

MOLLUSCA FROM THE CONTINENTAL SHELF OF EASTERN AUSTRALIA.

No. 2.

By

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(Plates xxxviii-xli.)

In continuation of a paper published under the above title in these Records¹ I offer descriptions of some more interesting forms.

Since the former paper was published little addition was made to our knowledge until quite recently, but now an old shell collector from Scotland in the person of Mr. Herbert Howell, well known in the annals of the molluscan history of Great Britain through his activities in securing rare specimens while engaged in the trawling industry off Aberdeen, has joined the trawling industry here. His interest was revived by the novelty of our fauna, and he has already made a very valuable addition to the larger faunula, and we can anticipate still more striking finds in the future; all of the species here discussed have been brought in by him.

Probably many of the species here introduced will later be found to be closely related to the fossils of the Muddy Creek and Table Cape beds. It would be a delightful study to correlate the recent and fossil species of Australia, as Finlay and Marwick are doing in connection with Neozelanic forms. In the present paper the *Glycymeris*, *Conus*, *Xenotrophon* and *Mathildona*, all of novel aspect as regards the recent fauna, appear to represent fossil types, and their exact relationship might be ascertained were long series of the fossils available.

The beautiful illustrations accompanying this article have been prepared by Miss J. K. Allan, of this Museum, and my thanks are herewith tendered for the exact representations, which cannot be surpassed; the photographs have been taken by Mr. G. C. Clutton, also of this Museum, and again thanks must be offered for the skilful portraiture of these difficult subjects.

¹ Iredale.—Rec. Austr. Mus. xiv, 1925, pp. 243-270.

NUCULA OBLIQUA *Lamarck*.

A lumping policy was adopted by Hedley in connection with the species of *Nucula* similar to the common *N. obliqua*. Larger series show that valid distinctions exist according to locality and depth, and consequently two of the names regarded as synonymous can be revived. The deepwater form for which Smith provided the name *N. dilecta*² is easily separable on account of its shape and smaller size, while the fossil *N. tenisoni* Pritchard is a much larger, crass, and more elongate shell, also much less obese at the same size than the typical south Tasmanian shell, which has also much longer teeth. Comparison of series indicates that the South Australian form is easily distinguishable by its more prominent beaks, fewer teeth, steeper anterior side, and less arched posterior side, as compared with the deepwater New South Wales shells here called *dilecta*. A series dredged from 100 fathoms, 40 miles south of Cape Wiles, South Australia, is here named *Nucula obliqua subdilecta*, nov.

Family NUCULANIDÆ.

Under the generic name *Nuculana*, Hedley admitted very differently shaped forms, and in order to save time and gain accuracy it is proposed to name the groups determined. The type of *Nuculana* is a long-beaked Palæarctic species much more resembling our *Propeleda* than the shells grouped round *L. crassa* Hinds, for which I introduce the genus name *Sceøleda*.

The forms hitherto lumped under *crassa* can be separated into at least three, the typical south Tasmanian form being very large, while the New South Wales form differs in shape, and is always a smaller, less obese shell; this will bear the name *hanleyi* as already pointed out. The South Australian shells are also large, but differ in shape, having shorter beaks and being deeper, the juveniles being more closely sulcate. This can be named *Sceøleda crassa illepidata* nov., the series being from Encounter Bay, South Australia.

Differing by the lack of the customary sculpture, the name *Teretileda* is proposed for *N. oculata*, and with it may be classed *N. fortis*, the very long narrow teeth and small deep set chondrophore being peculiar. *Leda inopinata* is a curious and distinct shell as pointed out by its conservative author, E. A. Smith, and is therefore distinguished as *Magaleda*.

L. ramsayi is also unhappily situated, and would be better transferred to the neighbourhood of *Propeleda*, though its sculpture seems to indicate separation from that group as *Thestyleda*. Before leaving the family attention may be drawn to the fact that the South Australian deepwater shells differ at sight from the New

² Smith.—Proc. Zool. Soc., 1891, p. 443, pl. xxxv, f. 25.

South Wales representatives. Thus *Comitileda miliacea* is common in our dredgings, and the South Australian shell so named differs in being larger, with a more lengthened beak and also shorter anterior side. It may be that there is more than one species of this genus, the smaller one being *miliacea*, the larger one being called *remensa* nov. May has named a fossil *Nuculana rhomboidea*³ without drawing attention to its very close relationship with this species.

Hedley's *Leda pala*⁴ may be at present included in *Comitileda*, as the species *remensa*, the type locality being 100 fathoms, 40 miles south of Cape Wiles, South Australia, appears to have been regarded by Verco as *pala*, from which it differs in size and shape as well as hinge formation.

Dredged in 40 fathoms north of Cape Borda, South Australia, is a species of *Poroleda* which differs from *spathula* in the presence of a fine radial sculpture, and is here named *flindersi*. Apparently a similar shell lives in deeper water off the eastern coast, and these will be further dealt with later.

MICROCUCULLÆA gen. nov.

This name is proposed for *Bathyarca perversidens* Hedley, which, as I have already pointed out, appears to be a dwarf relation of *Cucullæa*.

The South Australian form may be named *Microcucullæa adelaideana*, a necessary name as Verco⁵ has suggested that it partook of the characters of the Peronian *perversidens*, while showing some of the Neozelanic *cybæa* and thereupon concluded that the whole three should be lumped, a retrograde step forbidden by the geographical distribution of the three forms.

Specimens from 100 fathoms, 40 miles south of Cape Wiles, South Australia, are smaller, much more globose, less inequilateral, and much more weakly sculptured than the typical *perversidens*, and are also more equilateral than *cybæa*. As pointed out by Verco, the right valve is more strongly sculptured, and is also smaller and clasped by the left valve.

LIMOPSIS LORINGI Angas.

A shell in general agreement with this species was brought in by Howell from 55-60 fathoms off Montague Island, and was noted to be much more oblique than the figure prepared from a Moreton Bay shell. Small Limopsis shells also occurred, and examination of

³ May.—Papers Proc. Roy. Soc. Tasm., 1921, p. 12, pl. iv, f. 9.

⁴ Hedley.—Rec. Austr. Mus., vi, 1907, p. 36, pl. lxvi, f. 1.

⁵ Verco.—Trans. Roy. Soc. South Austr., xxxi, 1907, p. 222.

the series showed many anomalies present on account of the scant material generally available. The differences seen in the various groups deserve recognition, so that *Loringella* is here proposed for the large species, *loringi* being named as type.

For the curious little group typified by *L. brazieri*, the name *Phrynelima* is introduced, the hinge line showing many closely packed teeth, upon which, medially, the external ligament pit intrudes.

A further development is seen in *L. erectus*, where the teeth are few and widely separated by the ligament pit, which is tending to become internal, and recalls the American fossil genus *Trinacria*; the generic name *Aspalima* is provided for this species, and the South Australian form may be differentiated as *Aspalima erecta idonea* subsp. nov., a series collected from 100 fathoms, 40 miles south of Cape Wiles, S.A., being larger, less strongly sculptured, comparatively broader, and with weaker teeth.

Under the name *Limopsis tenisoni* Tenison-Woods probably more than one species and many subspecies are being associated. The South Australian *penelevis*, which Verco introduced as a variety only, is worthy of full specific rank, while other specimens ranked under this name show diverse hinge formation.

Under the name *Glycymeris radians* there are in this Museum specimens of a large Limopsid shell from South Australia which appear to have been overlooked.

CYRILLONA *gen. nov.*

This name is proposed for the minute shell called *Cyrilla dalli* Hedley,⁶ which was well figured. It is a common species among the sand brought up, and is certainly not congeneric with *Cyrilla* A. Adams,⁷ whose type species, among other things, was sulcate.

Verco⁸ has added *Nuculina (Cyrilla) concentrica* from 104 fathoms, 35 miles south-west of Neptune Island, South Australia. It was obvious from the figure that this was referable to a genus distinct from either *Nuculina* or *Cyrilla*, and it does not agree with Hedley's *C. dalli* in hinge formation. In order to avoid further confusion the new generic name *Cyrollista* is here proposed for Verco's species.

I cannot see any valid reason for including these shells in the family Arcidæ.

⁶ Hedley.—Austr. Mus. Mem., iv, 1902, p. 296, fig. 44.

⁷ A. Adams.—Ann. Mag. Nat. Hist., (3), v, 1860, p. 478.

⁸ Verco.—Trans. Roy. Soc. South Austr., xxxi, p. 220, pl. xxvii, figs. 4 a, b.

GLYCYMERIS MAGNIFICENS *sp. nov.*

(Plate xxxviii, figs. 1-2.)

Although dead and somewhat worn this magnificent shell adds another important item to our knowledge of the mollusca of the Continental Shelf, as obviously it is related to the fossils grouped about *G. maccoyi* Johnston, which have been exhaustively treated by Chapman and Singleton.⁹

Marwick¹⁰ has also described the New Zealand recent and fossil forms, and these palaeontologists' results are not easy to reconcile with a study of large series of recent species. There seems to be much individual variation as well as age differences, and when in addition we have geographical differentiation, and also bathymetrical divergence, the problems surrounding the recent forms are not easily solved. The conclusions put forward five years ago¹¹ have not been materially amended, though the variation has been found to be more extensive, and specimens suggesting new species have been separated, but until longer series are obtained these will not be diagnosed.

