington), vol. viii, 1900, p. 151, pl. i.

² "On the Muscular Attachment of the Animal to its Shell in some Fossil Cephalopoda (Ammonoidea)": Trans. Linn. Soc. London, ser. II, Zoology, vol. vii, 1898, pp. 71-113, pls. xvii-xx.

concentrically laminate structure. On account of its shape and position, there is also the suggestion that this supposed valve may be the remnants of the hood of the Cephalopod, which, according to Owen¹ with regard to *Nautilus*, is a "ligamento-muscular disc that surmounts the head". This Nautiloid was long considered to belong to *Aturia ziczac* (Sowerby) of Eocene times, although, as pointed out by Dr. Foord and other palæontologists, the two species are quite distinct, *Aturia aturi* being a much more compressed shell and possessing a more elongate aperture.

| <i>Dimensions of specimen</i> :— | mm. |
|---|------------------------------|
| Height (total) | 182 (= 7 $\frac{1}{5}$ in.). |
| Width of body-whorl (maximum) | 118 |
| Width from umbilicus to periphery | 93 |
| Depth near septal region | 40 |
| Maximum width of aperture (approximate) | 55 |

HISTORY AND STRATIGRAPHY OF THE SPECIES.

Messrs. Jutson and Simpson may claim to have first recorded this fossil from Western Australia, and determined it as *Aturia australis* in 1915. They obtained it from the north-east of Albany, where probably Mr. Field's specimen was found, in "marine beds forming a low plateau" which they termed the "Plantagenet Beds"; it was associated with Mollusca, Bryozoa, Echinoids, and an abundance of siliceous Sponges.² No figure or description was given of their specimen, although the authors mentioned that the species was known in the Tertiaries of Victoria, where it extended from the Oligocene to the Pliocene formations. This is probably the first reliable determination of a Tertiary mollusc from Western Australia, their usually imperfect preservation having hitherto militated against the compilation of accurate specific lists from which to obtain a knowledge of faunistic assemblages, a fact which has been remarked upon by Mr. L. Glauert³ as late as 1910. In this way they form a striking contrast to fossils found in the Victorian and South Australian Tertiaries, which are of prolific occurrence and usually in a fine state of preservation. The presence of this organism in Australian rocks was, however, first indicated by J. E. Tenison-Woods, whose brief description of the same was accompanied by an excellent text-figure of a cast showing the septal region, but with no body-whorl. It was referred to as the most predominant fossil of the Mount Gambier beds of South Australia, although its determination was mistaken for *Nautilus ziczac* of J. Sowerby,

¹ Richard Owen, *Memoir on the Pearly Nautilus*, 1832, pp. 11, 12, pl. i, fig. n; pl. ii, fig. h.

² These sponges are probably similar to those found at Norseman in Western Australia, described by Dr. Hinde (Bull. Geol. Surv. W. Australia, 1910, No. 36, pp. 7-21, pls. i-iii), which Mr. Chapman considers, "in some respects," to resemble the spicule-bearing rock of Oamaru in New Zealand, which is of Miocene age (*Australasian Fossils*, 1914, p. 110).

³ Bull. 36, Geol. Surv. W. Australia, 1910, p. 71.

a species of *Aturia* common to the older Eocenes of Britain, Europe, etc.

McCoy next referred to the fossil as it occurred in Victoria under the new name of *A. australis*, and regarded its stratigraphical position as Lower Miocene, the deposits showing a resemblance to the Faluns of Touraine, as well as to the beds of Bordeaux and Malta.

The results of a more complete study of Victorian specimens were subsequently published by McCoy, giving excellent figures and a full description. On this occasion the name was altered to *A. ziczac* (Sowerby, sp.) var. *australis*, with an acknowledgment, however, of its close affinity to *A. aturi* from the Miocene of France. Its geological distribution in the Victorian Tertiaries was considered to be from Oligocene to the Lower Pliocene, although mentioned as of rare occurrence in the last-named formation.

It was pointed out by the present writer¹ in 1915 that the *A. australis* presented no differences of importance from the true *A. aturi* of Europe, and therefore it should be known under the latter name, a view which was fully confirmed in a verbal statement by the late Mr. G. C. Crick.

The species has been also recorded from the Table Cape Beds of Tasmania, where it was first recognized by R. M. Johnston under the name of *A. ziczac*, while all authorities are agreed that it occurs as well in the Oamaru deposits of New Zealand.

In connexion with the New Zealand occurrence, it is of interest to mention that Mr. A. Hamilton² has reported a very large example of this shell, measuring 16 inches in diameter, from some calcareous greensands of the Waitaki River Valley, North Otago, which was determined as *A. ziczac* var. *australis*, while zeuglodont remains, *Kekenodon onamata*, Hector, were found in association. Both of these fossils form part of the fauna of the Oamaru deposits which are considered to be equivalent in age to the Janjukian rocks of Victoria; so that the Waitaki River Valley beds may be accurately regarded as Miocene, more especially as Professor Park³ brackets them with the Oamaru formation, which is Lower Miocene. According to Messrs. Dennant & Kitson's⁴ catalogue of Cainozoic Fossils of Victoria, South Australia, and Tasmania, this Cephalopod has been recognized from the following localities:—

Victoria: Birrurra Creek, Muddy Creek, Gellibrand River, Birrurra, Lower Moorabool, Mornington, Mitchell River, Spring Creek, Beaumaris, Royal Park Moone Ponds, and Apsley.

South Australia: Mount Gambier.

Tasmania: Table Cape.

The New Zealand occurrences, taken from Professor Park's work, already quoted, are as follows: Oamaru, Waitaki River Valley, Waihao, and Kakanui, all these localities being in the South Island.

¹ R. B. Newton, Report 84th Meeting British Assoc. Australia for 1914. Published 1915, p. 375.

² Trans. New Zealand Inst., vol. xxxvi, 1904, p. 466, pls. xxxvii, xxxviii.

³ *The Geology of New Zealand*, 1910, p. 114.

⁴ Record Geol. Surv. Victoria, vol. i, 1903, p. 94.

The distribution of this Cephalopod in other countries may next be considered.

In 1825, under the name of *Nautilus aturi*, Basterot first described the shell from the Dax¹ beds of South-Western France, founding his description on Montfort's old figure of *Nautilite de Dax* published in 1802. These so-called Dax beds are of Lower Miocene age, having been regarded as Burdigalian by De Lapparent² and by Haug³ as Aquitanian. Bronn⁴ established the generic name of *Aturia* in 1838 on Basterot's species, but failed to properly unite the two names of *Aturia aturi* until 1856.

Excellent examples of the species have been described and figured from the Italian Tertiaries by Dr. Sacco, who gives its geological range as from Aquitanian to Helvetian.

Austrian specimens of *A. aturi* have been figured by Hoernes from the "Schlier" deposits of Ottnang, which are recognized as of Vindobonian (= Helvetian) age and equivalent to the "Tegel" of Malta.

Its occurrence in the Island of Malta was first referred to by Forbes in 1844 as *Nautilus zigzag*, and although regarding it as identical with the London Clay fossil, he was of opinion that it belonged to the Miocene period on account of the Maltese deposits bearing a resemblance to those of the South of France and Northern Italy.

Subsequently Fuchs figured the shell from Malta as *Nautilus (Aturia) aturi*, from the so-called "Badner Tegel", which is equivalent to the "Schlier" of Austria, and therefore belonging to the Vindobonian (Helvetian) division of the Miocene.

M. Lemoine has identified the species from Madagascar as *Aturia cf. aturi*, in older Miocene rocks which he attributes to the Aquitanian stage of that period.

Fairly recently, M. Fourtau has made known its occurrence in the Burdigalian Beds of Egypt, which belong to the Lower Miocene.

Found also in South America (Chili), and determined as *Aturia cf. aturi*, it has been reported by Dr. Mörücke from the Navidad deposits, which are considered equivalent to the Patagonian Formation, and hence, according to Dr. Ortmann,⁵ may be referred to the Lower Miocene.

So far as can be ascertained, therefore, *Aturia aturi* belongs entirely to the Miocene period, and it is only in Australia that it is said to extend to Pliocene times, having been found in the Beaumaris Beds of the so-called Kalimnan division of the Tertiaries

¹ It should be understood here that at Dax itself there are no Miocene deposits; they really occur at St. Paul de Dax, which is about 1½ miles from the village of Dax, where the beds abound in shells and other organic remains of Miocene age.

² *Traité de Géologie*, 5th ed., 1906, p. 1600.

³ *Traité de Géologie*, vol. ii, 1911, pt. iii, p. 1612.

