

On the Freshwater Shells of Australia. By EDGAR A. SMITH.  
(Communicated by Dr. J. MURIE, F.L.S.)

[Read April 21, 1881.]

(PLATES V.-VII.)

OUR knowledge with respect to the freshwater shells of the Australian continent is comparatively in its infancy. Although more than one hundred and fifty species are now known (many of these but unsatisfactorily), this, in comparison with the extent of the country, is but a small number, probably not a moiety of those existing; and there is but little doubt that, in the course of time, when the known rivers and lakes and those as yet unexplored have been thoroughly investigated, many new species will be discovered.

Judging from those with which we are now acquainted, no very strange forms are to be expected; for, with the exception of the elongate *Unio novæ hollandiæ*, with its tuberculose surface and black epidermis, there are scarcely any except very ordinary types among them. The existence of a species apparently belonging to the African genus *Physopsis* is certainly remarkable; and another shell, described as a *Mycetopus*, if truly belonging to that genus, is interesting as the representative of a South-American group. However, it is not at all improbable that, whenever the animals inhabiting these two shells are examined, they will prove very different from those belonging to the genera to which they have been referred.

A few of the species hereafter enumerated are not peculiar to Australia; and among them may be instanced the ubiquitous *Melania tuberculata*, *M. amarula*, *Neritina crepidularia*, and *N. pulligera*. The most numerous-represented genus is *Physa*. Of this group no less than 52 distinct forms have been described. Some of these may eventually prove to be mere varieties, possessing no essential constant specific characters; but others new to science will in all probability ere long be added to the list. *Unio* is the next most important group in point of numbers, being represented by 17 different species. Then follows *Melania* with 12, *Neritina* with 10, *Limnæa* with 11, *Paludina* and *Corbicula* each having 9 species, *Hydrobia*? 6, *Planorbis* 6, *Sphærium* and *Bithynia* 4, *Pisidium* 3, *Segmentina* 2; and, finally, *Tatea*, *Amnicola*?, *Paludinella*?, *Larina*, *Gabbia*,



*Ancylus*, *Physopsis*, *Mycetopus*, and *Navicella* have but single representatives.

The great uncertainty and difficulty in determining the limits of most freshwater shells is well known. On this account, and considering the insufficient amount of material to work with, I trust that great allowance will be made for those errors which undoubtedly exist in the following account. However, I am confident that my labour has not altogether been expended in vain; for to bring together a list of the known species and to correct and amplify some of the descriptions will, it is hoped, be of some use to those who may hereafter study this particular group, and have not access to the types preserved in the British Museum.

In conclusion, I have to thank, on behalf of that institution, Mr. John Brazier of Sydney, who some time ago presented a large series of shells from the Australian rivers, especially valuable, as to each specimen its particular locality is attached.

To Mr. Taylor, editor of the 'Journal of Conchology,' my thanks are also due for the loan of another set, including three species of *Physa*, described in that publication by himself and Mr. Nelson.

I should also state that I have not included in this account the freshwater shells of Tasmania, as this subject has been investigated by more competent naturalists resident in that island. Mr. Tenison-Woods, Mr. Johnston, Mr. Brazier, Mr. Petterd, and others have written many valuable contributions to the knowledge of that subject. Considering the ease with which the ova of most species can be carried from place to place, it is very probable that some of the Tasmanian species will hereafter be proved to be the same as others from the mainland; and this is a subject to which I call the attention of Australian conchologists.

#### Genus MELANIA.

##### 1. MELANIA AMARULA, Linn.

*Hab.* Amboina (*Rumph*): Sumatra, Fiji Islands, Solomon Islands, Mauritius, Madagascar, Nicobar Islands, &c. (*Brit. Mus.*): Saltwater Creek, Cardwell, Rockingham Bay, Queensland (*Brazier* and *Beddome*).

Mr. Beddome remarks that the creek is always freshwater where these are found.

The specimens from Australia have the form of the variety



known as *M. cybele* of Gould, and the whorls are crowned with numerous acute denticles. They are coated with a black earthy deposit, but exhibit sufficient traces of the epidermis to show that it has been of the same villose character peculiar to this species. The columella is stained reddish, and the aperture is a little paler.

The *M. amarula* of the twelfth edition of the 'Systema Naturæ' was founded upon Rumph's description and figure, the latter being apparently roughly copied by Argenville. Rumph's specimens were from Amboina, by the natives of which island they are called Laholun, Lahorun, and Papeÿte, which signifies bitterish (*amarula*), the name adopted by Linné. If his figure be correct, the shell delineated was of rather short proportions, had the short spines at the top of the whorls well developed, and about twelve on a whorl.

The specimen in the Museum which most nearly resembles the figure is Sumatran, and approximates much more closely to it than that figured by Reeve from the Mauritius. His figure (175 a), representing the dorsal view of what he calls *Melania mitra*, is much more like Rumph's figure than his fig. 177.

In the 'Conchylien-Cabinet' Brot gives seven figures in illustration of this species, of which fig. 1 d appears to me to represent very closely the general proportions of Rumph's specimens.

As far as my present knowledge of these forms extends, I am unable to distinguish any *constant* differences in several so-called species, such as *M. mitra* (Meuschen), Reeve, *M. villosa*, Philippi, *M. cybele*, Gould, *M. crenularis*, Deshayes, *M. thiarella*, Lamarck, *M. cornuta* and *M. diadema*, Lea; the two latter, however, may differ somewhat in the character of the epidermis.

## 2. MELANIA BALONNENSIS, Conrad. (Plate V. figs. 1-3.)

*Melania balonnensis*, Conrad, *Proc. Acad. Nat. Sci. Philadelphia*, 1850, vol. v. p. 11; *id. American Journ. Conch.* vol. ii. p. 80, pl. i. fig. 10; Brot, *Küster's Con.-Cab.* p. 287, pl. xxviii. figs. 14-14 b & 15.

*Melania tetrica*, Conrad, *P. A. N. S. Phil.* 1850, vol. v. p. 11; *id. Am. Journ. Conch.* vol. ii. p. 80, pl. i. fig. 9; Brot, *Am. Journ. Conch.* vol. vi. *Append.* p. 303.

*Melania incerta*, Brot, *Matériaux*, i. p. 52; *id. Am. Journ. Conch.* vol. vi. *Append.* p. 303.

*Melania lirata*, Menke (*non Benson*), *Moll. Nov. Holl.* p. 9.

*Hab.* Balonne River and rivers of S.E. Australia (Conrad): Port Curtis, Queensland; Upper Clarence River and Paterson



River, New South Wales, and Murray River (*Brazier*): North Australia (*J. R. Elsey*): Mackenzie River (*Port-Essington Expedition* 1845): Burdekin River, Queensland (*Brazier and Port-Essington Expedition* 1845): Victoria; S. Australia (*Brit. Mus.*).

Dr. Brot appears to me quite correct in uniting *M. tetrica*, Conrad, with this species. The colour, as well as the sculpture, is subject to considerable variation. Some specimens are uniformly olivaceous, whilst others are closely spotted with small streaks and minute dots of a dark red, the latter being pretty constantly upon the spiral raised ridges. Two or three of the latter, around the middle of the whorls of the spire and at the upper part of the last volution, become more or less tubercular on crossing the plicæ.