The species now described is the largest Australian form, rivaling the magnificent Neozelanic *G. laticostata* in size. Howell has brought in two dead valves from 50-60 fathoms off Montague Island, New South Wales, and states that very dead shells are not uncommonly met with, but no good recent shell has yet been found, which is natural in view of the fact that the trawl can only pick up surface material.

Shell very large, solid, suborbicular, a little longer than wide, moderately convex, beaks incurved and approximate, ligamental area very large and steep. Hinge line nearly straight, rounded at sides; hinge teeth obliterated with age by the intrusion of the ligamental area, which is deeply carved with incised lines; in the younger shell two large rounded teeth can still be seen at each side. Margin markedly crenulate in agreement with external sculpture, though, curiously enough, this external ribbing has disappeared in the senile example. Muscle scars large, calcified, the posterior one elevated upon a flattened boss; the pallial line well marked. The external sculpture consists of about forty to fifty low rounded ribs with narrow interstices, which become evanescent at sides, and obsolete with age, strong concentric growth lines developing in their place. These ribs appear to be stronger, more elevated, and narrower on the posterior side.

The size of the larger specimen figured is 106 mm. in height, 97 in length and 35 in thickness, single valve; the smaller measures

⁹ Chapman and Singleton.—Proc. Roy. Soc. Vict., n.s. xxxvii, 1925, pp. 18-60.

¹⁰ Marwick.—Trans. New Zeal. Inst., liv, 1923, pp. 63-80.

¹¹ Iredale.—Proc. Linn. Soc. N.S.W., xlix, 1924, pp. 187-9.

95 × 88 × 30 mm. Judging from the figures given by Chapman and Singleton this species is most like the fossil *G. ornithopetra*, but their fossil "*G. flabellatus*," figure 30, from the Werrikoian appears quite distinct from the recent species. There is also confusion among the recent species in South Australia, as in addition to *G. sordidus* and *G. flabellatus*, which are certainly different species, there is another fine large species collected by Mr. A. Broadfoot at Whyalla, Spencer's Gulf, which I here name *Glycymeris broadfooti*. It is characterized by its shape, being much less circular than *flabellatus*, its fewer stronger ribs with deep narrow interstices, and its fewer, more closely set and more horizontal teeth, the ligamental area deeper and encroaching more on the hinge teeth. *G. sordida* Verco and *G. insignis* Pilsbry are both more triangular, with flattened ribs and more numerous teeth. Height of type (single valve), 47 mm.; length, 44 mm.; thickness, 16 mm.

MESOPEPLUM CAROLI *sp. nov.*

(Plate xxxviii, figs. 7-9.)

This name is proposed for the fine large scallop trawled in 40-80 fathoms off the New South Wales coast, which has been referred to *C. hedleyi*. I have shown that the latter name was proposed as a new name only for Hedley's *C. fenestrata*, and that the older name must be resumed. Hedley's species was based on a small shell taken in Port Jackson, and he regarded the fine shell trawled as the adult of his species. I find, however, that his small shell is adult, and differs in shape and solidity from the present form, which is therefore here named as above.

Hedley lumped all the *Chlamys*-like scallops under the one name, and it is confusing to find quite unlike forms, such as these, associated with the *asperrimus* series. I had collated a few items when a paper by Marwick¹² on this subject was received, and therefore some of my notes with relation to these southern forms are here included. The Palearctic forms, both recent and fossil, have been referred to so many little groups that it would be a very unwise policy to attempt to allot our species to these northern groups merely from superficial features. European palæontologists, as well as malacologists, are not agreed, while Dall pointed out the difficulties when American fossil and recent species were studied.

Four very distinct series are at once noted, the *asperrimus*, *lividus*, *bifrons* and "*hedleyi*" groups, and it will clarify matters to designate these groups as genera, so I herewith propose *Mimachlamys* with *P. asperrimus* as type, *Scwochlamys* with *Pecten lividus* as type, *Equichlamys* with *P. bifrons* as type and *Meso-peplum* with *M. caroli* as type.

¹² Marwick.—Trans. New Zeal. Inst., lviii, 4, 1928, pp. 445-456.

In *Mimachlamys* the valves are both convex, but the left valve is more convex than the right, the auricles are unequal, the posterior being much smaller than the anterior. The byssal gape is deep and very strong, pectinidial teeth are present, a deeply furrowed fasciole occurring. The sculpture consists of closely scaled numerous radials flanked with subsidiary more delicate riblets, a deep gutter intervening between each group, which becomes filled up with such riblets as maturity is reached. The prodissoconch is smooth, with concentric growth lines, the succeeding sculpture being plain riblets with scratched intervals, the scales developing later. The sculpture on the two valves does not differ appreciably in design. In *Scæochlamys* a somewhat different growth sequence can be traced the auricles being more unequal, but otherwise the immature is similar to that of the preceding. The sculpture begins with plain radials, ten to twelve on the left valve but twenty to thirty on the right valve. The interstices between the riblets are threaded radially with irregular scratches, but this interradiial sculpture develops into the well-known "*Camptonectes*" form and then vanishes. On the valves the original ribbing develops in strength, but remains constant in number, scales appearing according to situation, and growing more strongly on the left valve, thus producing a dissimilar effect in the mature stage. The valves also become distorted with age, while the hinge area is more pronounced. *Equichlamys*, on the other hand, is a much larger flattened inequivalve form with the ears small and subequal, byssal gape small, almost missing, and pectinidial teeth almost obsolete in mature shells, though present in young specimens. Seven to nine distant compound ribs have their broad intervals filled with fine radials, the whole covered with "*Camptonectes*" sculpture. These large ribs are well marked internally, but, while with age the superficial ribs have a strong tendency to disappearance, the internal ridges become more pronounced, suggesting those of *Amusium*. The right valve is tightly clasped by the left, with the sides open, another Amusioid feature.

Mesopeplum caroli has the valves unequal, the right valve deeper than the left, auricles small and prickly, subequal, byssal gape minute, scarcely noticeable, pectinidial teeth small in the immature, obsolete in the adult. Left valve pink, right valve white.

Sculpture of the left valve: five prominent distant compound ribs, having the intervals broader than the ribs; the right valve has, similarly, five compound ribs whose intervals are narrower than the broad, flattened series whose edges fit into those of the left valve. The compound ribs of the left valve are composed of three ridges, rather sharp, the middle one the largest; the compound ribs of the right valve are made up of four to eight low, flattened semi-equal ribs, in early life scarcely separable but divergent with age. The interstices in the left valve have four to eight fine ridges, those of the right being deeper and with two or three ribs therein. Very fine

concentric threads over-run the whole of the left valve, but appear only in the intervals on the right valve, where, on the contrary, concentric growth lines are well marked continuously on the ribs. Height, 45 mm.; length, 48 mm.; thickness of conjoined valves, 21 mm. Type trawled in 55-60 fathoms off Montague Island, New South Wales.

Subordinate names must be proposed for the curious shell called *aktinos* by Petterd, and the deepwater forms as *famigerator* and *perillustris*. Thus *aktinos* recalled *Scæochlamys*, but has similar close radials on both valves, "*Camptonectes*" sculpture throughout and persistent, and the posterior auricle curiously folded in, so that at first sight it appears to have been broken off. The subgeneric name *Belchlamys* is proposed for this species alone.

The form *famigerator* seems to represent an arrested stage in the development of *Mimachlamys*, apparently never growing to a large size and being always less convex, with a more suppressed sculpture. It may be named *Talochlamys*, subgen. nov.

The very thin substance, obsolescence of sculpture, obliquity of shape, and delicacy of hinge characterize the deepwater species *perillustris* and *challengeri*, and for them the new subgeneric name *Vepriichlamys* is introduced, the former being selected as type.

The minute shells, referred by Hedley to *Cyclopecten*, do not agree at all well with the type of the genus, differing in shape, sculpture, and hinge details, and must be classed in a new genus *Chlamydella*, the species *favus* being named as type.

While *Amusium* may be retained for *japonicum*, the species name may later be amended, but the small species *thetidis* is here made the type of the new genus *Ctenamusium*. Palæartic palæontologists have proposed *Propeamusium*, *Parvamussium*, and *Variamussium* for similar forms but ours do not exactly agree. Thus while *Amusium* is very large and circular, with the ears small and subequal, the surface smooth, the shell gaping with no byssal gape, the chondrophore long and narrow, *Ctenamusium* is minute, ears large and unequal, surface sculptured, sculpture differing in each valve, valves unequal and clasping, byssal gape present, chondrophore small and broad. While the right valve has only concentric ridges, the left valve has radials at first, becoming cancellate with age.

The left valve figured by Hedley and Petterd¹³ as of this species from 250-300 fathoms represents a different species, which is here named *Ctenamusium salacon*, the right valve being much more closely concentrically ridged, and the left valve of true *thetidis* is less strongly sculptured, and the internal ribbing differs.

¹³ Hedley and Petterd.—Rec. Austr. Mus., vi, 1906, pl. xxxviii, figs. 18-19.