⁴ *Lethæa Geognostica*, vol. ii, 1838, pp. 1122, 1123, and vol. iii, 1856, p. 595.

⁵ Reports of the Princeton University Expeditions to Patagonia, 1896-9, vol. iv, pt. ii, 1902, p. 303.

which McCoy identified as Lower Pliocene, an age which has been since adopted by Mr. F. Chapman for those beds, although it is only right to mention that the Kalimnan deposits were formerly regarded as Miocene by Messrs. Tate & Dennant¹ and Hall & Pritchard.² One of the most important members of the Kalimnan fauna is undoubtedly that of *Scaldicetus maceyi*, described by Mr. Chapman³ in 1912. That genus, belonging to the Sperm Whale group of Cetaceans, was originally discovered in the "Crag Noir" Beds of Belgium (Borgerhout), which are recognized as belonging to the Anversian⁴ or uppermost Miocene, sometimes called Pontian or Messinian. The association also in the Kalimnan Beds of *Carcharodon megalodon*, the well-known Selachian fish of Miocene origin, adds to the assemblage, and certainly seems to suggest that those deposits may be Miocene rather than Pliocene. With regard to the presence of Oligocene in Victoria, first suggested by McCoy, the writer is still of opinion that such beds containing no Nummulites, but numerous *Amphistegina* and *Lepidocyclina*, belong to the oldest Miocene, which in Europe are included in the Aquitanian and Burdigalian stages of that period. This Cephalopod, therefore, occurs in each division of the Victorian Tertiaries, known as Kalimnan, Janjukian, and Balcombian, the last named being the oldest. The foraminiferal evidence worked out by Mr. Chapman furnishes complete data that the Balcombian division is homotaxially equivalent to the Aquitanian and the Janjukian to the Burdigalian, both of which groups form the basal stages of the European Miocene. The Kalimnan series, therefore, may represent the latest phase of the Miocene in Australia, and comparable to the Pontian or Messinian of Europe.

Distribution of *Aturia aturi*.

| MIOCENE. | | |
|--------------------------------------|---|--|
| EUROPEAN STAGES. | } | Probably Kalimnan Series of Southern Australia, hitherto regarded as Lower Pliocene. |
| Messinian or Pontian | | |
| Vindobonian (Helvetian-Tortonian) | | Austria and Malta. |
| Burdigalian and Aquitanian | } | Western Australia (Plantagenet Beds); Southern Australia (Janjukian and Balcombian Series); Tasmania (Table Cape Beds); New Zealand (Oamaru Beds); South America (Navidad Beds of Chili); Madagascar; Egypt; France and Italy. |

In offering these remarks on the correlation of the Australian Tertiaries, the author wishes to acknowledge his indebtedness to

¹ Trans. R. Soc. S. Australia, vol. xvii, 1893, p. 216.

² Proc. R. Soc. Victoria, vol. xiv, N.S., 1902, pp. 75-81.

³ Rec. Geol. Surv. Victoria, vol. iii, 1912, pp. 236-8, pl. xl.

⁴ See Van den Broeck, Ann. Soc. Mal. Belgique, vol. ix, 1874, p. 151.





P. Dollman phot.

Aturia aturi (Basterot).

R. B. Newton direr.

Miocene : Western Australia. [$\frac{5}{8}$ nat. size.]



P. Dollman phot.

H. B. Newton direz.

Aturia aturi (Basterot).
Miocene: Western Australia. [$\frac{5}{8}$ nat. size.]

Mr. Chapman's¹ comprehensive memoir on that subject, published in Melbourne during 1914.

EXPLANATION OF PLATES V AND VI.

The figures are photographed $\frac{5}{8}$ nat. size.

ATURIA ATURI (Basterot).

Miocene : Western Australia.

The specimen described is in the Geological Department of the British Museum.

PLATE V.

Lateral view of specimen :—

- A = Body-chamber with nearly complete outline.
- B = Probable muscular impression extending from the umbilical centre to the periphery.
- C = Lower boundary of probable muscular attachment region obscurely indicated.
- D = Septal muscular impression.
- E = Incomplete septal region with the deeply curved septa.

PLATE VI.

Opposite lateral view of same specimen.

- A = Body-chamber.
- B = Ramifying tubes of Annelida.
- C = Incomplete septal region.
- D = The angulated lateral lobe of a septum.
- E = Probable Ostreiform valve in cavity at the top of the body-chamber, also suggestive of a portion of the hard ligamentous hood which would formerly have covered the cephalic region.

¹ "On the Succession and Homotaxial Relationships of the Australian Cainozoic System" : Mem. Nat. Mus. Melbourne, No. 5, 1914, pp. 5-52.

THE MOLLUSCA OF MARSASCIROCCO HARBOUR, MALTA.

By G. DESPOTT.

Read 13th June, 1919.

IN nearly all the published lists of the Maltese Marine Mollusca no locality is given for the majority of the species enumerated, notwithstanding that locality is one of the most important points in a faunistic list.

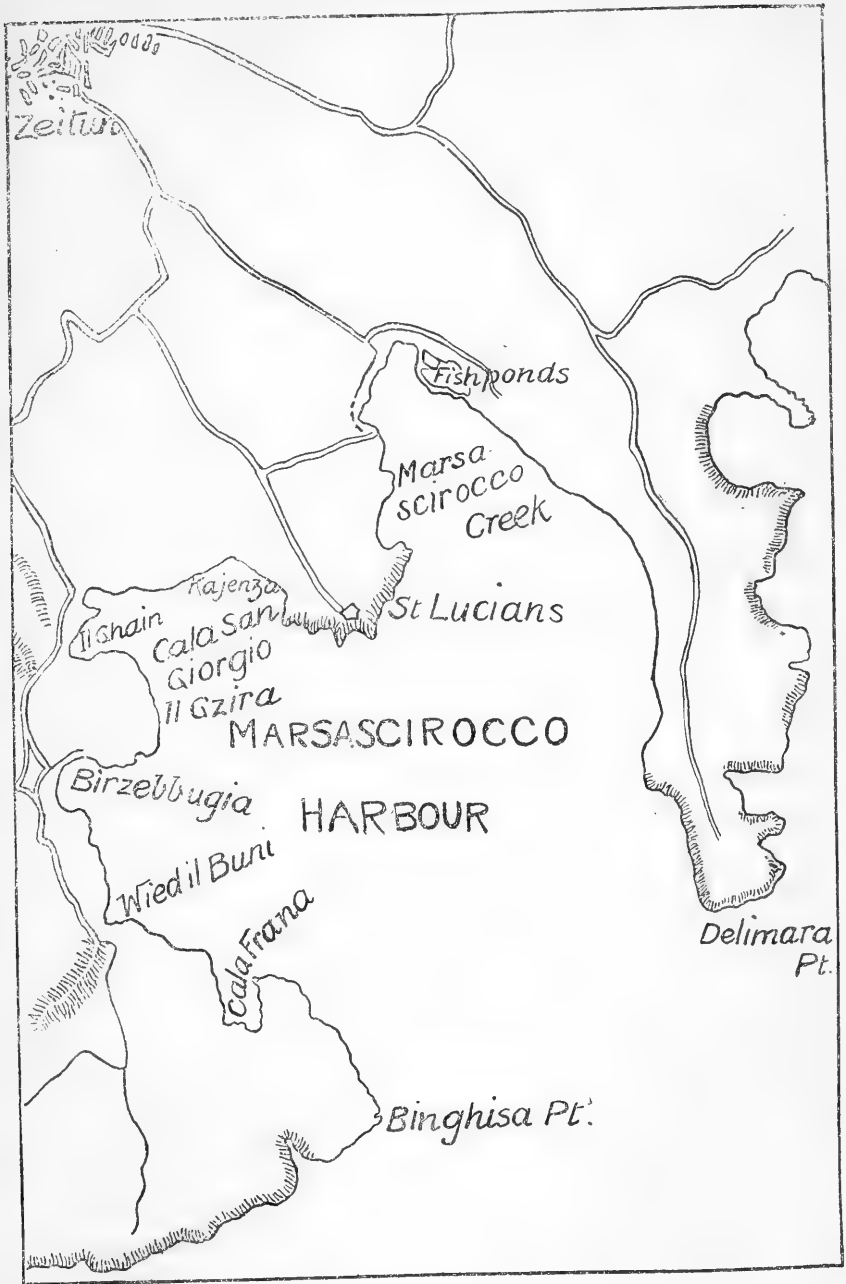
McAndrew published two lists of species obtained by him in these waters in the Report of the British Association for 1850. For the species enumerated in the first list, with the quantity of the specimens obtained, he gives as a locality "A ground of sand and stones at a depth of 40 fathoms 1 to 2 miles distant from the shore". For the species on the second list, the locality given is simply "a sandy bottom 6 to 12 and 15 fathoms deep in the harbour of Malta", while the frequency of occurrence is given for only two or three of the species recorded.