Some of the specimens from the Burdekin River are remarkable for their large size and their general resemblance to *M. scabra* of Müller. The largest is 34 millim. long and 12 wide. The costæ are more numerous and less prominent than in the normal form, the tuberculation in consequence being likewise more feebly expressed, and the last volution is large and ventricose. To give an idea of the great variation in the number of longitudinal plicæ, I may note that the specimen bearing the fewest has but seven on the last whorl, whilst one (from Limestone Creek, Burdekin River) has just double that number. *M. scabrella* of Philippi, said to come from Java, is very like this species, and may eventually prove to be the same.

### 3. MELANIA AUSTRALIS, *Lea*.

*Melania australis*, *Lea*, *Proc. Zool. Soc.* 1850, p. 185; *Brot in Küster's Con.-Cab.* p. 285, pl. xxviii. fig. 17 (copied from Reeve) & 17 a, pl. xxxi. fig. 3; *id. Amer. Journ. Conch.* vi. *Append.* p. 303.

*Melania australis*, *Reeve*, *Con. Icon.* fig. 82; *Smith, Voy. Erebus & Terror*, pl. iv. fig. 3.

*Melania decussata*, *Brot, Matériaux*, i. p. 55.

*Melania cerea*, *Brot, Rev. Zool.* 1860, pl. xvii. fig. 13; *id. Con.-Cab.* pl. xxviii. fig. 16; *id. Amer. Journ. Conch.* vi. *Append.* p. 303.

*Hab.* Victoria River, N. Australia (*Lea* and *Reeve*): Fitzroy River, Swan River, Port Essington, and River-head, Dampier's Archipelago (*British Museum*).

The most common form of this species is that figured by Brot under the name of *M. cerea*. The ribs on the body-whorl are not usually so much developed as they appear to be in the specimen figured in the 'Conchologia Iconica.' In this respect it



rather agrees with Lea's description of them, "plicis numerosis, crebris," than with Reeve's, "plicis varicosis, distantibus."

There are several specimens in the Museum, received from Mr. J. R. Elsey from N. Australia, which differ from the normal form in having the last whorl less ventricose, streaked and spotted with reddish brown, and the whorls of the spire a little angulated at the upper part. These differences, however, are scarcely sufficient to distinguish them specifically.

4. *MELANIA CARBONATA*, *Reeve*.

*Melania carbonata*, *Reeve*, *Con. Icon.* fig. 88; *Brot*, *Con.-Cab.* p. 153, pl. xix. fig. 3.

*Hab.* Port Essington (*J. B. Jukes* and *Gould*).

The mouth of this species is usually not quite so broad as Reeve's figure represents it, and the colour rather browner.

5. *MELANIA TUBERCULATA*, *Müller*.

*Hab.* Upper Brisbane River, Queensland (*Brazier*).

I am not aware that this very widely-distributed species has been before recorded from Australia.

6. *MELANIA ONCA*, *A. Adams & Angas*.

*Melania* (*Melasma*) *onca*, *A. Ad. & Ang. Proc. Zool. Soc.* 1863, p. 415; *Brot*, *Con.-Cab.* ed. 2, p. 330, pl. xxxiv. fig. 7.

*Hab.* Adelaide River, N. Australia.

7. *MELANIA DENISONIENSIS*, *Brot.* (Plate V. figs. 4-8.)

*Melania denisoniensis*, *Brot*, *Con.-Cab.* p. 234, pl. xxv. fig. 6 *a-b*.

*Hab.* Port Denison, Queensland (*Brot*); Burdekin River, Cardwell and Rockhampton (*Brazier*).

The series of this species sent to the Museum by Mr. Brazier exhibits very considerable variation. The specimens, with one exception, described by Brot, on the other hand, were very similar, exhibiting only a difference in the prominence of the keel or angulation on the last whorl, and in the amount of the transverse striation. The largest shell in the series before me is very minutely spirally striated, with rather high whorls, and the aperture longer than usual. It would, if complete, have been about 60 millim. in length and 16 in diameter. It is of a very dark, almost black, colour, and traces of spots beneath the thick epidermis can be detected below the suture of some of the upper



whorls. It has no angulation whatever on the body-whorl. On the other hand, another example, equally large, and of the same dark tint, is very strongly carinate about two millim. from the suture, thus producing a conspicuous oblique tabulation. This, however, only extends as far as the penultimate volution, the rest of the whorls being merely slightly convex.

A fairly constant character, judging from the series before me, appears to be in the upper whorls of the spire being spirally striated throughout, whilst those lower down are more or less devoid of striæ at the upper part. The colour of the aperture also differs, sometimes being of a dirty pale bluish, and at others brownish. The basal brown band, too, is scarcely observable in large specimens, whereas in younger shells it is usually quite conspicuous; but even in some of these it is absent.

8. *MELANIA ONCOIDES*, *Tenison-Woods*.

*Melania oncoides*, *Tenison-Woods*, *Proc. Linn. Soc. N. S. Wales*, vol. iii. 1878, p. 5.

*Hab.* In creeks near Bourke, Darling River (*Tenison-Woods*).

The author describes this species as very close in form and colouring to *M. onca*, Angas. It is, however, smaller, conspicuously lirate, and scarcely plicated, except upon the upper whorls. The colour, too, is described as very pale yellow, marked longitudinally with red undulating lines. On the contrary, *M. onca* is clothed with a pale olive epidermis, and the dark-red markings consist of dots forming transverse longitudinal series.

9. *MELANIA VENUSTULA*, *Brot.* (Plate V. figs. 9-10.)

*Melania venustula*, *Brot*, *Con.-Cab.* ed. 2, p. 331, pl. xxxiv. figs. 5-5 a.

*Hab.* Port Denison (*Brot*); Victoria River, N. Australia (*J. R. Elsey*); Cape Upstart (*Brazier*).

One specimen from North Australia, presented to the Museum by J. R. Elsey, Esq. (*vide* fig. 10), is of a much more elongated form than that described by Brot, or either of the two specimens received from Mr. Brazier. It is acuminate, greenish yellow, without spots, obliquely longitudinally closely ribbed, and transversely sulcated upon the lower half of the body-whorl; spire acute. Whorls about 10, nearly flat, or scarcely convex; body-whorl rounded at the middle, at which point the costæ abruptly terminate and the spiral sulci commence. Aperture rather livid within, occupying a little less than one third of the entire length of the specimen.



Lip broadly sinuated at the upper part and prominent below. Columella covered with a whitish callus. Length 31 millim., diam. 9, aperture 9 long and  $4\frac{1}{4}$  broad.

10. *MELANIA QUEENSLANDICA*, n. sp. (Plate V. fig. 11.)

Shell ovately subfusiform, thick, decollated, greenish olive, smooth; sculptured with lines of growth, and a few revolving striæ at the base of the body-whorl. Volutions ? 10; four or five remaining ones flat at the sides, divided by a deepish and slightly oblique suture. Spire apparently rather sharply conical. Last whorl long, flattish at the upper part, very little rounded at the middle and below. Aperture bluish, elongately subpyriform, occupying about three eighths of the probable length of the shell. Lip thin; viewed laterally, it appears broadly sinuated at the upper part, and very much produced at and below the middle. Columella thickened with a white callus below the middle where it joins the base, only a little arcuate. Parietal callosity thin, bluish.

Probable total length 40 millim., actual length of four whorls 33, diam. 12, aperture  $14\frac{1}{2}$  long and 6 wide.