SPONDYLUS (TENELLUS) REGILLUS *sp. nov.*

(Plate xxxviii, figs. 3-5.)

When Howell brought in a magnificent specimen of this species he recounted its strange habit of living enveloped in a sponge. On this account it shows no point of attachment and its growth is comparatively free and regular. At first it was regarded as the deepwater representative of the littoral *S. tenellus* Reeve, but this is not definite.

Shell large, inequivalve, inequilateral, upper valve slightly convex, lower valve deeply convex, free, unattached; umbo of right valve very prominent. Sculpture on the two valves similar, about twenty primary ribs, with long well developed spines, which are generally well thrust forward. With age similar weaker ribs develop in the interstices, a very fine scaly radial sculpture persisting all over the shell.

Height, 83 mm.; length, 90 mm.; depth of conjoined valves, 45 mm. Trawled off Montague Island, New South Wales, 50-60 fathoms.

AUSTROLIMA *gen. nov.*

This name is proposed for *Lima nimbifer*, which has a very small enclosed animal, sedentary by means of a byssus. The South Australian form of *nimbifer* differs in being broader and shorter, and more obese, and may therefore be named *Austrolima nimbifer gemina nov.*

Numerous specimens trawled show that *L. benthonimbifer* is constantly smaller, and more regular as diagnosed, but comparison with South Australian shells dredged in 100 fathoms, 40 miles south of Cape Wiles, and determined by Hedley as conspecific with the fossil *bassii* compels their distinction with the name *Austrolima spectata nov.*, an obvious character being the more abundant ribbing of the South Australian shell, the ribs numbering over forty, while there are only thirty-two on the eastern shell, and on a fossil from Table Cape, North Tasmania, there are only twenty-four ribs, the type of *bassii* from that locality being described as having twenty-two ribs only.

ESCALIMA *gen. nov.*

This new generic name is introduced for the shell named *Limca acclinis* by Hedley,¹⁴ dredged in 100 fathoms off Wollongong, New South Wales; he later recognised it as *Lima murrayi* of Smith¹⁵ from 440 fathoms off Sydney.

¹⁴ Hedley.—Rec. Austr. Mus. vi, 1905, p. 46, fig. 10.

¹⁵ Smith.—Proc. Zool. Soc., 1891, p. 444, pl. xxxv, f. 26.

Prejudiced by the presence of teeth in the hingeline, Hedley preferred *Limea* to *Lima*, though recognising the superficial resemblance of his species to *Lima linguatula* Lamarck.

Its thin shell and otherwise great dissimilarity from the traditional *Limea* urged its transference from that genus, and it was referred back to *Lima*, where Smith had located it. It now becomes necessary to create a better receptacle, as the form is prevalent all round the southern coast of Australia as far as yet investigated.

Consequently the shallower form *acclinis* can be allowed as well as the deeper *murrayi*, as the latter specimens are smaller and comparatively broader, the two forms being recognised as *Escalima murrayi murrayi* Smith, and *Escalima murrayi acclinis* Hedley.

Specimens dredged from 100 fathoms off Cape Pillar, south Tasmania, may be named *Escalima murrayi maugeana* subsp. nov., as the shells are much deeper than *acclinis*, the hinge triangle much larger, the teeth less distinct and externally the ribs are fewer.

On the other hand shells dredged in 100 fathoms, 40 miles south of Cape Wiles, South Australia, while also deeper than *L. acclinis*, are not as deep as the preceding, but are broader and shorter, with the hinge teeth more pronounced and more numerous, while the sculpture is not so complex, concentric lining and radials much less marked; and these may be called *Escalima murrayi relegata* subsp. nov. The South Australian species referred to *Limæa* must be separated under the new generic name *Gemellima*, as the hinge is practically toothless, while that of *Notolimea* has a very complex series of teeth, quite perpendicular and so unlike that of *Limea strigilata* Brocchi, the type of *Limea*, a fossil figured by Sacco,¹⁶ as to need no detailed comparison.

The type of *Gemellima* is *L. austrina* Tate, and *L. parvula* Verco may at present be associated with it, but, as the hinge is developing strong teeth, and the shell is less solid and smaller and slightly differently sculptured, it must be subgenerically designated with the new name *Isolimea*.

EXOSIPERNA gen. nov.

The name *Solamen rex* was proposed for the New South Wales shell previously referred to *Arcoperna*, and a beautiful living specimen was brought in by Howell, so that the soft parts may be later studied. Comparison of the shells included as *Musculus scapha* by Hedley from 80 fathoms, 22 miles off Narrabeen, New South Wales, showed that, while they agreed generically with Verco's species, they differed specifically in shape, being notably broader

¹⁶ Sacco.—I Molluschi terz. del Piemonte, part xxv, 1898, p. 21, pl. vi, figs. 4-7.

and more convex, the anterior dorsal border longer and straighter, and the apex much less incurved.

Compared with *Solamen* these shells are much smaller and more solid, with a fine cancellate sculpture; and do not show the hiatus in the sculpture so characteristic of *Musculus* and *Crenella*, while the muscle scars differ. The genus name *Exosiperna* is introduced, with *A. scapha* Verco¹⁷ as type, and the specific name *Exosiperna relata* for the New South Wales species above described.

Family TROCHIDÆ.

For many years the Trochoid shells arranged under the genera *Monilea* and *Minolia* have been confused. An attempt was made in the paper cited¹⁸ to separate the species. A few poor figures were given to assist, but the matter could not be regarded as settled. A further contribution is here added and excellent figures are provided.

The genus *Monilea* was dismissed in the abovenamed paper, while *Minolia* was retained for shells conchologically similar to the Japanese form. Since then, however, Thiele has described the radula of a Japanese species and this is quite unlike the radula of our species. Hence *Minolia* must also be rejected.

Genus SPECTAMEN Iredale.

1924. *Spectamen* Iredale, Proc. Linn. Soc. N.S.W., xlix, p. 227, Oct. 24, 1924. Type by original designation, *Trochus philippensis* Watson.

SPECTAMEN PHILIPPENSE (Watson).

(Plate xxxix, fig. 2.)

1881. *Trochus philippensis* Watson, Journ. Linn. Soc. (Lond.), Zool., xv, 1881, p. 92; Port Phillip, Victoria. *Id.*, Rep. Sci. Res. Chall., Zool., xv, 1886, p. 73, pl. vi, f. 10.

1918. *Minolia philippensis* Hedley, Journ. Proc. Roy. Soc. N. S. Wales, li, 1918, p. M44.

1924. *Spectamen philippensis* Iredale, Proc. Linn. Soc. N. S. Wales, xlix, 1924, p. 227, pl. xxxv, f. 11.

Contrasted with the succeeding two species this appears to grow to a larger size, and the flames are further apart and consequently fewer than in *bellulum*; in shape less conical but with the striæ of about the same strength. The very close relationship of these three makes it difficult to associate directly the fossil *Monilea strigata* Tenison-Woods, which is apparently an ancestral form of this series.

¹⁷ Verco.—Trans. Roy. Soc. South Austr., xxxii, 1908, p. 196, pl. xii, figs. 1-5.

¹⁸ Iredale.—Proc. Linn. Soc. N. S. Wales, xlix, 1924, pp. 227-229.

SPECTAMEN BELLULUM (*Angas*).

(Plate xxxix, fig. 1.)

1869. *Minolia bellula* Angas, Proc. Zool. Soc., 1869, p. 48, pl. ii, f. 11; Brisbane Water, New South Wales.
1879. *Trochus dianthus* Fischer, Coquilles Vivants, Trochus, 1879, p. 396, pl. cxviii, f. 2; new name for *Minolia bellula* Angas.
1918. *Minolia bellula* Hedley, Journ. Proc. Roy. Soc. N. S. Wales, li, 1918, p. M44.
1924. *Spectamen bellula* Iredale, Proc. Linn. Soc. N.S.W., xlix, 1924, p. 227.

I observed (*loc. cit.*): "The species *bellula* is so close to this (*philippensis*), that it seems a geographical representative, but Hedley has recorded both from localities not very far apart."

The relationship is now known to be specific, as the ranges coincide, but it may be that the present species lives in shallower water. It is easily distinguished by the lack of the colour markings on the base.

SPECTAMEN EPITHECA *sp. nov.*

(Plate xxxix, fig. 8.)

Shell trochoid, of similar appearance to *S. philippense* and *S. bellulum* but easily distinguished by the more pronounced liræ. Colour creamy white, marked with irregular broad flames of red-brown, which persist on to the base, stopping before they reach the umbilical keel. The striæ on the penultimate whorl number fifteen below the shoulder and about six on the shoulder, all well marked and distinct, with no longitudinal striæ to obscure them. In *S. philippense* there are forty to fifty striæ below the shoulder, all closely packed, and none show on the shoulder, the puckering there being more marked.

The umbilicus is narrower, and no keel separates the umbilical cavity, the strong striæ continuing within.

Height, 8.5 mm.; breadth, 10 mm.

Type dredged by Roy Bell in Twofold Bay, New South Wales, 25 fathoms.

Range: New South Wales.

Genus MINOLOPS *nov.*

Type, *Minolia pulcherrima emendata* Iredale.