In Mamo's list, compiled by the late Dr. A. A. Caruana, the locality is given in only a few cases. Such localities, however, as well as several other statements made in this list, appear now to be somewhat incorrect; this, nevertheless, may probably be due to the great change which has taken place in some parts of our harbours since Dr. Caruana published his list.

Similarly, the locality of only a few species is given in Benoit and Gulia's list published in *Il Barth* of 1872, and the frequency of occurrence of some of the species recorded has, we find, varied immensely.

Up to the year 1912 I entertained doubts about many of the statements made in the above-mentioned publications, and in many cases could not agree with my friend the Contino Dr. A. Caruana Gatto, who is undoubtedly one of our most accurate and reliable naturalists (and to whom I am much indebted for help in malacology). As to the frequency of occurrence of several species of mollusca in our waters, many of the species which he considered common were according to my experience rare; and, on the other hand, I had collected a considerable number of other species which he considered rare. Such a difference of opinion was, however, mainly due to the fact that we had investigated different localities. Till that time I had limited my dredgings to the harbour of Marsascirocco, whence since 1896 my specimens had been for the most part collected; whilst Dr. Caruana Gatto and the late Dr. J. S. Galizia had carried out their researches in the Grand and Marsamusetto Harbours.

Such a marked difference having then been observed in connection with the frequency of occurrence of a good number of species, which difference was evidently due to the diversity of their collection in either time or locality, or probably both, and knowing moreover that the various works which are being continually carried out in several harbours must necessarily affect some of the species



Plan of Marsascirocco Harbour. \propto Scale $\frac{1}{2}$ inch = 1 mile.

inhabiting those localities, I thought that the results of my researches which have been carried on systematically for the last six years would be of some interest, especially to future investigators, in this class of our marine fauna. I therefore begin by giving a list of the species found by me in the locality where my first researches were made, namely Marsascirocco Harbour.

This harbour faces the south-east. It extends more than $1\frac{1}{2}$ miles inland, whilst its breadth is about 2 miles. The greatest depth is about 16 fathoms. The bottom varies considerably, the coast is more or less deeply indented, forming several beautiful inlets, so that a short description will be of some interest.

Leaving Delimara Point, which is the extremity on the right-hand side, we enter the creek of Marsascirocco, a fishermen's village from which the whole harbour takes its name. This creek is about one mile long and about half a mile broad. Its bottom is for the greater part weedy, its innermost part being muddy. In the fish-ponds which exist on the right-hand side *Rissoa fusca*, *R. micrometrica*, and *Cerithium conicum* are found in myriads, and *Cardium rusticum*, which is very abundant in the muddy bottom of the creek, grows to an exceptionally large size within these ponds.

The next inlet is Cala San Giorgio, or San Giorgio a Mare, with its innermost portion commonly called "Il Ghain". This double depression of the coast is separated from the creek of Marsascirocco by a tongue of land, at the end of which is the promontory of St. Lucian. *Cyprea lurida* is rather frequently found on the shore below this promontory.

The bottom of the outer part of Cala San Giorgio is mostly muddy and weedy, the shallow parts and the beach being covered with a very fine sand. *Capsa fragilis* once occurred in great abundance here, but now not even its valves are to be met with. *Tellina planata*, though rather scarce, is still obtainable in this sandy bottom, and after strong sciroccos its valves can be picked up on the sandy beach.

The bottom of "Il Ghain" is either muddy or shingly. *Capsa fragilis* was also once common to this locality, though only its valves are now noticeable. According to the older fishermen two species of *Tapes* were also common in this bottom; of these, however, there is not the faintest sign at present. *Cerithium lima* is in some years found in countless numbers in some weedy patches in this locality, but in other years it somehow seems to disappear altogether. A broad tongue of land called "Il Gzira" divides "Il Ghain" from the next bay, known as Birzebbugia, the finest bay of Marsascirocco Harbour and a very popular summer resort. The bottom of this place is composed of the finest silvery sand to be seen in these islands. In it *Mactra stultorum* is generally found in good numbers. *Tellina planata* is also frequent, while *Venus gallina* and one or two species of *Donax* have been known to occur also plentifully during some years. *Nassa mutabilis* is procurable in fairly large numbers from this sandy bottom; the majority of the specimens, however, though generally in fine condition, are dead, and mostly inhabited by

a peculiar hermit crab. *Fissurella græca* was for two consecutive years (1912-13) common along the rocky portion of the beach of Birzebbugia, but is now very rarely met with, and *Mytilus minimus*, which once literally covered the rocky shore, appears to be almost extinct.

Leaving Birzebbugia, after passing a straight and almost regular rocky coast about a quarter of a mile long known locally as "Is-Salini" (the salt-pans), we come to Wied il Buni. The nature of the bottom here varies also considerably. In some parts it is shingly or muddy, in others rocky or weedy, whilst its innermost portion is encumbered with boulders of various sizes, mostly embedded in patches of small pebbles and sand. Here dead specimens of *Trochus adansonii* can be collected in fair numbers, and with them shells of *Gibbula nirosa* are also frequent. *Bornia corbuloides*, too, during some years is found in fair numbers adhering to the larger pebbles; and amongst the weeds in the deeper portion of this inlet *Pinna nobilis* is common. Beyond Wied il Buni there is another straight rocky beach equal in length to the one from Birzebbugia to Wied il Buni. This beach, however, has been lately converted into a wharf. Along this part of the coast *Murex edwardsii* and *Pisania maculosa* used to be found in large numbers, with *Trochus turbinatus*, *T. articulatus*, and *T. divaricatus*.

At the end of this tract there is the once beautiful cove of Cala Frana, which has unfortunately been so modified that it cannot be called beautiful any more. The character of the bottom of this little bay is also varied, but for the greater part it is sandy and weedy. Here *Solemya togata* was rather common, but now it is very probably extinct. Valves of *Tapes nitens* were also obtained here in large numbers, showing that the species used to be common enough.

Next to Cala Frana comes another tract of rocky coast, which, running down to the left end of the harbour, is known as Binghisa Point. Along this shore *Fasciolaria lignaria* is generally common, and *Purpura hæmastoma* is frequently met with.

The list of the species of Mollusca which have been met with in Marsascirocco Harbour is as follows:—

1. *Anomia ephippium*, L. Not common, found attached to stones, shells, and other objects dredged from various depths.
2. *Anomia patelliformis*, L. Very scarce; its valves are occasionally found in shingly corners.
3. *Ostrea lamellosa*, Brocc. Valves are occasionally found along the beach; the species, however, is undoubtedly rare in the locality.
4. *Spondylus gæderopus*, L. Very rare. I have only met with this species twice in the living state; its valves, however, are more or less frequently dredged on gravelly bottoms, and are also occasionally found on the sandy beaches.
5. *Pecten varius*, L. Some valves have been obtained from a shingly and sandy bottom, 8 to 10 fathoms. I have not yet met with a single living specimen.

6. *Pecten opercularis*, L. A pair of dead but very perfect valves have been obtained from a shingly bottom about 8 fathoms deep.
7. *Pecten pes-felis*, L. Dredged some dead specimens and valves on a shingly bottom 6 to 8 fathoms.
8. *Pecten flexuosus*, Poli. Dredged four specimens and a few valves on various bottoms, at a depth of 5 to 10 fathoms.
9. *Pecten glaber*, L. A few valves dredged on a sandy bottom about 10 fathoms.
10. *Pecten bruei*, Payr. One live specimen dredged on a weedy bottom about 10 fathoms and several valves on a sandy bottom at a depth of 6 to 8 fathoms.
11. *Pecten hyalinus*, Poli. Many valves dredged on a sandy bottom 6 to 10 fathoms.
12. *Pecten testæ*, Biv. Two specimens from a weedy bottom at a depth of 6 to 8 fathoms, a few valves dredged on a sandy bottom in Cala Frana.
13. *Pecten jacobæus*, L. Valves are pretty common in various sandy bottoms, 5 to 12 fathoms.
14. *Lima squamosa*, Lamk. Few valves obtained from several sandy bottoms at various depths.
15. *Lima inflata*, Chemn. Some valves obtained from the same localities as the foregoing.
16. *Lima lions*, Gmel. An odd valve is every now and then met with along the sandy beach of Birzebbugia and Cala San Giorgio, or in shingly corners.
17. *Lima subauriculata*, Mont. A live specimen dredged on a weedy bottom about 8 fathoms, and one valve picked up on the sandy beach at Birzebbugia.
18. *Avicula tarentina*, Lamk. Valves are occasionally cast on the sandy beach of Birzebbugia.
19. *Meleagrina savignyi*, Montr. Two small and very imperfect valves picked up on the beach at Birzebbugia, and another, worn, found in a shingly corner at "Il Gzira".
20. *Pinna nobilis*, L. This species commonly occurs on several sandy and weedy bottoms and ranges from 2 to 7 fathoms.
21. *Pinna rudis*, Lamk. A fragment of a valve dredged on a sandy bottom about 7 fathoms.
22. *Mytilus minimus*, Poli. Until a few years ago this species was produced in great profusion almost all along the coast of this harbour; at present, however, it is rather scarce and in many points where it was once abundant not a single specimen is now to be found.
23. *Mytilus crispus*, Cantr. Some valves obtained from sandy and shingly bottoms 6 to 10 fathoms in depth.
24. *Modiola barbata*, L. Very rare, only three or four specimens obtained.
25. *Lithophaga lithophaga*, L. Frequent, but not common. The specimens from this locality never attain the size of those obtained in the Grand Harbour.