*Hab.* Saltwater Creek, Cardwell, Queensland, near the coast; and Paroo River, Queensland (*Brazier*).

This is very distinct from any other of the Australian species. The smooth surface, the greenish-olive colour, the decollated spire, and especially the long body-whorl are the principal characteristics.

11. *MELANIA ELSEYI*, n. sp. (Plate V. fig. 12.)

Shell elongate, acuminate, olivaceous (probably), spotted and streaked with reddish brown. Whorls 10, somewhat convex, furnished with slightly oblique and arcuate plicæ (about 12 on the penultimate whorl), crossed by a few spiral striæ, which are most conspicuous near the suture, both above and below. Plicæ upon the last volution obsolete about the middle, the transverse striæ extending to the base. Aperture ovate, acute above. Columella coated with a callosity.

Length 31 millim., width  $10\frac{1}{2}$ .

*Hab.* Australia (*J. R. Elsey*).

This species is more elongated than *M. australis*, with finer spiral striation and differently coloured. Unfortunately the only specimens in the Museum are in a dead condition and have lost the epidermis. This probably was of an olivaceous tint. The



shells in their present state are white, with reddish-brown streaks between the plicæ; these being more or less interrupted at the middle, form two series of oblong spots, one at the upper part of the whorls and one beneath. Upon the last volution the lower series are prolonged into wavy streaks extending to the base. The striæ are coarser upon the upper whorls than upon the last three or four, and, cutting across the plicæ, give the latter a nodulous appearance.

12. *MELANIA SUBSIMILIS*, n. sp. (Plate V. fig. 13.)

Shell elongate, turreted, yellow, streaked and dotted with red. Whorls about 10, shallowly excavated at the upper part, and slightly convex beneath the depression, obliquely plicated and spirally grooved. Plicæ about 12 in number upon a whorl, frequently almost obsolete upon the last, most conspicuous near the middle, and scarcely attaining to the suture either above or below; upon the upper whorls they are decidedly granose, though being cut across by the spiral grooves. Upon the last and penultimate volutions the nodules are one or two in number upon the plicæ; but further up the spire they are three or four; the uppermost ones mark the extent of the shallow depression, and stand out a paler colour than the rest of the surface. Last whorl grooved and ridged throughout. Ridges about 14 in number, those near the middle rather the coarsest. Aperture ovate, about one third the length of the shell, exhibiting the spotting of the exterior. Columella arcuate.

Length 25 millim., diam. 8.

*Hab.* Australia (*J. Gould.*)

*M. balonnensis* is the nearest ally of the present species. The latter is more elongated and narrower, has a less decided angulation near the middle of the whorls, and a general smoother appearance owing to the transverse grooves being shallower. The painting of the two species is very similar; but the epidermis of that described by Conrad, judging from the series in the Museum, is not so yellow as that which clothes [the eight] specimens of *M. subsimilis*.

Genus *VIVIPARA*.

Two peculiarities are constant in all the Australian species of this genus. Every example that has come under my examination exhibits spiral sculpture; and in none of them are colour-bands



found below the periphery. Mr. Brazier, however, has described one, *V. Alisoni*, as "smooth." I shall be glad to know whether in reality minute spiral sculpture is altogether absent in that species.

13. *VIVIPARA SUBLINEATA*, *Conrad*.

*Paludina sublineata*, *Conrad*, *Proc. Acad. Nat. Sci. Philad.* 1850, p. 11.

*Vivipara sublineata*, *Conrad*, *Am. Journ. Conch.* vol. ii. p. 79, pl. i. fig. 8.

*Paludina polita*, *Martens*, *Ann. & Mag. Nat. Hist.* 1865, vol. xvi. p. 256 (non *Viv. polita*, *Frauenfeld*, *Verhandl. zool.-botan. Ver. Wien*, 1862, p. 1163).

*Hab.* Darling River (*Conrad*); Balonne River (*M'Gillivray*); Lake Alexandria (*Strange*); Bogie River, Queensland (*Brazier*).

The subcarination near the periphery of the body-whorl mentioned by *Conrad* is also present in some of the specimens described by *Martens*.

14. *VIVIPARA ESSINGTONENSIS*, *Shuttleworth*.

*Vivipara essingtonensis*, *Frauenfeld*, *Verhandl. zool.-botan. Vereins Wien*, 1862, p. 1162.

*Vivipara suprafasciata*, *Tryon*, *Amer. Journ. Conch.* vol. ii. 1866, p. 8, pl. ii. fig. 7.

*Hab.* Port Essington (*Frauenfeld*); tropical Australia (*Tryon* and *M'Gillivray*); Victoria River, North Australia (*J. R. Elsey*); Cleveland Bay, Queensland (*Brazier*).

There appears to me no difference between the *V. suprafasciata* of *Tryon* and this species, except that the former, judging by the figure, seems rather broad. Possibly this may be an exaggeration and incorrectly drawn; for it is certainly broader than the dimensions given in the text.

Three specimens from Cleveland Bay, presented to the Museum by Mr. Brazier, are remarkable on account of their bright olive-green colour and the blackness of the transverse lines. Of these, the three principal ones on the body-whorl occupy the positions always observable in this species—namely, the lowermost being at the periphery and terminating in front just above the aperture, the uppermost one distant 2 to 3 millim. from the suture, and the intermediate one more or less equidistant between the others. Besides these, there are at times finer interjacent lines, which, however, are more frequently above the uppermost, or between that and the next beneath than between the latter and the lowermost principal bands. The peristome in these three examples is unusually stained with black.



15. *VIVIPARA AMPULLAROIDES*, *Hanley*.

*Vivipara ampullaroides*, *Hanley*, *Con. Icon.* (Paludina), fig. 30.

*Paludina australis*, *Reeve*, *Con. Icon.* fig. 71; *Martens*, *Ann. & Mag. Nat. Hist.* 1865, xvi. p. 255; *Smith*, *Voy. Erebus & Terror*, p. 3, pl. iv. fig. 19.

*Paludina affinis*, *Martens*, *l. c.* p. 256.

*Hab.* — ? and Victoria River, N. Australia (*Reeve*); Fitzroy River and Port Essington (*Capt. Wickham*).

It is difficult satisfactorily to draw a line of separation between this species and *V. essingtonensis*. It has rather less of an umbilicus and less convex whorls. The aperture, too, is a little acuminate at the base at a point where an obtuse angulation around the umbilical region terminates on the peritreme. The latter is somewhat, as it were, pressed down on the columellar side, reflexed and bordered with dark olive. The typical specimens of *V. ampullaroides*, *V. australis*, and *V. affinis* are all in the Museum collection, so that I can state with certainty that they are identical. *Reeves* describes the sculpture of *V. ampullaroides* as "minutely punctured," and that of *V. australis* as "minutely striated." On examining the shells figured, their sculpture proves to be of precisely the same character.

16. *VIVIPARA WATERHOUSII*, *A. Adams & Angas*. (Plate VII. fig. 14.)

*Vivipara Waterhousii*, *A. Adams & Angas*, *Proc. Zool. Soc.* 1863, p. 414.

*Hab.* Newcastle waters, Arnheim's Land, N. Australia.

17. *VIVIPARA KINGI*, *A. Adams & Angas*. (Plate VII. fig. 15.)

*Vivipara Kingi*, *A. Adams & Angas*, *Proc. Zool. Soc.* 1863, p. 415.