The shell characters do not show much difference from those of *Minolia*, but the radular features differ widely. Peile¹⁹ has figured that of the present form, while Thiele²⁰ has described and figured that of *Minolia casta*, which has little to do with our form.

MINOLOPS EMENDATA (*Iredale*).

(Plate xxxix, fig. 5.)

1924. *Minolia pulcherrima emendata* Iredale, Proc. Linn. Soc. N. S. Wales, xlix, p. 229, pl. xxxv, f. 12. Oct. 24, Twofold Bay, New South Wales, 10-25 fathoms.

As suggested at the time of description, this form appears to be of specific rank, five prominent keels being counted on the penultimate whorl, all of equal strength.

MINOLOPS PULCHERRIMA (*Angas*).

(Plate xxxix, fig. 3.)

1869. *Minolia pulcherrima* Angas, Proc. Zool. Soc., 1869, p. 48, pl. ii, f. 10; Brisbane Water, New South Wales.

Two prominent keels with minor intervening liræ give an angulate appearance to the whorls, while the shell is more conical; the striæ are also more pronounced, and the basal liræ less defined, save one very prominent one encircling the umbilical area, which is more contracted than in the preceding form.

MINOLOPS ROSULENTA (*Watson*).

1886. *Solarium rosulentum* Watson, Rep. Sci. Res. Chall., Zool. xv, 1886, p. 136, pl. viii, f. 12. Off Port Jackson, New South Wales, 35 fathoms.

1903. *Minolia rosulenta* Hedley, Austr. Mus. Mem. iv, 1903, p. 332.

The description and figure suggest relationship with the preceding.

MINOLOPS ARATA (*Hedley*).

(Plate xxxix, fig. 6.)

1903. *Minolia arata* Hedley, Austr. Mus. Mem. iv, 1903, p. 333, f. 65. Off Botany Bay, 50-52 fathoms, New South Wales.

¹⁹ Peile.—Proc. Malac. Soc. (Lond.), xv, 1922, p. 17.

²⁰ Thiele.—Mittel. Zool. Mus. Berlin, xi, 1924, p. 58, f. 15.

Apparently not uncommon on the Continental shelf. I have not recognised Watson's similar *rosulenta*, and was inclined to think these synonymous, but the differently sculptured bases seem to separate them. The operculum seems to differ from that of *Spectamen*; contrast figures 6 and 8.

Genus ETHMINOLIA Iredale.

1924. *Ethminolia* Iredale, Proc. Linn. Soc. N. S. Wales, xlix, p. 228.
Type by monotypy, *E. probabilis* Iredale.

ETHMINOLIA PROBABILIS *Iredale.*

(Plate xxxix, fig. 4.)

1924. *Ethminolia probabilis* Iredale, Proc. Linn. Soc. N. S. Wales, xlix, p. 228, pl. xxxv, figs. 7-9. Twofold Bay, New South Wales.
1918. *Monilea angulata* Hedley, Journ. Proc. Roy. Soc. N. S. Wales, li, p. M44.

Genus ARCHIMINOLIA nov.

This generic name is proposed for the beautiful species named *Monilea oleacea* by Hedley and Petterd.²¹ Examination of the type shows it to have a very *Architectonica*-like aspect, and it was suggested that its relationships might be with that family, but its apex proved to be normal, not anastrophic, so that it is truly Trochoid. A resemblance, also superficial, is seen with some species closely related to *Ethalia* and *Umbonium* dredged at Lord Howe Island.

Genus TALOPENA Iredale.

1918. *Talopena* Iredale, Proc. Malac. Soc. (Lond.), xiii, 30. Type by monotypy, *Monilea incerta* Iredale.

TALOPENA GLORIOLA *sp. nov.*

(Plate xxxix, fig. 7.)

1918. *Monilea vitiliginea* Hedley, Journ. Proc. Roy. Soc. N. S. Wales, li, p. M44.

The true *vitoliginea*²² is most probably an *Ethminolia*, with which it agrees in shell characters.

The present species, which has been misidentified in New South Wales with the Western Australian shell, is more like the New

²¹ Hedley and Petterd.—Rec. Austr. Mus., vi, 1906, p. 215, pl. 37, f. 1.

²² Menke.—Moll. Nov. Holl. Spec., 1843, p. 18.

Caledonian *lifuana*,²³ which is also a *Talopena*, and which also occurs on the Great Barrier Reef. Shell conoidly turbinate, narrowly umbilicate, thin whorls flatly convex, not shouldered. Colour greyish fawn mottled all over with shades of brown, a wavy pattern of angular flames persisting on the base, being indistinctly seen. Apex very small, of about one whorl, six adult whorls succeeding, a slight shoulder seen in the earlier ones, disappearing on the later ones.

Sculpture: fine spiral liræ begin and increase in number throughout, though not showing much more strength in the first and last whorls. On the other hand very fine longitudinal striæ are scarcely discernible on the earliest whorls and are stronger on each succeeding whorl until they almost equal the spirals on the last whorl where they are a little weaker and more numerous and thus produce a weak cancellated effect, which is almost as marked on the base. The whole surface is a dull matt but not roughened.

The aperture is subangulately subcircular, the somewhat angulate periphery being more pronounced at the mouth, the outer lip thin; columella a little curved, bearing a funicle medially, which runs up the umbilical cavity. The umbilicus deep narrow bounded by a thickened rib which continues to the columella.

Height, 10 mm.; breadth, 11.5 mm.

Range.—New South Wales; type collected at Manly.

ASTELE SUBCARINATA *Swainson*.

It is a pleasure to add this magnificent Trochoid to the New South Wales fauna, and a splendid living specimen secured off Montague Island in 55-60 fathoms makes its entry definite. I have been unable to note any difference from the normal Tasmanian form, but it may be that a series would show variation.

The references for both genus and species read:

1854. *Astele subcarinata* Swainson, Proc. Roy. Soc. Van Diemen's Land, iii, p. 36, pl. vi, figs. 1-2. Tasmania.
1863. *Eutrochus perspectivus* A. Adams, Proc. Zool. Soc., 1863, p. 506. Tasmania.
1889. *Calliostoma (Eutrochus) adamsi* Pilsbry, Man. Conch. (Tryon), xi, 402, new name for *E. perspectivus* A. Adams.
1893. *Astele subcarinata* Brazier, Proc. Linn. Soc. N. S. Wales, (2), viii, p. 107-110, figs. in text.

²³ Fischer.—Journ. de Conch., xxvi, 1878, p. 63.

XENOPHORA TATEI *Harris.*

Hedley²⁴ added this fossil to the recent fauna from half-grown dead examples from off Port Kembla in 63-75 fathoms. As usual young examples are umbilicate, while adults are imperforate. A couple of odd living adult shells secured some time since threw doubt upon the identity of the recent and fossil species. A large series collected by Howell has shown that though the recent shell is certainly separable from the fossil it is scarcely distinguishable from the Neozelanic species. The Australian shells do not reach the size of the examples from New Zealand and are comparatively broader and less elate. It will be best to distinguish the local form as *Onustus peronianus*; photographs of this shell have been published in the Austr. Mus. Magazine, vol. iii, 1927, p. 57. An obvious means of separation will be the shells carried by the species. Finlay²⁵ has written about the reinstatement of the well-known *Onustus* for this genus.

Family CYMATIIDÆ.

Hedley²⁶ broke new ground when he described the deepwater form of the common shell known as *Septa rubicunda* Perry (olim *Triton nodiferus* Lamarck) as *Charonia nodifera* var. *euclia*. After discussing and figuring this West Australian form he added: "Since writing the above a series has been received from the 'Endeavour,' trawled off the South East Coast."

Odd specimens have since come to hand, and when Howell brought in shells referable *sensu lato* to *C. rubicunda* Perry, *Cymatium spengleri* Perry, and *Mayena australasia* Perry, all trawled together alive, the matter was reopened. All were seen to vary from the littoral forms in the same manner, elongation of the spire and more definite sculpture. Reconsideration forced the conclusion that the East Australian form differed from the true *euclia* in being comparatively broader and more regularly nodulose with other minor details. Also the relationship was with the Australian *rubicunda*, and not with the Mediterranean *nodiferus*, but certainly there appeared to be full specific validity. The deep-water shells are therefore regarded as a species *Charonia euclia* and the eastern shell here figured (Plate xli, fig. 5) is named sub-specifically as *Charonia euclia instructa* nov.

The difference between *euclia* and *rubicunda* was readily seen when Howell brought in a large shell of the latter measuring 185 mm. in length with a breadth of 125 mm., proportions quite unlike

²⁴ Hedley.—Mem. Austr. Mus., iv, 1902, p. 357.

²⁵ Finlay.—Trans. New Zeal. Inst., lvii, 1926, p. 391.

²⁶ Hedley.—Zool. Results "Endeavour," ii, 1914, p. 65, pl. viii.

that of *euclia*, 200 mm. by 100 mm. In addition the coloration of *rubicunda* was deep reddish brown, with brown markings on the mouth, while *euclia* was marked with pale orange brown, with dull pale brownish mouth markings. The sculpture in the latter was much bolder and the varices more flattened back, and therefore more projecting.