26. *Nucula nucleus*, L. Frequently dredged on various bottoms and at various depths.
27. *Pectunculus glycymeris*, L. Rare; live specimens have been obtained on a shingly bottom near Cala Frana at a depth of 4 to 6 fathoms.
28. *Arca diluvii*, Lamk. Three live specimens obtained from a weedy bottom about 8 fathoms, and a few valves found in shingly corners at "Il Gzira".
29. *Arca lactea*, L. Rare; valves are very occasionally found with the shingle.
30. *Arca barbata*, L. Live specimens are only occasionally met with, but valves are generally found in considerable numbers, especially in pebbly portions of the beach.
31. *Arca tetragona*, Poli. Two specimens obtained in dredging weedy bottoms, 5 and 9 fathoms.
32. *Arca noæ*, L. Valves are pretty common on the beach; live specimens, however, are only very occasionally met with.
33. *Solemya togata*, Poly. In the weedy portions of Cala Frana this species used to be produced in fairly good numbers.
34. *Lasæa rubra*, Mont. Gregarious in fissures about waterline, but it is only met with by mere chance.
36. *Bornia corbuloides*, Phil. Frequent but not common, it is generally found attached to stones and pebbles, especially in the inlet of Wied il Buni.
37. *Lucina leucoma*, Turt. Valves are generally abundant on the sandy beach of Birzebbugia and Cala San Giorgio. In the living state, however, this species is rather difficult to procure.
38. *Lucina reticulata*, Poli. Frequent, but by no means common, and live specimens are usually very hard to get.
39. *Diplodonta rotundata*, Mont. Valves are very occasionally found with the sand and shingle.
40. *Diplodonta apicalis*, Phil. Three specimens obtained from a sandy bottom about 10 fathoms.
41. *Cardium echinatum*, L. A specimen was brought up with a trammel net, cast at a depth of 8 to 12 fathoms.
42. *Cardium tuberculatum*, L. Valves used to be common on the sandy beaches of Birzebbugia and Cala San Giorgio, but at present even these are very scarce. In the living state the species is very rarely met with.
43. *Cardium papillosum*, Poli. Few valves obtained in the dredging, and others found with the shingle on the beach.
44. *Cardium rusticum*, Chemn. Abundant in the muddy bottoms of Marsascirocco Creek. The specimens found in the fishponds of that locality grow to an exceptionally large size.
45. *Cardium norvegicum*, Sperg. A specimen dredged on a shingly bottom about 8 fathoms.
46. *Cardita sulcata*, Brug. This species was, till a few years ago, very common in some parts of Marsascirocco Creek, but is now becoming increasingly scarce.
47. *Cardita trapezia*, L. Not very common, it is usually taken on weedy bottoms at various depths.

48. *Cardita calyculata*, L. Frequent along the rocky coast about waterline. Its shells are very common with the shingle and sand.
49. *Cardita corbis*, Phil. Very scarce, inhabits weedy bottoms at various depths.
50. *Chama gryphoides*, L. Valves are frequently found, especially in shingly corners. In the living state this species is rather difficult to get.
51. *Chama sinistrorsa*, Brocc. Valves are occasionally obtained with the sand and shingle.
52. *Isocardia cor*, L. A dead specimen and some fragments of valves obtained in dredging from a sandy bottom opposite Cala Frana at a depth of 6 to 8 fathoms.
53. *Astarte incrassata*, Brocc. A live specimen obtained from a shingly bottom about 10 fathoms.
54. *Dosinia lupinus*, Poli. Rare, very few specimens and some valves obtained in dredgings from a sandy bottom 5 to 8 fathoms.
55. *Dosinia exoleta*, L. Some valves obtained together with the foregoing species.
56. *Venus verrucosa*, L. Some very old and worn valves dredged on a sandy bottom 8 to 10 fathoms.
57. *Venus gallina*, L. During some years this species is fairly common in the sandy bottom of Birzebbugia Bay.
58. *Venus fasciata*, Donov. Two specimens obtained in dredgings at a depth of 5 to 7 fathoms.
59. *Venus ovata*, Ren. Three specimens obtained on various bottoms at a depth of 5 to 9 feet.
60. *Cytherea chione*, L. Valves obtained from a sandy bottom opposite Cala Frana, and some also from the inner portion of that bay, where the species seems to have been fairly common.
61. *Tapes aureus*, Gmel. Few valves obtained from a sandy bottom about 6 fathoms.
62. *Tapes decussatus*, L. Occasionally found in the muddy bottom of Marsascirocco Creek, used to be present also in the muddy bottom of "Il Ghain", where it is now very probably extinct.
63. *Tapes nitens*, Scacc. & Phil. Three specimens and some valves obtained in the dredgings at Cala Frana.
65. *Capsa fragilis*, L. This species was once very common, especially in the muddy bottoms of Cala San Giorgio, but now even its valves are very scarce.
66. *Tellina nitida*, Poli. Some valves obtained from a sandy bottom, opposite Cala Frana, at a depth of 7 or 8 fathoms.
67. *Tellina planata*, L. Generally frequent in the sandy bottoms of Cala San Giorgio and Birzebbugia, found also in Marsascirocco Creek, and used to occur also in the sandy bottom of Cala Frana.
68. *Tellina exigua*, Poli. Some valves obtained from the muddy bottom of Marsascirocco Creek.

69. *Tellina incarnata*, L. Dredged alive in sandy bottoms at a depth of 4 to 10 fathoms. Its valves are very frequently met with in some parts.
70. *Tellina balaustina*, L. Two specimens found in the muddy bottom of Marsascirocco Creek.
71. *Tellina distorta*, Poli. Two valves obtained from the sandy bottom opposite Cala Frana.
72. *Tellina pulchella*, Lamk. Few specimens and some valves obtained together with the foregoing.
73. *Psammodia ferroensis*, Chemn. Two specimens and few valves dredged on a sandy and shingle bottom opposite Wied il Buni at a depth of 4 to 6 fathoms.
74. *Psammodia vespertina*, Chemn. Some valves obtained from the same locality as the foregoing.
75. *Donax trunculus*, L. Generally scarce, though for two years it was common in the sandy bottom of Birzebbugia.
76. *Donax venusta*, L. For two years it was commonly found with the foregoing.
77. *Donax semistriata*, Poli. Found with the two foregoing species, but it is always much scarcer.
78. *Donax politus*, Poli. One valve picked up on the sandy beach of Birzebbugia.
79. *Mesodesma cornea*, Poli. Two specimens dredged on a shingly bottom at a depth of 5 and 7 fathoms, and a single valve found in a shingly corner near St. Lucian's promontory.
80. *Maetra stultorum*, L. Generally common in the sandy bottoms of Cala San Giorgio and Birzebbugia. In this last locality, during some years it is found almost in abundance.
81. *Syndasmya alba*, Wood. Very scarce, valves are found in shingly corners, especially at "Il Gzira".
82. *Solecurtus strigillatus*, L. Two valves picked up on the sandy beach of Birzebbugia.
83. *Solecurtus candidus*, Ren. A few valves obtained from the sandy bottoms opposite Cala Frana and Wied il Buni.
84. *Ceratisolen legumen*, L. A broken valve picked up on the sandy beach of Birzebbugia.
85. *Solen vagina*, L. Two or three valves and one whole specimen picked up on the above-mentioned beach.
86. *Corbula gibba*, Olivi. Two or three specimens dredged from various bottoms and various depths.
87. *Corbula mediterranea*, Costa. Few valves picked up on the sandy beach of Birzebbugia.
88. *Venerupis irus*, L. Frequent, but not common; the finest specimens are found in Cala San Giorgio.
89. *Petricola lithophaga*, Retz. Not very common, usually found boring the same stones as the foregoing.
90. *Dentalium vulgare*, da Costa. Some dead specimens have been obtained from a sandy bottom, 6 to 8 fathoms.
91. *Dentalium rubescens*, Desh. Few specimens obtained from the same bottom as the foregoing.