*Hab.* King's Ponds, Arnheim's Land.

This species resembles to some extent *V. intermedia*; but is distinguished by its larger umbilicus and the paler colour of the aperture.

18. *VIVIPARA INTERMEDIA*, *Hanley*.

*Vivipara intermedia*, *Hanley*, *Conchol. Icon.* (Paludina), fig. 57 (1863).

*Paludina purpurea*, *Martens*, *Ann. & Mag. Nat. Hist.* 1865, xvi. p. 428; *id. Mal. Blat.* 1865, p. 150.

*Hab.* — ? (*Reeve*); Murray River, Australia (*Martens*).

The specimens described by *Martens* were received from Mr. *Krefft*. The British Museum is also indebted to the same gentleman for three examples from the same river with the follow-



ing remark :—" Under water and old dead logs, and embedded in mud." On comparing these with the type of *V. intermedia*, I cannot trace any specific distinction.

19. *VIVIPARA ALISONI*, *Brazier*.

*Vivipara Alisoni*, *Brazier*, *Proc. Linn. Soc. N. S. Wales*, 1879, vol. iii. p. 221.

*Hab.* Dalmatia River, Queensland.

From the brief description of this species, it appears to differ from *V. sublineata* in the whorls being only "slightly convex" and "smooth." The latter character, if it apply to the absence of spiral striation, at once distinguishes this species from all the other known forms inhabiting Australia.

20. *VIVIPARA TRICINCTA*, n. sp. (Plate VII. fig. 16.)

Shell globosely conical, narrowly rimate, moderately solid, greenish yellow, encircled with three slightly raised, dark brown, subequidistant thickish lines, sculptured by the lines of growth and minute spiral lirulæ visible only under a lens, most conspicuous upon the spire and unequal in strength. Whorls 5, moderately convex, the penultimate somewhat bicarinated by the two raised brown lines, which are considerably paler, yet more prominent than upon the last volution; upon this the uppermost and lowermost lines are more raised than the intermediate one. Aperture ovately circular, bluish white, the exterior bands being visible only far within, occupying rather more than half the entire length of the shell. Peristome simple, thin; columellar margin narrowly reflexed and depressed, united to the termination of the outer lip by a thin bluish-white callus.

Length 22 millim., greatest diameter 18, above aperture 14; aperture 12 long, 10 broad.

*Hab.* North Australia (*J. R. Elsey*).

This species, of which there are eleven specimens in the Museum, has the bands in the same position as the three chief ones in *V. essingtonensis*. In the latter, however, they are not raised. The whorls are less convex, the umbilicus much smaller, and the substance stouter. The prominence of the lines upon the penultimate volution, amounting almost to keels, is very peculiar. The apex also is not purplish to the extent it is in *V. essingtonensis*.

21. *VIVIPARA DIMIDIATA*, n. sp. (Plate VII. fig. 17.)

Shell ovately conical, thinnish, umbilicated, olivaceous above



the periphery, greenish beneath it. Spire livid, purplish. Whorls 5, moderately convex, minutely spirally striated. Striæ raised, subgranular through being crossed by fine lines of growth. Last volution not particularly swollen, exhibiting in some specimens a faint obtuse angulation at the middle. Aperture irregularly broadly ovate, somewhat acute above, and a trifle effuse or pointed at the base, occupying about five ninths of the whole length; the lower half of it is whitish, with a red stain at the base near the columella and at some distance from the basal margin of the peristome; the upper half corresponding with the exterior is darker in colour. Peristome but very little reflexed on the columellar side. Callus uniting the upper extremity and the columella very thin.

Length 19 millim., diam. above aperture 12; mouth 10 long,  $7\frac{1}{2}$  wide.

*Hab.* Victoria River, N. Australia (*J. R. Elsey*).

This species may be known from *V. sublineata* by its rather narrower form, more conical spire, difference of colour, little wider umbilicus, narrower aperture and the red stain within it. The division of colour on the upper and lower part of the last whorl is more marked in some specimens than in others. The upper or dark colour in some examples exhibits faint indications of obscure narrow bands. The operculum is reddish, darker at the nucleus.

#### Genus LARINA.

##### 22. LARINA STRANGEI, *A. Adams*.

*Larina strangei*, *A. Adams*, *Proc. Zool. Soc.* 1854, p. 41, pl. xxvii. fig. 3.

*Hab.* Moreton Bay (*Adams*); Mackenzie River (*Brit. Mus.*).

This genus was supposed by Adams to be marine. It has, however, very close relationship with *Vivipara* on account of the similarity of the opercula; and it is undoubtedly a freshwater form, as is clearly proved by the Museum specimen, obtained in the Mackenzie River by the Port-Essington Expedition during the year 1845.

#### Genus BITHINIA.

##### 23. BITHINIA VERTIGINOSA, *Frauenfeld*.

*Bithinia vertiginosa*, *Frauenfeld*, *Verhandl. zool.-bot. Vereins Wien*, 1862, p. 1152, 1864, p. 665, 1865, p. 527, pl. ix.

*Hab.* New Holland (*Frfld.*).



24. BITHINIA SCHRADERI, *Frauenfeld*.

*Bithinia Schraderi*, *Frauenfeld*, l. c. 1862, p. 1153, 1864, p. 665, 1865, p. 527, pl. viii.

*Hab.* Australia? (*Erfld.*).

25. BITHINIA HYALINA, *Brazier*.

*Bithinia hyalina*, *Brazier*, *Proc. Linn. Soc. N. S. Wales*, 1875, vol. i. p. 9.

"Shell turbinated, thin, glossy, shining, whitish under a brown epidermis. Whorls 5, roundly convex; the last large, equalling half the length of the whole shell. Aperture somewhat lunate; peristome thickish; margins continuous. Length 4 lines, breadth  $2\frac{1}{2}$ .

"*Hab.* Eastern Creek, N. S. Wales.

"Found in various parts of New South Wales, about Parramatta and Chatsworth."—*Brazier*.

## 26. BITHINIA AUSTRALIS, n. sp. (Plate VII. fig. 18.)

Shell small, white, not perforate. Whorls 4–5, very convex, very finely striated by the lines of growth. Suture deep, scarcely oblique. Aperture small, obliquely oval, somewhat acute above, occupying less than half the entire length. Peristome continuous, a little prominent on the columellar side, thus producing a false umbilical rimation and somewhat thickened, thin elsewhere. Operculum normal, shelly.

Length 5 millim., diam. 3; aperture  $2\frac{1}{3}$  long,  $1\frac{1}{2}$  wide.

*Hab.* Victoria River, N. Australia.

Besides the striæ or lines of growth, by the aid of a compound microscope very fine transverse lines are observable.

Under the name of *B. affinis*, *Brazier*, two specimens found at Hillgrove Limestone Creek, Burdekin River, Queensland, have come under my observation, sent to Mr. J. Taylor of Leeds by Mr. C. E. Beddome of Hobart Town, Tasmania. They differ from those here described in having the last whorl smaller, the increase of the volutions appears to be less rapid, and the operculum is much more distinctly concentrically ringed by the lines of growth.

## Genus GABBIA.

27. GABBIA AUSTRALIS, *Tryon*.

*Gabbia australis*, *Tryon*, *American Journal of Conchol.* vol. i. p. 220, pl. xxii. fig. 7.

*Hab.* New South Wales.