It may be noted that Finlay recorded *euclia* from off the southern New Zealand coast in deep water, and then determined the shells to be deepwater derivatives of the Neozelanic littoral representative of the Australian *rubicunda*. Again it is curious that no littoral form of this group has yet been found in Western Australia, whence *euclia* was first described.

As to the *Cymatium spengleri* series, the deepwater form is obviously more elongate and regular in growth. Through breakage sometimes an elongate specimen of the shore shell may be found, but when compared with the benthal shell it is seen to be quite irregular. The Victorian form of *spengleri* is much more obese than the New South Wales shell, which is typical, and will bear the name *C. spengleri barthelmyi* Bernardi.²⁷

I have already recorded that this was a variant and undoubtedly the name refers to the Victorian form.

I acquiesced in Hedley's suggestion that *A. Adams' boltenianum* was an aberration of *spengleri*, but more intensive collecting has negated that idea, and it is here reinstated as a valid species, apparently never growing any larger than the specimen figured (Plate xli, fig. 7), which has been compared with the type and agreed very accurately in detail. The deepwater form of *spengleri* figured (Plate xli, fig. 1) is here named *Cymatium (spengleri) procerum* nov.

Variation has long been noted in connection with *Mayena australasia* Perry, but it was difficult to diagnose geographical races, though there can be no hesitation in recognising the deep-water form here figured. Many specimens have now been secured, and all agree in the strong nodulation and the elongate spire, the spire being longer than the aperture. There are eight adult whorls, with a varix each half whorl, but these are a little irregular. The main sculpture is the two strong, nodulate, peripheral keels, whereas in the shore forms one is the rule, and when two are present one is much weaker, the nodules smaller and more numerous.

An immature specimen trawled at the same time shows the protoconch to survive as three and a half brown subglobose whorls but the apex is still missing. The first sculptured whorl has five concentric ridges with minor threads between, and overrun by fine

²⁷ Bernardi.—Journ. de Conch., (2), ii, 1857, p. 54, pl. 1, f. 1.

longitudinal scratchings; longitudinal ribs begin forming almost at once, and eight can be counted on the next half whorl, where a varix is formed; on each succeeding half whorl the nodules grow stronger, and on the fourth whorl the second row begins, the peripheral row being now well formed and angulately nodulose. I am naming this benthic form *Mayena (australasia) benthicola* nov. (Plate xli, fig. 4). As the slender form of *Cymatiella* has again turned up, being brought in by Howell from off Montague Island, it becomes necessary to review the *Cymatiella* group. With a good series available the forms recognised by Australian conchologists were easily determined, and I now conclude that Reeve's *quoyi* is an absolute synonym of his *verrucosus*, and that *eburneus* is certainly not Australian.

The Australian shell regarded as *eburneus* has very fine sculpture and is a comparatively broad shell; specimens are in this Museum from many places in Victoria, South Australia, and the east coast of Tasmania.

The South Australian shell here named *quoyi* is narrow and strongly sculptured but has the mouth contracted, which distinguishes it at sight from true *verrucosus*, which has even bolder sculpture and the mouth open.

The true *verrucosus* also occurs in South Australia, but appears to be most typical in Victoria, the east Tasmanian form being elongate and strongly sculptured like the New South Wales shell and closely allied to *columnaria*.

A better nomenclature would be thus displayed:

Cymatiella verrucosa Reeve. Victoria, South Australia.
peroniana nov. New South Wales, east Tasmania.
columnaria Hedley and May. East Tasmania, 100 fathoms.

Cymatiella lesueuri nov. = *eburneus* of Australian writers.
 Victoria, South Australia, east Tasmania.

Cymatiella gaimardi nov. = *quoyi* of South Australian writers.
 South Australia.

Most accounts can be reconciled by this means, as Pritchard and Gatliff were correct in regarding *quoyi* and *verrucosus* as synonyms and *eburneus* as distinct. Kesteven, who figured the apices of these species as distinct, handled the three I have discriminated, as proven by the specimens he named and figured in the Australian Museum. The species, as now distinguished, are therefore redescribed and figured here, and it is hoped the confusion will be dispelled by the study of the details given.

CYMATIELLA VERRUCOSA Reeve.

(Plate xl, fig. 2.)

Triton verrucosus Reeve, Conch. Icon. Triton, June, 1844, pl. xvii, f. 71. Hab.?

Triton quoyi Reeve, *ibid.*, pl. xix, f. 93. New Holland. Restricted type locality Victoria; specimen here figured from Port Phillip.

Shell small, variced, varix every three-fourths of a whorl.

Adult whorls five and one half in number, strongly sculptured, apex smooth.

Nine strong, longitudinal ridges can be counted between each varix, while these are over-ridden by nearly the same number of concentric ridges on the last whorl, a peripheral one forming a shoulder, above which lie two others and below about six similar ones: Two or three finer cords appear between each ridge, and throughout there is a fine longitudinal scratching.

Colour pale cream, a fine velvety periostracum present when living.

Mouth open, canal short, columella curved with four or five nodules present anteriorly; heavily varicose; inside the outer lip are six elongated separate teeth.

Length, 24 mm.; breadth, 13 mm.

CYMATIELLA LESUEURI sp. nov.

(Plate xl, fig. 11.)

Shell a little smaller than the preceding, similar in shape.

Adult whorls five, more finely sculptured, apex missing in shell figured.

The last adult whorl is sculptured with fifteen concentric cords between the varices, scarcely showing any subsidiary intervening ones except towards the base; longitudinal ridges obsolete but cords all beaded; on earlier whorls longitudinals are a little more pronounced.

Colour of dead shells chalky white, living ones not yet seen.

Mouth open, canal short, columella a little curved, showing anteriorly four short ridges; outer lip heavily variced; internally six short conical teeth appear.

Length, 19 mm.; breadth, 10.5 mm.

Type from Port Phillip, Victoria.

Range: Victoria, South Australia, east Tasmania.

This is the species known as *eburnea*, but it is certainly not *Triton eburneus* Reeve.

CYMATIELLA GAIMARDI *sp. nov.*

(Plate xl, fig. 7.)

Shell smaller than preceding, more attenuate and narrower.

Adult whorls six, strongly sculptured, apex smooth.

Sculpture formed of about nine strong primary ridges with a dozen subsidiary ones, while about twelve longitudinals between each varix form nodules at the intersections.

Colour golden brown.

Mouth cramped posteriorly, canal short, columella almost straight, posteriorly even a little cut back, a couple of strong teeth showing on anterior part of columella. Outer varix of mouth not as strong as in the preceding, while internally there are four or five short teeth.

Length, 15.5 mm.; breadth, 7 mm.

Type from Port Lincoln, South Australia.

Range: South Australia.

CYMATIELLA PERONIANA *sp. nov.*

(Plate xl, fig. 9.)

Shell in size and shape as preceding, but with a long canal and more open mouth.

Adult whorls nearly six, strongly sculptured, apex smooth, three whorled.

Sculpture consists of seven strong concentric chords with about twenty smaller thread-like ones; about a dozen longitudinal ridges form nodules at their intersection; three more prominent peripheral ridges are seen on the antepenultimate whorl.

Colour white, periostracum brown and very thin.

Mouth small, open, canal long, columella curved, three teeth very close together anteriorly, varix not very crass but prominent, with six short teeth internally.

Length, 16 mm.; breadth, 7.25 mm.

Type trawled off Montague Island, New South Wales, 50-60 fathoms.

Range: Southern part of New South Wales coast in deep water.

CYMATONA *gen. nov.*

This genus is provided for the shell described by Watson²⁸ as *Nassaria kampyla*, and figured under the name *Nassaria campyla*.²⁹ It appears to be the most common of the family on the Continental shelf. The very long oblique canal is characteristic, and it appears to have no close relationship with the genus *Fusitriton*.

The latter genus is represented by Hedley's *retiolus*, and the genus occurs in deep water off the extremities of South America, South Africa, eastern Australia and New Zealand, and thus has an antarctic range coincident with the littoral form for which Finlay³⁰ has introduced the generic name *Gondwanula*, naming *Ranella tumida* Dunker as type. The name seems to have been chosen through an unfortunate misapprehension of the data.

NEGYRINA, *gen. nov.*

This generic name appears to be necessary for the curious species *Triton subdistortus* Lamarck,³¹ which appears to have no definite resting-place. This course is taken as it now has to be added to the New South Wales list, a living specimen being brought in by Howell from off Montague Island in 55-60 fathoms. This shell agrees too closely with Victorian specimens for separation, though later this course may be necessary.

I have added *Cymatium waterhousei* A. Adams and Angas³² to our list, and I now find it necessary to distinguish the New South Wales form under the name *Cymatium waterhousei frigidulum* nov. (Plate xli, fig. 2), as it is altogether narrower than the South Australian typical form, measuring 75 mm. in length and only 35 mm. in breadth, with six adult whorls; there are six pronounced varices, a varix every three-fourths of a whorl, the earlier whorls unvariced. The colour is pale straw and the periostracum fine. The interior of the mouth is not ridged and the varix of the outer lip shows the external sculpture, not internal as in *spengleri*.

The New South Wales members of the family would now be:

Charonia euclia instructa Iredale.