92. *Chiton siculus*. Not common; it is generally found attached to stones and other objects at various depths.
93. *Chiton rissoi*, Payr. Few specimens found in the same conditions as the foregoing.
94. *Chiton lævis*, Penn. Three or four specimens found attached to stones a little below waterline.
95. *Chiton polii*, Phil. Frequent, but not common, found attached to the rocks about waterline.
96. *Chiton cajetanus*, Phil. Very abundant almost all along the rocky coast of the harbour, usually found at and above waterline.
97. *Patella lusitanica*, Gmel. Not common, generally found on stones below waterline.
98. *Patella cærulea*, L. Common all along the rocky beach, generally found above waterline.
99. *Patella tarentina*, Lamk. Common and found under the same conditions as the foregoing.
100. *Emarginula cancellata*, Phil. Dead specimens are occasionally found with the shingle and sand.
101. *Emarginula elongata*, Costa. Dead specimens are also occasionally found with the sand and shingle.
102. *Emarginula buzardi*, Payr. Few specimens found on the sandy beach of Birzebugia, and in shingly corner at "Il Gzira".
103. *Fissurella costaria*, Desh. Very sparingly met with along the rocky coast.
104. *Fissurella græca*, L. Found in the same conditions as the foregoing, and it is also rather scarce.
105. *Fissurella nubecula*, L. During some years this species is commonly found on some parts of the rocky coast, in other years, however, it becomes very scarce.
106. *Fissurella gibberula*, Lamk. Dead specimens are very common with the sand and shingle; alive, however, the species is only occasionally met with.
107. *Calyptrea chinensis*, L. The shells of this species are occasionally met with on the sandy beaches of Birzebugia and Cala San Giorgio, and are also formed in various shingly corners on the coast.
108. *Crepidula unguiformis*, Lamk. Common, generally found inhabiting dead shells, more frequently those of *Conus mediterraneus*, *Murex trunculus*, *Cerithium vulgatum*, and *Cassis sulcosa*.
109. *Haliotis lamellosa*, Lamk. The shells of this mollusc are frequently found with the sand and shingle; in the living state, however, the species is somewhat difficult to obtain.
110. *Trochus turbinatus*, Born. Very common all along the rocky beach, it is usually found above waterline; on some parts of the coast it is generally most abundant.
111. *Trochus articulatus*, Lamk. Common, in rock pools and in the salt-pans of Wied il Buni.

112. *Trochus umbilicaris*, L. Abundant, over weedy bottoms at various depths.
113. *Trochus varius*, L. Frequent, but not common; found attached to stones at waterline or a little below.
114. *Trochus ardens*, von Salis. Most abundant on weedy bottoms at various depths.
115. *Trochus fanulum*, Gmel. Very rarely taken in the dredge from the same bottoms as the foregoing.
116. *Trochus adansonii*, Payr. Frequent but not common, it is more easily taken during spring, when it is found inhabiting weedy bottoms at a depth of 4 to 8 or 10 fathoms.
117. *Trochus adriaticus*, Phil. Found together with *T. adansonii*, but it is much scarcer.
118. *Trochus nivosus*, A. Adams. Living specimens are very seldom met with in this harbour; dead ones are, however, more or less frequently found in the sand between the boulders of Wied il Buni.
119. *Trochus divaricatus*, L. Common on many parts of the rocky coast, generally found attached to stones about waterline.
120. *Trochus conulus*, L. One live specimen taken in the dredge from a weedy bottom about 3 fathoms deep.
122. *Trochus laugeri*, Payr. Very common on weedy and rocky bottoms at a depth of 2 to 10 fathoms or more.
123. *Trochus matonii*, Payr. Abundant, taken together with the foregoing.
124. *Trochus striatus*, L. Not so common as the foregoing, with which it is always taken.
126. *Clanculus corallinus*, Gmel. Rare, the specimens taken are generally dead.
127. *Clanculus cruciatus*, L. Not very common, generally found on weedy and rocky bottoms at a depth of 2 to 10 fathoms or more.
128. *Clanculus jussieui*, Payr. Common on the same bottoms and at the same depths as the foregoing.
129. *Phasianella pulla*, L. Frequent, alive on weedy and rocky bottoms at various depths, dead specimens are commonly found with the sand and shingle.
130. *Phasianella speciosa*, Muhlf. Very abundant, especially on weedy bottoms at a depth of 2 to 10 fathoms.
131. *Turbo rugosus*, L. Occasionally taken in the dredge from weedy bottoms at various depths.
132. *Turbo sanguineus*, L. Few dead specimens found with the sand and shingle at Birzebbugia.
133. *Fossarus ambiguus*, L. Two or three specimens found with the shingle at Birzebbugia.
134. *Fossarus costatus*, Brocc. Few very worn specimens found together with the foregoing.
135. *Littorina neritoides*, L. Spread in great profusion almost all along the rocky coast, and usually extends to some distance above waterline.

136. *Rissoa auriscalpium*, L. Frequent on weedy bottoms at various depths, dead specimens commonly found with the sand and shingle.
137. *Rissoa membranacea*, Ad. For some years this species was more or less common on weedy bottoms at a depth of 1 to 4 fathoms.
138. *Rissoa monodonta*, Biv. Dead specimens are frequent, but not common, especially on the sandy beach, and in some shingly corners of Birzebbugia.
139. *Rissoa variabilis*, Muhlf. Common, especially on weedy and rocky bottoms 1 to 8 fathoms.
140. *Rissoa ventricosa*, Desm. Found with the preceding species, but it is not so common.
141. *Rissoa violacea*, Desm. Not common, taken in the dredge from weedy bottoms at various depths.
142. *Rissoa cimez*, L. The shells of this species are very common with the sand and shingle.
143. *Rissoa montagui*, Payr. Dead specimens are common amongst the sand and shingle; alive, it is frequently taken from weedy bottoms at various depths.
144. *Rissoa fusca*, Phil. Rather abundant in the fish-ponds of Marsascirocco Creek.
145. *Rissoa micrometrica*, Seg. Generally very abundant in the same locality as the foregoing.
146. *Rissoina bruguieri*, Payr. Only three or four specimens found with the sand and shingle.
147. *Barleja rubra*, Adams. Dead and generally worn specimens are common with the sand and shingle.
148. *Vermetus arenarius*, L. Commonly found at and below waterline; dead specimens are frequently found amongst the pebbles on many parts of the beach.
149. *Vermetus cristatus*, Biondi. Some specimens found with the shingle.
150. *Vermetus triquetur*, Biv. Very commonly found almost all along the rocky beach.
151. *Vermetus glomeratus*, L. This species seems to be more frequent on the soft rocks below St. Lucian's promontory and at Binghisa and Delimara Points.
152. *Turritella communis*, Risso. Two dead and very imperfect specimens found with the shingle.
153. *Turritella triplicata*, Brocc. Not so rare as the foregoing species; the specimens obtained are, however, always dead and very imperfect.
154. *Truncatella truncatula*, Drp. Alive this species is gregarious under stones about waterline. It is more commonly found in the fish-ponds of Marsascirocco Creek; dead specimens are common with the sand and shingle everywhere.
155. *Scalaria communis*, Lamk. Very sparingly taken in the dredge from weedy bottoms. The species ranges almost from waterline down to a depth of several fathoms.