"The operculum is somewhat calcareous, like *Bithinia tentaculata*" (*Tryon*).

This genus requires further investigation in order to demonstrate its distinctness from *Bithinia*.

#### Genus PALUDINELLA ?

##### 28. PALUDINELLA GILESI, *Angas*.

*Paludinella Gilesi*, *Angas*, *Proc. Zool. Soc.* 1877, p. 170, pl. xxvi. fig. 2.

*Hab.* Lake Eyre, South Australia.

The operculum of this species is described by Angas as "horny, paucispiral, with the nucleus subcentral." I have examined the only operculum accompanying four specimens, among them being the type, liberally presented to the British Museum by Mr. G. F. Angas; and it proves to be more of a concentric character, as in the genus *Vivipara*, with the exception of the subcentral nucleus, which exhibits about two spiral turns.

#### Genus AMNICOLA ?

##### 29. AMNICOLA GRANUM, *Menke*.

*Paludina granum*, *Menke*, *Moll. Nov. Holl.* p. 8; *Philippi*, *Abbild.* i. p. 6, pl. i. fig. 16; *Küster*, *Con.-Cab.* p. 64, pl. xi. figs. 37-38.

*Amnicola granum*, *Frauenfeld*, *Verhandl. zool.-botan. Vereins Wien*, 1864, pp. 611 & 663.

*Hab.* Among white quartz-sand on the banks of the Swan River (*Menke*).

The generic position of this little shell is at present doubtful, and it is unknown whether it is a marine or fluviatile form.

#### Genus TATEA.

##### 30. TATEA RUFILABRIS, *A. Adams*. (Plate VII. fig. 19.)

*Diala rufilabris*, *A. Ad. Ann. & Mag. Nat. Hist.* 1862, p. 298.

*Hydrobia rufilabris*, *Smith*, *Proc. Zool. Soc.* 1875, p. 538.

*Bythinia huonensis*, *Tenison-Woods*, *Proc. Roy. Soc. Tasm.* 1875, p. 71; *id.* *Trans. Roy. Soc. Victoria*, 1878, vol. xiv. p. 62; *Petterd*, *Journ. Conch.* vol. ii. p. 93 (*Bithynia*).

*Tatea huonensis*, *Tenison-Woods*, *op. cit.* 1878, p. 72.

*Hab.* Port Lincoln (*Adams*); South Grafton, Clarence River, New South Wales (*Brazier*); Huon River, Tasmania (*Tenison-Woods & Beddome*); Melbourne, Victoria (*Petterd*; also *Tenison-Woods*).



Adams's description was founded on old worn specimens, void of the dark brown epidermis which everywhere covers the surface. The operculum is said to be "calcareous, with a vertical submarginal claw" (*Tenison-Woods, l. c. p. 71*). As far as I can discover, judging from an external view, it appears to be thin, horny, paucispiral, with the nucleus subcentral, but rather towards the base or lower end.

Lieut. C. E. Beddome, I.N., kindly presented to the British Museum some examples of *Tatea huonensis*, which, on comparison, prove to be identical with the *Diala rufilabris* of A. Adams.

### Genus HYDROBIA.

#### 31. HYDROBIA\* BUCCINOIDES, Quoy & Gaimard.

*Paludina buccinoides*, Quoy & Gaim. *Voy. Astrolabe*, vol. iii. p. 175, *Atlas* pl. lviii. figs. 13-15.

*Hydrobia buccinoides*, Frauenfeld, *Verhandl. zool.-botan. Vereins Wien*, 1864, pp. 582 & 665.

*Hab.* "Les marais saumâtres du port Weston," New Holland.

#### 32. HYDROBIA PREISSII, Philippi.

*Paludina Preissii*, Ph. *Abbild.* ii. p. 137, pl. ii. fig. 12.

*Hydrobia Preissii*, Frauenfeld, *op. cit. supra* pp. 637 & 667.

*Hab.* West Australia.

#### 33. HYDROBIA BRAZIERI, n. sp. (Plate VII. fig. 21.)

Shell trochoidal, subrimate, small, brown, coated generally with an earthy deposit, acutely keeled at the periphery. Whorls 5, moderately convex, striated by the lines of growth. Keel on body-whorl prominent, acute, falling just above the suture, and visible upon the upper whorls, obsolete on approaching the aperture. Base a little convex. Aperture broadly ovate. Peritreme continuous, a little thickened on the columellar side, and feebly expanded on the labral margin.

Length 3 millim., diam. 2; aperture  $1\frac{1}{2}$  long,  $1\frac{1}{4}$  wide.

*Hab.* South Grafton, Clarence River, New South Wales, in a freshwater creek (*Brazier*).

This species is well characterized by the sharp prominent keel which encircles the middle of the last volution. It does not, however, extend quite to the aperture, which consequently is not

\* The generic position of this and the following nine species will remain in doubt until the animals have been carefully studied.



angular on the right or labral side. Its operculum is horny, brown, and littorinoid in character, consisting of about two and a half whorls.

I have much pleasure in associating this interesting form with the name of Mr. Brazier, who has sent a large series of it to the Museum.

34. *HYDROBIA VICTORIÆ*, *Tenison-Woods*. (Plate VII. fig. 20.)

*Bythinia victoriæ*, *Tenison-Woods*, *Trans. Roy. Soc. Victoria*, 1878, vol. xiv. p. 65.

*Bythinella victoriæ*, *Tenison-Woods*, *Proc. Roy. Soc. Tasmania*, 1878, p. 71.

Shell small, ovately conical, narrowly rimate, horn-colour, longitudinally striated, covered with a blackish earthy deposit. Whorls 5, smooth, very convex, separated by a deep suture. Apex rather obtuse. Aperture small, obliquely ovate, a trifle narrower above than below, but not acuminate, occupying about two fifths of the whole length of the shell. Peristome continuous and free from the whorl. Operculum horny, paucispiral.

Length 3 millim., diam.  $1\frac{1}{2}$ ; aperture  $1\frac{1}{4}$  long,  $\frac{3}{4}$  wide.

*Hab.* St. Kitts, South Australia (*Angas*); Lake Connewarre, Geelong (*Tenison-Woods*).

I do not feel quite certain that the operculum is not slightly shelly; if so, the calcareous deposit is very thin indeed. Several specimens have been presented to the Museum by Mr. G. F. Angas. I am not absolutely certain that the specimens, the description of which is given above, are, without doubt, the *Bythinia victoriæ* of Woods. However, the diagnoses agree in many respects; and I prefer to leave the question to be decided by comparison of specimens to giving a new and possibly unnecessary name.

35. *HYDROBIA PETTERDI*, n. sp. (Plate VII. fig. 23.)

Shell very small, pale horn-colour, rimate, subpupiform, semi-transparent, rather glossy, smooth. Whorls 4-5, very convex, and divided by a very deep suture; body-whorl only a trifle broader than the preceding. Aperture small, ovately circular, a little oblique, occupying about two sevenths of the entire length. Peristome continuous, free from the whorl. Operculum horny, thin, paucispiral.

Length 2 millim., diam.  $1\frac{1}{4}$ .



*Hab.* Richmond River, New South Wales, and Alert River, Queensland (*W. F. Petterd*).

36. *HYDROBIA ANGASI*, n. sp. (Plate VII. fig. 22.)