Charonia rubicunda Perry.

Charonia pumilio Hedley.

Austrotriton parkinsonius Perry.

²⁸ Watson.—Journ. Linn. Soc. Lond., Zool. xvi, 1885, p. 594.

²⁹ Watson.—Rep. Sci. Res. Chall. Zool. xv, 1886, p. 405, pl. xiv, f. 12.

³⁰ Finlay.—Trans. New Zeal. Inst., lvii, 1926, p. 399, 1927.

³¹ Lamarck.—Hist. Anim. s. Vert., vii, 1822, p. 186.

³² Iredale.—Rec. Austr. Mus. xiv, 1925, p. 261.

- Austrotriton (parkinsonius) basilicus* Iredale.
Distorsio reticulata Bolten.
Cymatium caudatum Gmelin.
 exaratum Reeve.
 gemmatum Reeve.
 labiosum Wood.
 australasia Perry.
 sinense Reeve.
 waterhousei frigidulum Iredale.
 spengleri Perry.
 (*spengleri*) *procerum* Iredale.
 boltenianum A. Adams.
 pyrum Linné.
 zimara Iredale.
 nicobaricum Bolten.
Cymatiella peroniana Iredale.
Cymatona kampyla Watson.
Fusitriton retiolus Hedley.
Negyryna subdistorta Lamarck.
Mayena australasia Perry.
Mayena (australasia) benthicola Iredale.

CHARONIA PUMILIS *Hedley.*

The species *Charonia pumilio* Hedley has not again turned up and may be the juvenile of a large form.

In the deep water there appears to be more than one species referred to *Austrotriton* but the material is not sufficient to determine yet.

The genus *Cymatium* requires revision, but as most of those here named belong to northern groups, they will be attended to in connection with Queensland shells now being studied. Thus the forms classed under *caudatum* Gmelin and *sinense* Reeve certainly need reconsideration, while two different shells are called *exaratum* Reeve, and the Sydney form, which is, however, not common, may need differentiation.

The species classed by Hedley under *Gyrineum* and *Bursa* are known in New South Wales only as stragglers, and are also under consideration in connection with Queensland shells.

XENOGALEA SPECTABILIS *sp. nov.*

(Plate xxxviii, fig. 6.)

As my review was going through the press I added in connection with *X. paucirugis* (p. 346)³³ that Mr. W. Boardman had

³³ Iredale.—Rec. Austr. Mus. xv, 1927, pp. 321-354.

brought in a shell from off Montague Island which agreed with specimens from the Ninety Mile Beach, Victoria, which my friends in Victoria, Messrs. Gatliff and Gabriel, regarded as *pyrum*, from which conclusion I dissented. The magnificent specimen brought in by Howell, also from off Montague Island, definitely proves this form to be a distinct species. It is as large as the largest *stadialis* but is much thinner, and has a shorter spire and a double peripheral keel.

Shell large, globose, thin, spire very short, a little attenuate, less than one-third the length of the aperture. Whorls somewhat roundly shouldered, the shoulder most marked and subangular in body whorl.

Early whorls sculptured with close concentric lines, a few slanting threads becoming more prominent on the third adult whorl and then vanishing. Body whorl smooth save for growth lines and the shoulder ridges. Aperture reverse earshaped, elongate; outer lip rolled back, smooth within.

Coloration pinkish cream marked with seven brown bands showing most strongly on the outer lip.

Apical whorls four, very regularly wound, beginning from a very small whorl and increasing slowly; six adult whorls, the last increasing very rapidly. On the third a shoulder develops and on the fourth this becomes rounded and succeeded by a groove, which is more pronounced on the next whorl, and on the last whorl another groove succeeds, the median shoulder ridge becoming closely nodulose.

Canal short, recurved, preceded by a long broad gutter running into a deep false umbilicus, which is entirely hidden from the front by the reflection of the inner lip. Snout a little turned back; an umbilical chink persisting; columella internally wrinkled, half a dozen being counted when the shell is twisted, a couple only seen from the outside. Aperture fairly wide.

Length, 100 mm.; breadth, 74 mm.

Type from off Montague Island, New South Wales, 50-60 fathoms.

NATICA LUCULENTA *sp. nov.*

(Plate xl, fig. 10.)

This beautiful species, with the facies of a tropical shell, may be related to some fossil form, but the characteristic colouring of the recent shell would be missing; otherwise it suggests *sagittata* or *gualteriana* as being a deepwater relative.

Shell globose, thin, spire short, mouth large, umbilicus small.

Colour shining buffy cream, regularly spotted with splashes of orange brown.

Apex minute, whorls six rapidly increasing, smooth save for very fine growth striae; sutures lightly impressed, edges plain. Aperture large, semilunate. Umbilicus open but narrow with a small distinct funicle leading into it from the inner lip, which posteriorly develops a callus spreading on to the body whorl as it reaches the outer lip. Operculum unknown.

Height, 24 mm.; breadth, 21.5 mm.

Trawled off Montague Island, New South Wales, 50-60 fathoms.

Family VOLUTIDÆ.

I³⁴ gave a few notes on the species, and, noting that Hedley regarded *Voluta maculata* Swainson as the type of *Scaphella*, renamed the species *Scaphella caroli*. At Dr. Marwick's request I re-examined the matter and he³⁵ has published a note pointing out the rejection of *Scaphella*, the type being *V. junonia* Hwass.

The next name for the *undulata* series appears to be *Amoria* Gray,³⁶ though the species are not typical, *Amoria* properly belonging to the tropical group of *volva* Gmelin, the type being *turneri* Gray and its associates. The correct course would be to separate the lined southern forms under the subgeneric name *Amorena* nov., the form, apex and columellar plaits differing, while another subgenus should be created for the *zebra* series under the name of *Zeboramoria*, the same details showing differing features.

As Marwick noted the type of *Cymbiola* is *Voluta cymbiola* and the species allotted to this genus by Hedley need distinction, as none agrees with that type. Neither can the three associated by Hedley be kept together, unless subgeneric distinction only be allowed for the differences observed.

The species *V. magnifica* Perry is of large size, has four delicate plaits and a very regularly wound small protoconch. The second species, *V. marmorata* Swainson, is a smaller species with a smaller, more conical, regular protoconch, the plaits better marked and an altogether differently shaped mouth, approaching more the true *Cymbiola* in that respect. As to *V. punctata* Swainson, which I renamed *Cymbiola complexa*, it is a small crass shell, the protoconch missing in the specimens examined, the plaits very thick and pronounced and recalling some species allotted to *Cymbiola*, but obviously with a different protoconch, as theirs is planate and therefore always present.

³⁴ Iredale.—Proc. Linn. Soc. N. S. Wales, xlix, 1924, p. 258.

³⁵ Marwick.—Trans. New Zeal. Inst., lvi, 1926, p. 264.

³⁶ Gray.—Proc. Zool. Soc., 1855, p. 64 (May 16th).

It seems best to differentiate *V. magnifica* as a new genus *Cymbiolena* and introduce *Cymbiolista* as a new subgenus, with *V. marmorata* as type, and *Cymbiolacca* as another new subgenus, with *Cymbiola complexa* as type.

Brazier's *Voluta kenyoniana* was degraded to the rank of a variety of *papillosa* by Verco³⁷ and this was accepted by Hedley. As only the supposed variety comes from the New South Wales coast it is here reinstated with specific rank, and if it be regarded as an *Ericusa*, then the species known as *sowerbyi* Kiener must be generically separated. The short stout form of *kenyoniana* is quite unlike the graceful elongate shape of the so-called *sowerbyi*, whose plaiting is very different. While *sowerbyi* has delicate sloping plaits, *kenyoniana* has very crass thickened ones. The name *Voluta sowerbyi* Kiener can be applicable only to the south Tasmanian shell, and the New South Wales species differs in its larger size, lengthened spire, narrower build, and somewhat different coloration, and is here separated with the name *Mesericusa sowerbyi perspecta* nov. (Plate xli, fig. 9). This is one of the commonest shells brought up by the trawl, and large and small shells are constantly found. There seems to be a distinct discrepancy in size as shown in the photograph, the large form measuring 260 mm. in length and 140 mm. in breadth, the small one being only 95 mm. by 38 mm. As these are always found and always seem to be adult, it is suggested that the dwarfs are males and the large specimens are females. It may be noted that this marked size distinction has not been noted in connection with other Australian *Volutes* on the east coast, but that Verco³⁸ has observed it in South Australian waters in connection with *S. fulgetrum* Sowerby.

A very curious little shell suggesting *undulata* in miniature is introduced as

NANNAMORIA AMICULA *gen. et sp. nov.*

(Plate xl, fig. 4.)

Shell very small, spire less than half the length of the aperture, acuminate.

Colour of dead shell white with yellow irregular longitudinal lining.

Sculpture consists of eight nodules on shoulder of last whorl, with about twelve on the preceding two, a three-whorled regular smooth protoconch present. The last whorl shouldered, the mouth narrow, almost linear, the outer lip thickened but not varicose.

³⁷ Verco.—Trans. Roy. Soc. South Austr., xxxvi, 1912, p. 228.

³⁸ Verco.—*Loc. cit.*, p. 222.