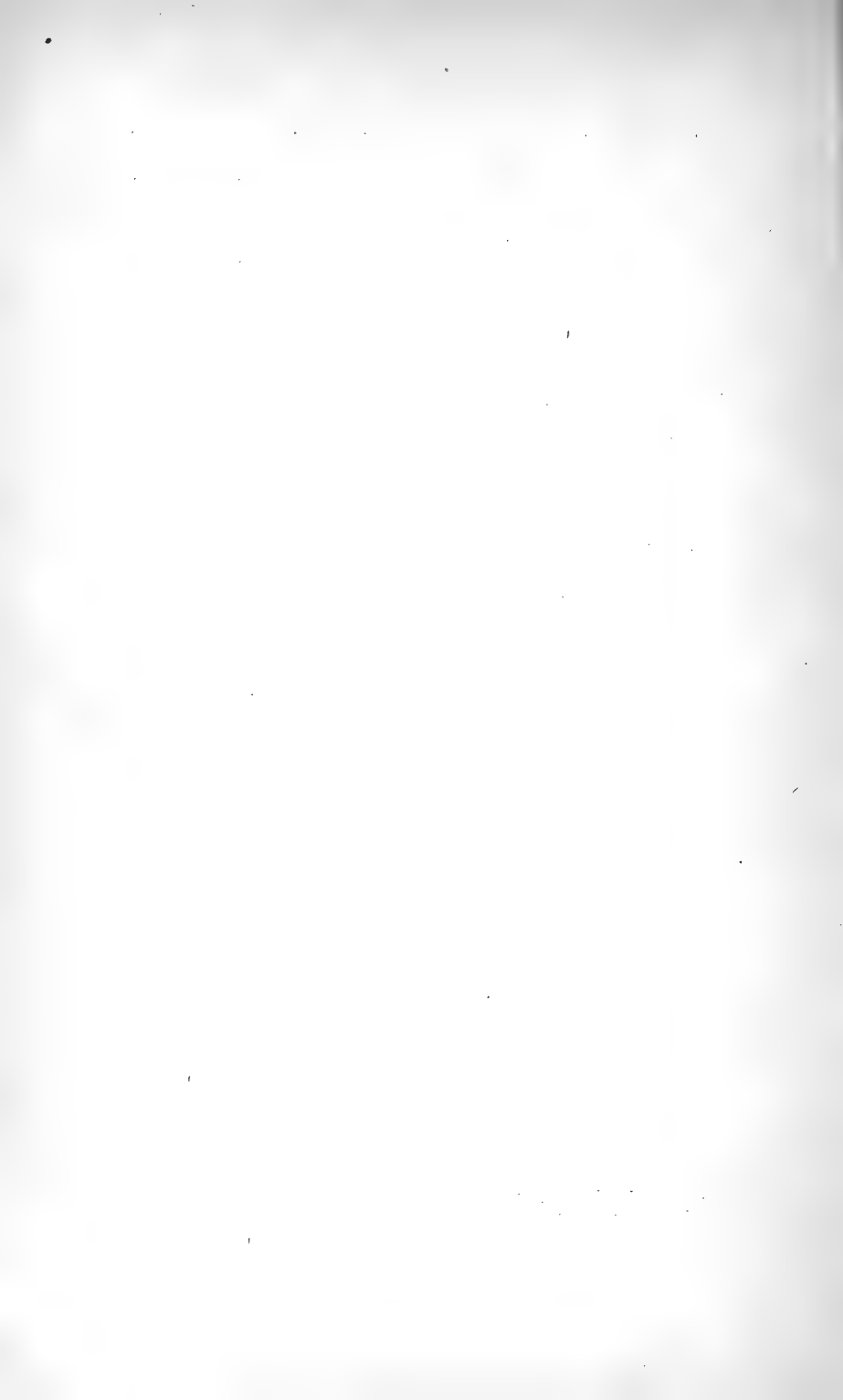
156. *Scalaria tenuicosta*, Mich. Dead and generally imperfect specimens occasionally found with the sand and shingle.
157. *Scalaria commutata*, Montr. Occasionally met with along the rocky beach, but more frequently under St. Lucian's promontory and near Binghisa Point.
158. *Odostomia plicata*, Mont. Dead specimens occasionally found with the sand and shingle.
159. *Mathilda elegantissima*, Costa. Dead specimens are also very occasionally found with the sand and shingle.
160. *Turbonilla rufa*, Phil. More common than the foregoing, with which it is generally found.
161. *Menesiho humboldtii*, Risso. A dead specimen found amongst the shingle at Wied il Buni, and another one picked up on the sandy beach of Birzebbugia.
162. *Janthina bicolor*, Menk. Dead and generally very imperfect specimens are every now and then cast ashore, especially in winter.
163. *Eulima polita*, L. Frequent, but not common; these shells are generally found in a shingly corner at Birzebbugia.
164. *Eulima intermedia*, Cantr. Two live specimens dredged on a weedy bottom about 4 fathoms.
165. *Eulima distorta*, Desh. Dead and generally very imperfect specimens are occasionally found with the sand and shingle.
166. *Eulima subulata*, Donovan. Dead specimens are very occasionally found with the foregoing.
167. *Eulimella acicula*, Phil. Found very sparingly amongst the sand and shingle at Cala Frana, Birzebbugia, and Cala San Giorgio.
168. *Natica millepunctata*, Lamk. Not common, generally taken on shingly bottoms at a depth of 1 to 8 fathoms.
169. *Natica habrea*, Mart. Apparently scarcer than the foregoing, with which it is generally found.
170. *Natica dilwyni*, Payr. Very scarce; dead specimens are found with the sand and shingle; alive, the species has been obtained from the muddy bottom of Marsascirocco Creek.
171. *Natica guillemini*, Payr. Two or three dead specimens found with the sand and shingle.
172. *Natica intricata*, Donovan. Dead specimens are more or less common in some localities, such as Marsascirocco Creek; live ones, however, are very sparingly met with.
173. *Adeorbis subcarinata*, Mont. Dead specimens are very occasionally found amongst the sand and shingle.
174. *Lamellaria perspicua*, L. Not frequent; inhabits weedy bottoms at various depths; its shell is occasionally found on the sandy beaches.
175. *Cerithium vulgatum*, Brug. The smaller form of this species is very common and widely distributed, but is most abundant in the muddy and weedy bottoms of Marsascirocco Creek, in which locality the larger form was once also rather common, but has now become very scarce.

176. *Cerithium rupestre*, Risso. Very common, especially in the fish-ponds of Marsascirocco Creek and in the salt-pans of Wied il Buni.
177. *Cerithium conicum*, Blainv. This species is found in the fish-ponds of Marsascirocco, where it is very abundant.
178. *Cerithium reticulatum*, da Costa. During some years this species is reproduced in countless numbers amongst the weeds of "Il Ghain".
179. *Cerithium lacteum*, Phil. The shells of this mollusc are very common in sand and shingle, but in the living state the species is very hard to get.
180. *Triforis perversus*, L. Dead and generally very imperfect specimens are frequently found in sand and shingle.
181. *Ranella reticulata*, Blainv. Dead specimens, generally inhabited by a hermit crab, are common along the rocky coast, and taken frequently in the dredge, but alive the species is only very occasionally met with.
- 181a. *Purpura hæmastoma*, L. Frequent; Cala Frana to Bingham Point.
182. *Typhis tetrapterus*, Bronn. Very scarce; inhabits weedy and shingly bottoms at a depth of 4 to 10 fathoms or more.
183. *Murex brandaris*, L. One live specimen dredged on the muddy bottom of Cala San Giorgio.
184. *Murex trunculus*, L. Relatively scarce, but universally spread over all sorts of bottoms and at various depths.
185. *Murex edwardsii*, Payr. Common all along the rocky shore, but more frequent on that portion between Birzebbugia and Cala Frana; it is usually found at waterline.
186. *Murex cristatus*, Brocc. Occurs rather sparingly; inhabits both weedy and shingly bottoms, and ranges from waterline to a depth of several fathoms.
187. *Murex aciculatus*, Lamk. Very scarce; inhabits weedy and rocky bottoms at various depths. The specimens taken in the dredge are generally very small.
188. *Coralliophila lamellosa*, Jan. Rare; only six or seven dead specimens obtained from various points of the coast.
189. *Fusus syracusanus*, L. Live specimens are very seldom met with; dead ones, however, are more or less frequent. The species inhabits weedy and rocky bottoms at various depths.
190. *Fasciolaria lignaria*, L. Found almost all along the rocky beach, but is more frequent on the part between Cala Frana and Bingham Point, ranging from waterline or above to a depth of about 1 fathom.
191. *Lachesis minima*, Phil. Living specimens are more or less frequent on weeds near waterline, dead ones are common enough amongst sand and shingle.
192. *Lachesis candidissima*, Phil. One dead but very beautiful specimen picked up on the sandy beach of Birzebbugia.
193. *Pisania maculosa*, Lamk. Common about waterline almost all along the rocky beach.