Shell ovately conical, narrowly rimate, smooth, yellowish olive, shining, covered with a blackish earthy deposit. Whorls 5, convex. Aperture ovate, oblique. Peristome continuous, free from the last whorl, the right margin being very slightly expanded.

Length  $3\frac{1}{3}$  millim., diam.  $1\frac{3}{4}$ ; aperture  $1\frac{1}{2}$  long, 1 broad.

Operculum with a subcentral nucleus, paucispiral, horny, with a callosity on the inner surface, from the centre of which arises an apophysis which is directed towards the inner or columellar edge.

*Hab.* Compasely River, Victoria.

The operculum differs from that in *Eatoniella kerguelensis* in having the nucleus more central; and notwithstanding its differing from the normal or typical form of the operculum in *Hydrobia*, at present I deem it advisable not to separate the species generically on that account alone.

Genus LIMNÆA.

37. *LIMNÆA* (*AMPHIPEPLEA* ?) *LESSONI*, *Deshayes*.

*Limnea Lessoni*, *Deshayes*, *Magasin de Zool.* 1830, p. 16, figs. 1-2; *Lesson*, *Voy. Coquille*, *Zool.* pl. xv. fig. 1; *id.* *Centurie Zoologique*, pl. xlv.; *Küster*, *Con.-Cab.* pl. v. figs. 16-17.

*Lymnæa Lessonii*, *Desh.*, *Lesson*, *Centurie Zoologique*, 1830, p. 120, pl. xlv. (shell and animal).

*Neristoma Lessoni*, *Desh.*, *Chenu*, *Man. de Conch.* vol. i. fig. 3542.

*Lymnea perlevis*, *Conrad*, *Proc. Acad. Nat. Sci. Philad.* 1850, vol. v. p. 11.

*Amphipeplea perlevis*, *Conrad*, *American Journ. Conch.* vol. ii. p. 80, pl. i. fig. 5.

*Amphipeplea Strangei*, *Pfeiffer*, *Malak. Blätt.* 1854, p. 64; *Novitat. Conch.* 1854, p. 6, pl. ii. figs. 5 & 6; *Küster*, *Con.-Cab.* p. 60; *Sowerby*, *Con. Icon.* fig. 40 (*Limnæa*).

*Amphipeplea melbournensis*, *Pfr.\**, *Novitat. Conch.* p. 70, pl. xix. figs. 14-15; *Sowerby*, *Con. Icon.* fig. 38 a-b (*Limnæa*).

*Limnæa globosa*, *Sowerby*, *Con. Icon.* fig. 84.

*Hab.* New Holland (*Deshayes*); Macquarie River (*Lesson*); Salamanca and Balonne Rivers, New South Wales (*Conrad*); Moreton Bay, Queensland (*Pfeiffer*); Melbourne, Victoria (*Pfr.*);

\* *Pfeiffer*, in the 'Novitates,' *l.c.*, gives a reference to *Proc. Zool. Soc.* 1856; but I have carefully searched the volume in question, indeed the entire series of the 'Proceedings,' but cannot find any mention whatsoever of an *A. melbournensis*.



Douglas River, Brisbane and Ipswich, Queensland, and Eastern Creek near Chatsworth, N. S. Wales (*Brazier*).

This species, like most others in the genus, is subject to considerable variation in form. The typical shell figured in the 'Magasin de Zoologie' appears unusually globose, and exhibits very regularly curved outlines, whilst the majority of the specimens which have come under my observation display a tendency to somewhat flattened sides. This difference was considered sufficient by Conrad for specific distinction; hence he described his *L. perlevis*. It is very doubtful whether this species is a true *Amphipeplea*, upon which subject Martens (Ann. & Mag. Nat. Hist. 1866, vol. xvii. p. 212) offers some very interesting remarks.

38. LIMNÆA (AMPHIPEPLEA ?) PHILLIPSI, *A. Adams & Angas*.

*Amphipeplea* Phillipsi, *A. Ad. & Ang. Proc. Zool. Soc.* 1863, p. 416; *Sowerby, Con. Icon.* fig. 41 a-b.

*Limnæa* Deshayesii (*Adams*), *Sowerby, Con. Icon.* fig. 95 a-b.

*Hab.* Cornet Creek and Roper's Lake, N. Australia (*Port-Essington Expedition*, 1845); Arnheim's Land (*Stuart's Expedition*).

It is difficult to draw a line between this species and *L. Lessoni*. The typical forms are very different, the latter having a very short spire, whilst that of the former is comparatively long and acuminate. But there are some varieties which appear almost intermediate with regard to the height of the spire. The specimens described by Adams and Angas have been liberally presented to the British Museum by the latter gentleman. They are, I believe, the young state of the large *L. Deshayesii*. Both were obtained from North Australia, and both exhibit the same strong spiral striation, a character entirely overlooked by Sowerby in his slovenly monograph of this genus.

39. LIMNÆA (AMPHIPEPLEA ?) ANGASI, *Sowerby*.

*Limnæa* Angasi, *Sowerby, Con. Icon.* fig. 11 a-b, species 12.

*Hab.* Port Darwin, North Australia.

This is closely allied to *L. Phillipsi*, but has a shorter spire, is rather more globose, more glossy, although exhibiting spiral striation, and of a brownish horny colour. Sowerby says it is "variegated by opaque white interrupted stripes. In this respect the species differs from all the other known species." This is an inac-



curacy of observation; for the "opaque white interrupted stripes" are merely accidental blemishes where the shell has been eaten into and the coloured surface removed. Of this I speak with certainty, as the actual type is in the Museum, presented by Mr. Angas.

40. *LIMNÆA* (*AMPHIPEPLEA*?) *VINOSA*, *A. Adams & Angas*.

*Amphipeplea vinosa*, *A. Ad. & Ang. Proc. Zool. Soc.* 1863, p. 415; *Sowerby, Con. Icon.* fig. 37.

*Hab.* Adelaide River, North Australia (*Stuart's Expedition*).

This is remarkable for the depth of its colour. It is less acuminate in the spire and more shouldered in the body-whorl than *L. Angasi*, agreeing rather in these respects with *L. Lessoni*; but that is a larger species, somewhat more globose, and of a pale tint.

It appears to me a matter of considerable doubt whether this and the three preceding forms have, or have not, any real specific differences. In the Museum series, consisting of over a hundred and fifty specimens, I cannot draw any quite satisfactory limits. *L. vinosa* perhaps is the most easily distinguishable; for, judging from the ten examples before me, it appears to be always of a uniform vinous tint. *L. Lessoni* is the most globose of the four species, *L. Phillipsi* the most elongate, and *L. Angasi* somewhat intermediate between the two latter, and of a rather brighter colour. All exhibit more or less spiral striation. Scarcely two specimens are precisely alike, and the form of the aperture, the height of the spire, and the character of the columellar twist are subject to the greatest variation.

41. *LIMNÆA AFFINIS*, *Parreyss*. (Plate V. fig. 14.)

*Limnæus affinis*, *Parreyss, Küster, Con.-Cab.* p. 55, pl. xii. figs. 5-6.

*Hab.* New Holland.

Of this species the British Museum possesses examples purchased of Parreyss under the above name. It is of a narrower and more ovate form than the preceding species.

42. *LIMNÆA BREVICAUDA*, *Sowerby*. (Plate V. figs. 17-18.)