The columellar plaits are six in number, three large alternating with three smaller.

Length, 27·5 mm.; breadth, 12 mm.

Trawled off Montague Island, New South Wales, 50-60 fathoms.

CONUS HOWELLI *sp. nov.*

(Plate xl, figs. 1, 8.)

This most striking discovery, resembling no recent member of our fauna, recalls the Eocene fossil *Conus ligatus* Tate,³⁹ which is comparatively coarser.

Shell of medium size, elegantly coniform, sharply angulate at the shoulder, early whorls concave above, spire acute, less than half the length of the aperture, the apical whorls missing, apparently papillate.

Colour pale dove grey, the body whorl encircled with three underlying bands of paler hue made up of slanting, white, linear marks. Adult whorls eight, sculpture of spire consisting of concentric growth lines only, the peripheral carina being subrenulate; the growth lines become fainter on the body whorl, where anteriorly revolving liræ persist in a subdued manner.

Aperture linear, canal short narrow, outer lip thin.

Length of type, 27 mm.; breadth, 13·25 mm.

Trawled off Montague Island, New South Wales, 50-60 fathoms.

LARGISIPHO (OLIGOSTIRA) SPECTANDA *nov.*

(Plate xli, fig. 6.)

Shell large, regularly fusiform, spire a little shorter than the aperture.

Colour brownish cream.

Apical whorls missing, adult whorls eight, regularly increasing, convex, obsoletely subangulate at the shoulder.

The sculpture consists of closely packed concentric cords with narrow interspaces, each interval bearing a thread; about sixteen of these can be counted upon the penultimate whorl; about sixteen rounded ribs may be distinguished running longitudinally down the shell, but ill-defined and only pronounced as peripheral elongate nodules, becoming obsolete on the last whorl, until they reappear

³⁹ Tate.—Trans. Roy. Soc. South Austr., xiii, 1891, p. 196, pl. viii, f. 9.

as nodules near the aperture. Growth threads over the whole surface are weakly seen. Inner lip curved and spreading into a thin glaze on the body whorl, smooth, outer lip slightly thickened and internally ridged, agreeing with the external sculpture. Canal long, curved.

Length, 135 mm.; breadth, 61 mm.

Trawled off Montague Island, New South Wales, 50-60 fathoms.

When Tate⁴⁰ introduced the species from South Australia he called *Siphonalia oligostira*, he contrasted it with the Neozelanic *mandarina*, but noted the difference in the nuclear whorls. This difference has been found to persist between the Neozelanic *dilatata* and the Australian *maxima*, and consequently my generic name *Verconella* must be used in connection with the former. The name *Austrosipho*, proposed for the fossil *F. roblini* Ten. Woods, was suggested as available for these Australian species, but that species recalls *Propefusus* or *Berylsma* as much as the present series. As there appears to be some confusion in connection with the fossils, it is considered inadvisable to cause further perplexity, and therefore the new name *Largisipho* is introduced, the present species being named as type. It differs from *S. oligostira* in form and nodulation but appears closely related; it is easily separated from *Berylsma* by its broader build, more open mouth, and shorter canal, and especially by the facies, which is definitely that of the "*Verconella*" series.

RATIFUSUS ADJUNCTUS *gen. et sp. nov.*

(Plate xl, fig. 5.)

Shell small, regularly fusiform, spire longer than aperture, whorls convex, sutures deep, aperture subvaricose, with suggestion of posterior sinuation, canal short, open.

Colour white, irregularly blotched with orange brown, running into bands below the suture and about the periphery of the last whorl.

Apical whorl minute, tilted, smooth, half immersed in succeeding whorl, which is also smooth; another smooth whorl follows and then sculpture begins without any indication of a varix. The sculpture begins as concentric liræ about eight in number, with longitudinal growth lines, producing an obsolete cancellation. An obscure varix is indicated at the end of the next whorl, and there are suggestions of indefinite varices about every whorl. The cording continues, increasing in number but not in strength, and the growth lines similarly remain weak, so that a subdued, minute, cancellate effect is produced.

⁴⁰ Tate.—Trans. Roy. Soc. South Austr., xiii, 1891, p. 258, pl. xi, f. 6.

The outer lip is thickened and bevelled but not strongly varicose, and quite smooth inside; a sinuate curve suggesting an anal groove may be seen, and the outer runs up the body whorl a little, forcing the spire into an excentric position. The mouth is fairly wide, oval, anterior canal short and open. Columella smooth, inner lip a little reflected forming a slight body glaze.

Length, 16 mm.; breadth, 5 mm.

Trawled off Montague Island, New South Wales, 50-60 fathoms.

This is another member of the series recently called *Fusus*, and differs from *F. mestayeræ* and *schoutanicus* in the suppression of the varices and in nuclear features. There appear to be two series of similar species living in southern waters, as well as my *Obeæ* form, and, though of complex nature, the group is of great age, many forms being known from the fossil beds of Victoria and South Australia. It will be a difficult task and will need much material to correlate the recent and fossil forms, as in both cases species very similar, but certainly distinct, have already been found.

XENOTROPHON EUSCHEMA *gen. et sp. nov.*

(Plate xl, fig. 3.)

Shell small, tumid, fusiform, spire a little shorter than aperture, mouth rounded, free, canal long, straight and narrow.

Colour creamy white.

Protoconch of one and a half smooth whorls, apex incurved, flattened, the succeeding four adult whorls separated by an obsolete varix.

Adult sculpture begins with two concentric ridges, the upper one forming a shoulder, the lower a peripheral ridge; these two persist and a minor ridge appears above the shoulder and six to eight below, all weaker than the primary ones. Longitudinal growth lines developing into wrinkled, laminate, erect frills appear, about one dozen on the first adult whorl; this sculpture continues irregularly the frills are much stronger, as if representing growth periods.

The mouth is rounded, the outer lip thickened but not varicose; the inner lip developed and freed from the body whorl, an umbilical chink being present.

Length, 17.5 mm.; breadth, 10 mm.

Type trawled off Montague Island, New South Wales, 50-60 fathoms.

The generic name *Trophon* has been used for a series of large and small shells, most unlike the genotype and has been rightly dismissed from the Neozelanic list by Finlay,⁴¹ who showed that the shells most like *Trophon* differed both in radular characters and in apical features. The only Australian shell at all recalling the genotype is the deepwater *carduelis* Watson,⁴² and in detail this is so dissimilar, a definite and very important feature being the plugging of the decapitated apex, a feature quite foreign to the true *Trophon*. The new generic name *Enixotrophon* is introduced for this species alone.

Another species at once separable is the *Murex licinus* of Hedley and Petterd, afterwards transferred to *Trophon*, which has a short squat shape, with short spire, huge open mouth, and short open canal, which is here designated with the new generic name *Emozamia*.

The little shell Hedley called *Trophon simplex* is a common member of the Shelf fauna, and is generically named *Enatimene*, the small apex, medium spire, delicate shape, long recurved canal, and free mouth, making it a striking form, the sculpture being an obsolete clathration.

The minute shore shells such as *rudolphi*, *goldsteini* and *brazieri* may be named *Litozamia*, their short fusiform shape, with a medium canal and a smooth apex, with their purplish tone of coloration, differentiating them from the preceding groups; *rudolphi* is named as type. Another well marked series is represented in the species adorned with frilled longitudinal laminae after the style of the true Trophons. The generic name *Gemixystus* is proposed, and *laminatus* is named as type. This species has a short spire, open mouth, long recurved canal, and laminate sculpture; the apex is angulate. *T. stimuleus* is very similar but has a smooth rounded apex, a feature otherwise regarded as generic, but it is here named *Apixystus*, with subgeneric value only. A deepwater form appears in *segmentatus*. A beautiful form with the same kind of sculpture, but perhaps unrelated, is *columnarius*, with a very long spire and very long apex and short canal. It is here generically named *Benthoxystus*, and the littoral *petterdi* may belong here, being similar but not of such striking proportions.

Two very different species, which do not appear to belong to this association of molluscs, were added by Hedley and May. The first, *Trophon molorthus*, has a long spire, a small apex, a medium canal, and a narrow mouth; it has a sculpture of concentric cords overrunning longitudinal waves, quite unlike any other of the

⁴¹ Finlay.—Trans. New Zeal. Inst., lvii, 1926, p. 419-425.

⁴² Watson.—Rep. Sci. Res. Chall., Zool., xv, 1886, p. 167, pl. 10, f. 7.

species above treated. The new generic name *Ollaphon* is introduced for this species, and it would be better placed near *Fusinus*.

Still more distinct is *Trophon sarmentosus*, with its long spire, short canal, and distinct semivaricose sculpture, recalling that of *Galfridus*, whose relation it may be. Until this can be determined it may be regarded as a genus *Anatrophon*, and *latior* may be a deepwater relation.

With time and material it would probably be easy to link up these recent species with the fossils and thus prove their distinct origin. In May's Checklist of the Mollusca of Tasmania the species named *Donovania fenestrata* by Tate and May⁴³ has been transferred to *Trophon*. It does not appear to have anything to do with this series, and still less with *Donovania* = *Syntagma*; it is here differentiated generically with the name *Gatliffena*, as a mark of respect for the venerable Victorian collector, J. H. Gatliff.