194. *Pisania d'orbignyi*, Payr. Live specimens are somewhat scarce; dead ones, however, which are nearly always inhabited by a hermit crab, are very frequent all along the rocky coast. The species inhabits various sorts of bottoms at various depths.
195. *Euthria cornea*, L. Relatively scarce in this harbour, though dead specimens are frequently taken in the dredge.
196. *Cyclope neritea*, L. A few dead specimens found with the shingle and one specimen alive obtained from the muddy bottom of Marsascirocco Creek.
197. *Nassa mutabilis*, L. Live specimens are very sparingly obtained, but dead ones, which are mostly in a very good state, are usually very common, especially over the sandy bottom of Birzebbugia. These are mostly inhabited by a peculiar hermit crab.
198. *Nassa costulata*, Ren. Common, especially in the muddy bottom of Marsascirocco Creek.
199. *Nassa corniculum*, Olive. Not very common, especially in the living state, but seems to be widely spread. It prefers weedy bottoms at various depths.
200. *Nassa incrassata*, Strom. Alive this species is occasionally dredged on weedy and shingly bottoms; its shell is, however, frequently met with along the beach.
201. *Columbella columbellaria*, Scacc. Only a few dead specimens obtained.
202. *Columbella rustica*, L. Most abundantly dredged on weedy bottoms at a depth of 1 to 12 fathoms or more.
203. *Mitrella scripta*, L. Alive this species is somewhat scarce; its shells, however, are very common along the coast and also dredged from various depths.
204. *Defrancia concinna*, Scacc. Only very few dead and mostly very imperfect specimens found amongst the shingle.
205. *Defrancia leufroyi*, Mich. Occasionally found with the shingle, or taken dead in the dredge.
206. *Defrancia linearis*, Mont. Not frequent; shells are found with the sand and shingle.
207. *Defrancia reticulata*, Ren. Frequent, but generally dead; taken in the dredge from various depths and collected also amongst the shingle on the beach.
208. *Defrancia philberti*, Mich. This species is also frequent, though, like the foregoing, it is generally dead; dredged mostly on weedy bottoms at various depths.
209. *Raphitoma brachistomum*, L. Found a few dead specimens amongst the sand and shingle at Birzebbugia and Cala Frana.
210. *Raphitoma germanianum*, Scacc. Shells of this species are not very rare, both on the beach and dredged. Not a single live specimen has as yet been obtained.
211. *Raphitoma lævigatum*, Phil. Two or three dead specimens found with the shingle in Birzebbugia and Gzira.
212. *Mangelia multilineolata*, Desh. Dead specimens are frequently found with the sand and shingle.

213. *Mangelia cæruleans*, Phil. One specimen found on the beach near Point St. Lucian.
214. *Mangelia vauguelini*, Payr. Frequent, but not common; dredged from weedy bottoms at various depths, its shells are commonly found with the sand and shingle.
215. *Mangelia tæniata*, Desh. Few specimens found in some shingly corners, especially in Birzebbugia.
216. *Conus mediterraneus*, Hwas. Common almost on all sorts of bottoms, and ranging from waterline down to a depth of several fathoms.
217. *Mitra ebenus*, Lamk. Scarce; appears to prefer weedy bottoms at various depths; its shells are more frequently met with.
218. *Mitra cornicula*, L. Dead specimens are met with in shingly corners, but in the living state, however, the species is very rarely met with.
219. *Mitra lutescens*, Lamk. Dead specimens of this species are occasionally taken in the dredge from various bottoms and at various depths.
220. *Mitra tricolor*, Gmel. The shell of this species is rather commonly found with the sand and shingle; the specimens, however, are generally very worn.
221. *Marginella secalina*, Phil. Live specimens are only occasionally met with, but dead specimens are frequently found with the sand and shingle.
222. *Marginella miliaria*, L. Common, especially in dead specimens with the sand.
223. *Marginella clandestina*, Brocc. Not rare; dead specimens are found together with the foregoing.
224. *Cypræa lurida*, L. Not common, but more frequently met with on the beach below St. Lucian's promontory.
225. *Cypræa pyrum*, Gmel. Two specimens taken in the dredge from weedy bottoms 5 and 11 fathoms.
226. *Cypræa spurca*, L. Taken rather frequently from weedy bottoms at various depths.
227. *Trivia pulex*, Gray. The shells of this species are more or less frequent with the sand and shingle along the beach; in the living state, however, it is not often met with. It seems to prefer weedy bottoms, and ranges almost from waterline down to a depth of 8 fathoms or more.
228. *Trivia candidula*, Gask. A live specimen taken in the dredge from a weedy bottom at a depth of about 8 fathoms, and two dead ones found with the sand on the beach.
229. *Ovula carnea*, Poir. Two specimens found with the dredgings from a depth of 6 to 10 fathoms.
230. *Acteon tornatilis*, L. Four shells found in shingly corners at Birzebbugia and Il Gzira.
231. *Haminea hydatis*, L. Common, especially on weedy bottoms, ranging from a depth of 1 to several fathoms.
232. *Bulla striata*, Brug. Very abundant on weedy and shingly bottoms at various depths.

233. *Philene aperta*, L. Frequently taken in the dredge from weedy bottoms at a depth of 1 to 10 fathoms or more.
234. *Philene punctata*, Clarke. Frequently taken together with the foregoing, though during some years it seems to become scarce.
235. *Aplisia punctata*, Cuv. During some years this species is tolerably common, in others it is very scarce; it is often found about waterline.
236. *Umbrella mediterranea*, Lamk. A living specimen obtained from a rocky and weedy bottom at Kajenza, near Cala San Giorgio, and a shell found with the shingle dredged from a depth of about 7 fathoms, opposite Cala Frana.
237. *Anysomyon gussoni*, Costa. Dead specimens are occasionally found with the sand and shingle.
238. *Gadinia garnoti*, Payr. Shells are also met with amongst the sand and shingle, in the living state; however, the species is only occasionally taken in the dredge. It is usually found adhering to stones and other objects obtained from various depths.
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A † is prefixed to the names of fossil species.