*Limnæa brevicauda* (*Parreyss MS.*), *Sowb. Con. Icon.* fig. 135; *Theobald & Hanley, Conchol. Indica*, p. 64, pl. clviii. fig. 7.

*Hab.* Australia (*Parreyss in Brit. Mus.*); Cashmere (*W. Blandford*).

This species calls to mind the European *L. auricularia*. Sowerby



represents the columella decidedly too sinuated, and his figure is unlike the shell he copied.

43. *LIMNÆA SUBAQUATILIS*, *Tate*.

*Limnæa subaquatilis*, *Tate*, *Trans. & Proc. Roy. Soc. South Australia*, vol. iii. p. 103, pl. iv. fig. 6 *a-b*.

*Hab.* River Torrens at Adelaide.

44. *LIMNÆA PAPYRACEA*, *Tate*.

*Limnæa papyracea*, *Tate*, *l. c. supra*, pl. iv. fig. 5 *a-c*.

*Hab.* Near Penola, South Australia.

45. *LIMNÆA BRAZIERI*, n. sp. (Plate V. fig. 15.)

Shell ovate, acuminate above, glossy, brownish horn-colour, somewhat strongly striated longitudinally by the lines of increment, without spiral or transverse sculpture. Whorls 4, very convex, separated by a simple deepish suture. Aperture ovately pyriform, occupying about two thirds of the entire length of the shell. Columella obliquely arcuate, spirally contorted, with a flattish or even excavated margin, reflexed in the umbilical region, and connected with the lip above by a thin whitish callosity.

Length 9 millim., diam.  $5\frac{1}{2}$ ; aperture 6 long,  $4\frac{1}{2}$  broad.

*Hab.* Glebe Point, Sydney, New South Wales. On a flat rock with clear water running over them (*Brazier*).

I have much pleasure in naming this species after Mr. John Brazier of Sydney, by whom the specimens were collected, and to whom the British Museum is indebted for a very valuable series of *Physæ* and *Limnææ* from Australia, besides a collection of *Melaniæ* from several of the Pacific islands, and various other shells, all of which have special localities attached to them, which circumstance adds very materially to their interest.

46. *LIMNÆA SPIRULATA*, *Mousson*.

*Limnæa spirulata*, *Sowerby*, *Con. Icon.* fig. 106 *a-b*.

*Hab.* Australia.

This species is said by Sowerby to be described in the 'Journal de Conchyliologie,' but I fail to find the description.

47. *LIMNÆA VICTORIÆ*, n. sp. (Plate V. fig. 16.)

Shell narrowly ovate, turreted, brownish corneous. Whorls 4-5, convex, striated both longitudinally by the lines of growth, and transversely by somewhat indistinct spiral striæ. Spire



turreted; apex not very acute. Last whorl elongate. Aperture inversely subauriform, about half the length of the shell. Columella not much contorted, brownish, reflexed over the umbilical region, and joined to the upper lip by a thin brownish callosity. Labrum tinged with brown.

Length 6 millim., diam.  $2\frac{1}{3}$ .

*Hab.* Barnsdale, Victoria, South Australia (*W. F. Petterd*).

Of this interesting little species I have seen but two specimens, kindly placed in my hands for examination by Mr. J. W. Taylor, editor of the 'Journal of Conchology.' It is much narrower than *L. Brazieri* or any of the Australian species of this genus. Of course it is impossible to say if either of these shells be adult; but, judging from the appearance of the columella and the callosity upon it, I am inclined to believe that such is the case.

Besides the eight species above mentioned, there are in the Museum three others with the locality "Australia" attached to them; but as I am not absolutely certain that they are without doubt Australian forms, I think it advisable to await further information before describing them.

#### Genus PHYSA.

The Australian species of this genus are numerous, some of them being very interesting forms. It is excessively difficult, I may say impossible, for one residing in England, and with comparatively small collections, to arrange the specimens in specific groups, and still more difficult, either by words or figures, to convey to others the characters which mark the various forms. Therefore I hope that some resident conchologist, who has the opportunity of collecting the shells in large numbers, will take up the study of this neglected group, and, by examination of the animals and large series of shells, endeavour to discover such constant distinctions as may enable us to know the limits of the different species. Fifty-two species, including those now described for the first time, have already been characterized; but some of these are undoubtedly synonymous with others; and there is every probability that some of those now admitted as distinct would fall in the category of synonyms if I had an opportunity of examining the type specimens.



*List of Australian Physæ arranged chronologically.*

1825. *Physa novæ hollandiæ*, Blainville.  
 1826-30. *Physa novæ hollandiæ*, Lesson, = Lessonii, Smith.  
 1832. *Physa georgiana*, Quoy & Gaimard.  
 1834. — *novæ hollandiæ*, Gray, = Grayi, Smith.  
 1839. — —, Anton, = *P. marginata*, Küster.  
 1844. — *marginata*, Küster.  
 „ — *australis*, Koch.  
 „ — *Ludwigii*, Krauss.  
 1847. — *gibbosa*, Gould.  
 1850. — *pectorosa*, Conrad.  
 „ — *australiana*, Conrad.  
 1861. — *carinata*, H. Adams.  
 „ — *truncata*, H. Adams.  
 „ — *obesa*, H. Adams.  
 „ — *Cumingii*, H. Adams.  
 1862. — *aliciæ*, Reeve.  
 1863. — *Newcombi*, A. Adams & Angas.  
 „ — *ferruginea*, A. Adams & Angas.  
 „ — *badia*, A. Adams & Angas.  
 „ — *olivacea*, A. Adams & Angas.  
 „ — *concinna*, A. Adams & Angas.  
 „ — *Reevei*, A. Adams & Angas.  
 „ — *bonus-henricus*, A. Adams & Angas.  
 1864. — *inflata*, A. Adams & Angas.  
 1866. — *Hainesii*, Tryon.  
 „ — *acutispira*, Tryon.  
 1873. — *tenuistriata*, Sowerby.  
 „ — *pyramidata*, Sowerby.  
 „ — *latilabiata*, Sowerby, = *Hainesii*, Tryon.  
 „ — *dispar*, Sowerby.  
 „ — *proteus*, Sowerby.  
 „ — *aciculata*, Sowerby.  
 „ — *subundata*, Sowerby.  
 „ — *Adamsiana*, Canefri, = *gibbosa*, var.  
 1874. — *pinguis*, Sowerby, = *pectorosa*, Conrad.  
 „ — *texturata*, Sowerby.  
 „ — *bullata*, Sowerby.  
 „ — *duplicata*, Sowerby.  
 „ — *puncturata*, Sowerby.  
 „ — *subinflata*, Sowerby.  
 1878. — *pilosa*, Tenison-Woods.  
 „ — *crebriciliata*, Tenison-Woods.  
 „ — *arachnoidea*, Tenison-Woods.  
 „ — *yarraensis*, Tenison-Woods.  
 „ — *Kershawi*, Tenison-Woods.  
 1879. — *brisbanica*, Nelson & Taylor, = *proteus*, var.  
 „ — *Beddomei*, Nelson & Taylor.  
 „ — *fusiformis*, Nelson & Taylor.  
 1861. *Physopsis Jukesii*, H. Adams.



48. *PHYSA NOVÆ-HOLLANDIÆ*, *Blainville*. (Plate V. figs. 19–20.)

*Physa novæ-hollandiæ*, *Bl. Man. de Malacol.* 1825, p. 450, pl. xxxvii. figs. 3–3a.