TOLEMA *gen. nov.*

(Plate xli, figs. 3, 8.)

This genus is introduced for *Purpura sertata* Hedley,⁴⁴ which was afterwards regarded by its author as synonymous with *Coralliophila lischkeana* Dunker,⁴⁵ a Japanese species. The adult shell has not yet been figured, as Hedley's species was based on an immature shell. It is quite like the Japanese form but is separable by means of the sculpture; it is a resident of our deeper water. The genus *Coralliophila*⁴⁶ has been utilised to cover many diverse forms of coral-living mollusks, and its type was fixed as *P. neritoidea* Lamarck,⁴⁷ which is not closely related to the present beautiful group, which, in connection with Japanese species, has been referred to the neighbourhood of *Latiaxis*.

MATHILDONA EUGLYPTA *gen. et sp. nov.*

(Plate xl, fig. 6.)

This very beautiful shell was recognised at sight as very closely resembling the true *Mathilda* Semper, based upon an Italian fossil. The other Australian species heretofore classed under *Mathilda* are quite unlike the type and also unlike each other. Shell tall, tapering, slender, thin, whorls rounded, regularly increasing, base rounded, imperforate. Apex anastrophic, tilted, slightly immersed

⁴³ Tate and May.—Trans. Roy. Soc. South Austr., xxiv, 1900, p. 94.

⁴⁴ Hedley.—Austr. Mus. Mem. iv, 1902, p. 332, figs. 95, 96.

⁴⁵ Hedley.—Rec. Austr. Mus. vi, 1906, p. 219.

⁴⁶ H. and A. Adams.—Gen. Rec. Moll. i, 1853, p. 135.

⁴⁷ Iredale.—Proc. Malac. Soc. (Lond.), x, 1912, p. 221.

by succeeding whorls, smooth. Colour of shell creamy white, apical whorls red-brown. The sculpture is composed of strong concentric ridges overridden by fine, close, longitudinal threads, forming a beautiful clathration. At first there are only three ridges but later subsidiary ones develop, though the primary three remain the most prominent. About forty longitudinals may be counted, which become weaker on the base, where six weak cinguli persist. The mouth is subcanaliculate, a weak basal notch appearing in front of the slightly twisted columella, outer lip thin.

Length 20 mm.; breadth 7 mm.

Trawled in 50-60 fathoms off Montague Island, New South Wales.

Nearest the fossil type of *Mathilda*, this species differs in the form of the protoconch, and Cossmann has separated the Palæartic fossils into groups by means of this feature so that it is necessary to avoid confusion to designate the Austral groups also. The fossil *Scalaria triplicata* Tate suggests comparison.

Finlay⁴⁸ has already introduced *Brookesena* for Suter's *Mathilda neozelanica*, observing that the Australian *decorata* is not congeneric, the resemblance being merely superficial.

Mathilda rosæ Hedley is quite unlike any other form; the anastrophic apex is succeeded by a long spiral with sharp cinguli but no longitudinals, spreading to a square base with a square mouth and a deep perforation. The new generic name *Charilda* is introduced for this alone. More different still is the beautiful shell named *elegantula* by Angas, with a longer spire, a tilted turbinate apex, a subplicate columella and lirate sculpture; it is imperforate, though the mouth is squarish. For this species the new genus *Eucharilda* is proposed, while *Opimilda* is added for *decorata* Hedley, a short, squat, perforate shell, quite dissimilar.

The new names introduced in this paper are:

Nucula obliqua subdilecta subsp. nov.

Scæoleda gen. nov.: type *Nucula crassa* Hinds.

Scæoleda crassa illepipa subsp. nov.

Teretileda gen. nov.: type *Nuculana oculata* Iredale.

Magaleda gen. nov.: type *Leda inopinata* E. A. Smith.

Thestyleda gen. nov.: type *Leda ramsayi* E. A. Smith.

Comitileda remensa sp. nov.

Poroleda flindersi sp. nov.

Microcucullæa gen. nov.: type *Bathyarca perversidens* Hedley.

⁴⁸ Finlay.—Trans. New Zeal. Inst. lvii, 1926, 1927, p. 339.

- Microcucullæa adelaideana* sp. nov.
Loringella gen. nov.: type *Limopsis loringi* Angas.
Phrynelima gen. nov.: type *Limopsis brazieri* Angas.
Aspalima gen. nov.: type *Limopsis erectus* Hedley and Petterd.
Aspalima erecta idonea subsp. nov.
Cyrrillona gen. nov.: type *Cyrrilla dalli* Hedley.
Cyrrillista gen. nov.: type *Nuculina concentrica* Verco.
Glycymeris magnificens sp. nov.
Glycymeris broadfooti sp. nov.
Mesopeplum gen. nov.: type *Mesopeplum caroli* Iredale.
Mesopeplum caroli sp. nov.
Mimachlamys gen. nov.: type *Pecten asperrimus* Lamarck.
Sceochlamys gen. nov.: type *Pecten lividus* Lamarck.
Equichlamys gen. nov.: type *Pecten bifrons* Lamarck.
Belchlamys subgen. nov.: type *Pecten aktinos* Petterd.
Talochlamys subgen. nov.: type *Chlamys famigerator* Iredale.
Veprichlamys subgen. nov.: type *Chlamys perillustris* Iredale.
Chlamydella gen. nov.: type *Cyclopecten favus* Hedley.
Ctenamusium gen. nov.: type *Amusium thetidis* Hedley.
Ctenamusium salacon sp. nov.
Spondylus (tenellus) regillus nov.
Austrolima gen. nov.: type *Lima nimbifer* Iredale.
Austrolima nimbifer gemina subsp. nov.
Austrolima spectata sp. nov.
Escalima gen. nov.: type *Limea acclinis* Hedley.
Escalima murrayi maugeana subsp. nov.
Escalima murrayi relegata subsp. nov.
Gemellima gen. nov.: type *Limæa austrina* Tate.
Isolimea subgen. nov.: type *Limæa parvula* Verco.
Exosiperna gen. nov.: type *Arcoperna scapha* Verco.
Exosiperna relata sp. nov.
Spectamen epitheca sp. nov.
Minolops gen. nov.: type *Minolia pulcherrima emendata* Iredale.
Archiminolia gen. nov.: type *Monilea oleacea* Hedley and Petterd.
Talopena gloriola sp. nov.
Onustus peronianus sp. nov.
Charonia euclia instructa subsp. nov.
Cymatium (spengleri) procerum nov.
Cymatium waterhousei frigidulum nov.
Mayena (australasia) benthicola nov.
Cymatiella peroniana sp. nov.
Cymatiella lesueuri sp. nov.
Cymatiella gaimardi sp. nov.

- Cymatona* gen. nov.: type *Nassaria kampyla* Watson.
Negyriina gen. nov.: type *Triton subdistortus* Lamarck.
Xenogalea spectabilis sp. nov.
Natica luculenta sp. nov.
Amorena subgen. nov.: type *Voluta undulata* Lamarck.
Zebromoria subgen. nov.: type *Voluta zebra* Leach.
Cymbiolena gen. nov.: type *Voluta magnifica* Shaw and Nodder.
Cymbiolista subgen. nov.: type *Voluta marmorata* Swainson.
Cymbiolacca subgen. nov.: type *Cymbiola complexa* Iredale.
Mesericusa gen. nov.: type *M. sowerbyi perspecta* Iredale.
Mesericusa sowerbyi perspecta subsp. nov.
Nannamoria gen. nov.: type *Nannamoria amicula* Iredale.
Nannamoria amicula sp. nov.
Conus howelli sp. nov.
Largisipho gen. nov.: type *Largisipho (oligostira) spectanda* Iredale.
Largisipho (oligostira) spectanda nov.
Ratifusus, gen. nov.: type *Ratifusus adjunctus* Iredale.
Ratifusus adjunctus sp. nov.
Xenotrophon gen. nov.: type *Xenotrophon euschema* Iredale.
Xenotrophon euschema sp. nov.
Enixotrophon gen. nov.: type *Trophon carduelis* Watson.
Emozamia gen. nov.: type *Murex licinus* Hedley and Petterd.
Enatimene gen. nov.: type *Trophon simplex* Hedley.
Litozamia gen. nov.: type *Peristernia rudolphi* Brazier.
Gemixystus gen. nov.: type *Trophon laminatus* Petterd.
Apixystus subgen. nov.: type *Trophon stimuleus* Hedley.
Benthoxystus gen. nov.: type *Trophon columnarius* Hedley and May.
Ollaphon gen. nov.: type *Trophon molorthus* Hedley and May.
Anatrophon gen. nov.: type *Trophon sarmentosus* Hedley and May.
Gatliffena gen. nov.: type *Donovania fenestrata* Tate and May.
Tolema gen. nov.: type *Purpura sertata* Hedley.
Mathildona gen. nov.: type *Mathildona euglypta* Iredale.
Mathildona euglypta sp. nov.
Charilda gen. nov.: type *Mathilda rosæ* Hedley.
Eucharilda gen. nov.: type *Mathilda elegantula* Angas.
Opimilda gen. nov.: type *Mathilda decorata* Hedley.