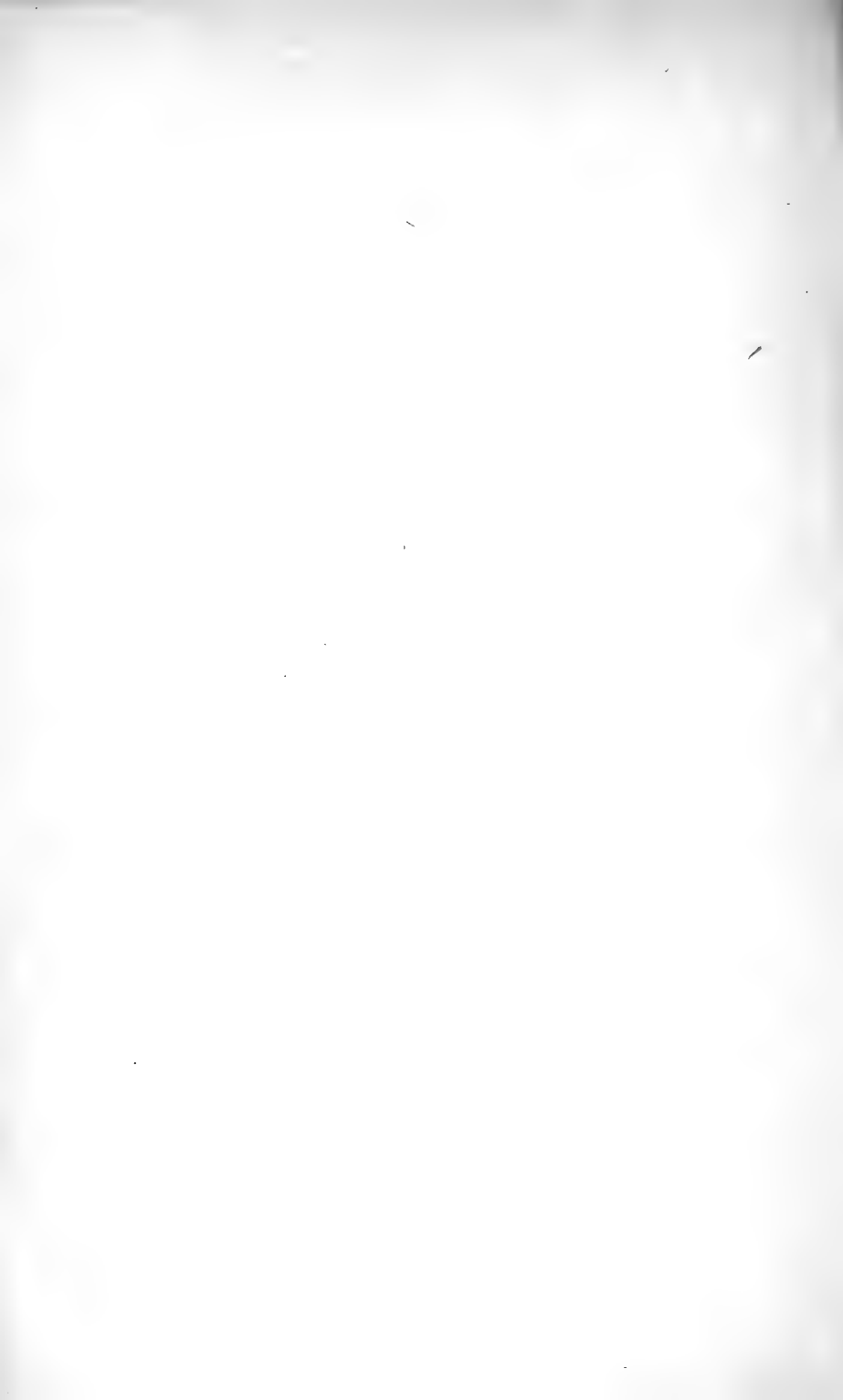
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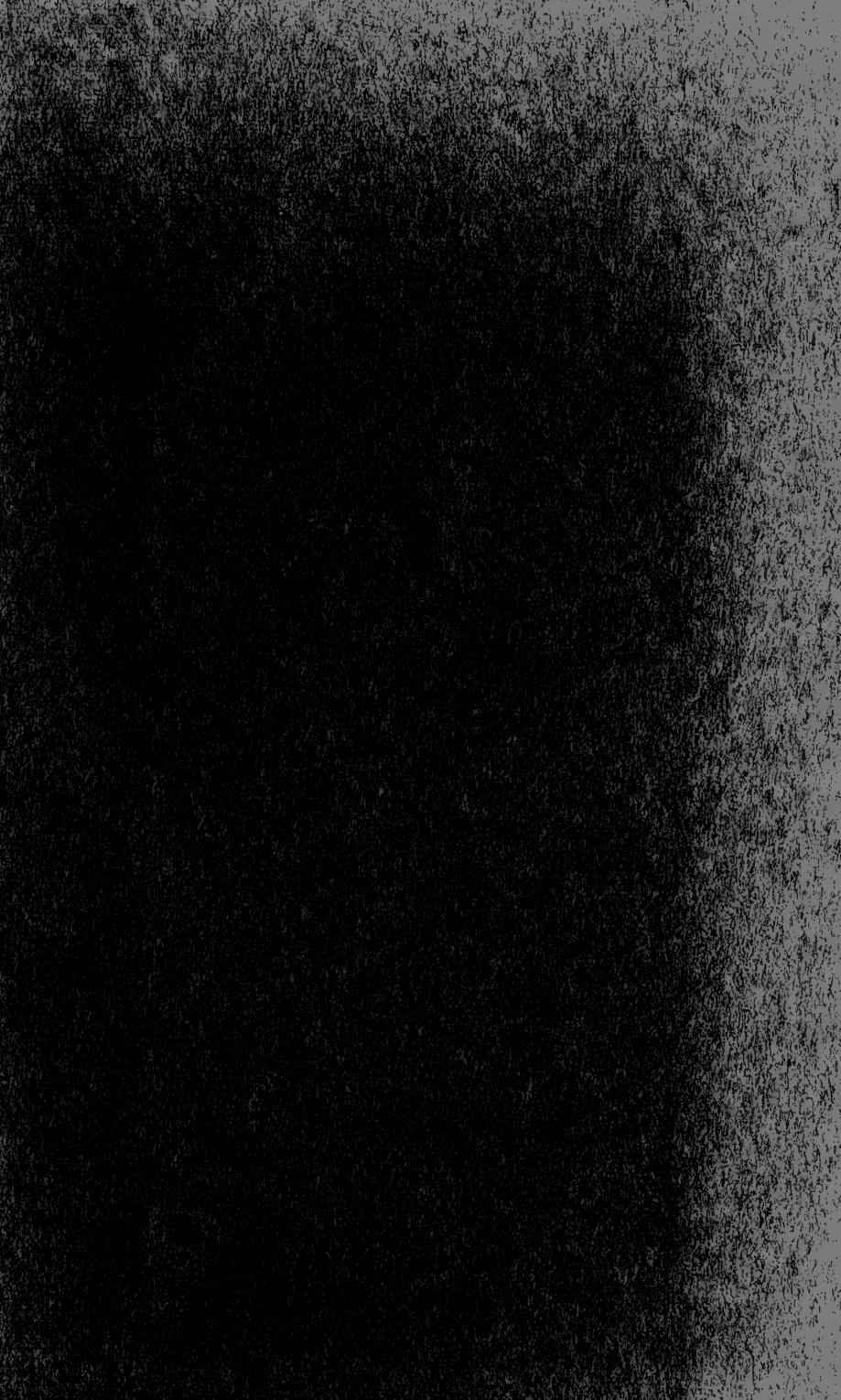
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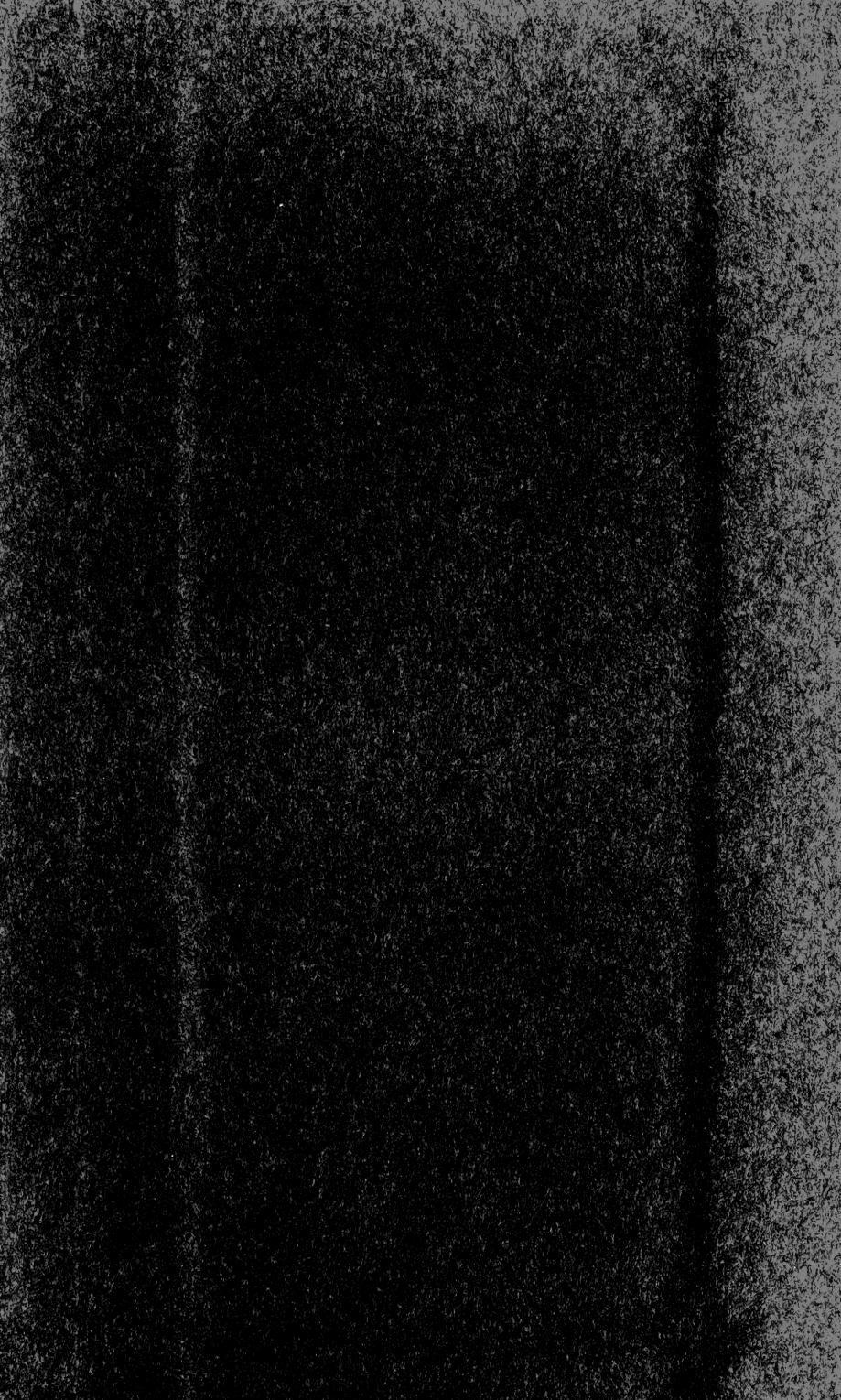




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