*Hab.* New Holland.

Blainville's figures, now reproduced, which are evidently very inaccurately drawn, represent a shell of unusually large size, with a much prolonged columella and aperture. A specimen in the Museum collection, which approaches the figure considerably in form, is a variety of *P. proteus*, Sowerby (*Con. Icon.* fig. 43 a). However, the mouth is more oblique and not so prolonged inferiorly, and the apex of the spire is more acute. Another species which bears a closer resemblance to Blainville's figure is the *Aplexa aurantia* of Carpenter; but this is an inhabitant of California, and consequently, if the locality given by Blainville be correct, it is very remarkable that Australia and North America should possess species so very similar.

49. *PHYSA LESSONI*. (Plate V. figs. 21–22, after Lesson.)

*Physa novæ hollandiæ*, *Lesson, Voy. Coquille*, vol. ii. p. 332, pl. xvi. figs. 5–5"; *Küster, Con.-Cab.* p. 18, pl. ii. figs. 20–22.

*Hab.* Macquarie River.

The name employed by Lesson having already been assigned to a species by Blainville, I here substitute that of *Lessonii*. I have not been able satisfactorily to identify any specimens in the Museum with this species; but certain forms of *P. proteus* approach it rather closely.

50. *PHYSA GEORGIANA*, *Quoy & Gaimard*. (Plate V. figs. 23–24.)

*Physa georgiana*, *Quoy & Gaimard, Voy. de l'Astrolabe*, vol. ii. p. 207, pl. lviii. figs. 23–24; *Küster, Con.-Cab.* p. 25, pl. iv. figs. 13–14.

*Hab.* "Le port du Roi-Georges, à la Nouvelle-Hollande."

The figures here given are copied from the 'Astrolabe.'

51. *PHYSA GRAYI*. (Plate V. fig. 25.)

*Physa novæ-hollandiæ*, *Gray, Griffith's ed. Cuvier's Animal Kingdom*, pl. xxvii. fig. 4; *Sowerby, Con. Icon.* fig. 10.

*Hab.* New Holland.

In this instance Sowerby figures Gray's *P. novæ-hollandiæ*, and gives the reference to that described by Blainville under the same name. The species may eventually prove a variety of the variable *P. gibbosa*.



52. *PHYSA MARGINATA*, *Küster*. (Plate VI. figs. 1-2, after Küster.)

*Physa marginata*, *Küster*, *Con.-Cab.* p. 10, pl. ii. figs. 1-2.

*Physa novæ-hollandiæ*, *Anton*, *Verzeichn.* p. 49. no. 1789.

"*Ph.* testa elongato-ovata, acuminata, nitidiuscula, striata, pel-lucida, tenuiuscula, corneo-lutescens, vertice obscuro; anfractibus 6, convexiusculis, ultimis marginibus rufis; apertura semiovata; columella alba, uniplicata." Length 22 millim.

*Hab.* New Holland (*Koch*).

53. *PHYSA AUSTRALIS*, *Koch*. (Plate VI. figs. 7-8.)

*Physa australis*, *Küster*, *Con.-Cab.* ed. 2, p. 9, pl. i. figs. 15-17.

"*Ph.* testa oblongo-ovata, subdiaphana, lævi, nitidiuscula, lutescens; spira exserta, obtusa; anfractibus subito majoribus, convexis; apertura ovata, alba, peristomate acuto, intus sublabiato; columella recta, subplicata."

*Hab.* West Australia.

Spire almost half the length of the shell. Lip with a thin white thickening within. The figures now given are copied from Küster.

54. *PHYSA LUDWIGII*, *Krauss*. (Plate VI. figs. 9-10, after Küster.)

*Physa Ludwigii*, *Küster*, *Con.-Cab.* p. 21, pl. iii. figs. 14-16.

"*Ph.* testa irregulariter ovata, ventricosa, diaphana, tenera, corneo-lutescens; spira elongata, turrita, acuminata; anfractibus 6, subito accrescentibus, convexis, ultimo superne subplano; aper-tura oblonga; columella subconcava, alba, peristomate simplice, acuto, intus sanguineo-limbato."

*Hab.* New Holland.

Peculiar for its pointed spire and the flattened upper part of the body-whorl.

This species may hereafter be identified with *P. gibbosa*. If so, the latter name must be abandoned. The figure of *P. Ludwigii* appeared in Lieferung 47 of the 'Conchylien-Cabinet,' published in 1844; but the description was not given until 1850, in the ninetieth part. Gould's description appeared in the Boston Soc. Nat. Hist. Proceedings for 1847.

55. *PHYSA GIBBOSA*, *Gould*. (Plate VI. figs. 3-6.)

*Physa gibbosa*, *Gould*, *Proc. Boston Soc. Nat. Hist.* vol. ii. 1847, p. 214;

*id.* *Wilkes's Explor. Exped., Atlas*, fig. 137; *Otia Conchol.* p. 42;

*Sowerby, Con. Icon.* fig. 27.



Var. = *Aplexa Adamsiana*, *Canefri, Viag. Magenta*, p. 103, pl. iii. fig. 3.  
*Physa proteus* (part.), *Sowerby, l. c.* fig. 43c.

*Hab.* New South Wales.

This species, judging from the specimens in the Museum which I consider belong to it, is very variable. The typical form has rather a short spire; but this in certain examples is much produced, so that the length above the aperture equals half the shell.

The Museum specimens are from Cook's River near Sydney, from Denbigh, Liverpool, and Parramatta. New Zealand is given by Sowerby, and is evidently incorrect.

The large form named *Adamsiana* by Canefri, of which there are several specimens in the Museum, does not, I think, exhibit any constant specific differences. It certainly presents a very different appearance to the normal *gibbosa*, lacking the shouldering or gibbosity of the last whorl, and exhibiting a comparatively elongated spire; still, in a large series, such as that before me, there are many intermediate forms; so that the conspecific relationship is apparent, and it becomes impossible to draw a line of limitation.

56. *PHYSA PECTOROSA*, *Conrad*. (Plate VI. fig. 11.)

*Physa pectorosa*, *Conrad, Proc. Acad. Nat. Sci. Philad.* 1850, vol. v. p. 11; *id. American Journ. Conch.* ii. p. 81, pl. i. fig. 6.

Var. = *Physa pinguis*, *Sowerby, Con. Icon.* fig. 93 a-b.

*Hab.* Bogan River (*Conrad*); Balonne River (*McGillivray*); South Australia (*Sowerby*).

The figure of this species in the 'American Journal' does not show the ventricosity of the penultimate whorl at all satisfactorily. The double fold on the columella is not peculiar to this species; for the same character, by no means a constant one, is met with in some specimens of *P. gibbosa*, *P. proteus*, and other species. *P. pinguis* differs from the typical form in having a shorter spire, which is subject to much variation in this genus.

57. *PHYSA AUSTRALIANA*, *Conrad*. (Plate VI. fig. 12, after *Conrad*.)

*Physa australiana*, *Conrad, Proc. Acad. Nat. Sci. Philad.* 1850, vol. v. p. 81; *id. American Journ. Conch.* ii. p. 81, pl. i. fig. 7.

"Elliptical, thin, diaphanous; volutions 4 or 5, regularly convex; spire short; epidermis amber-coloured; columella with a



slender prominent fold, which revolves within to the apex; margin of labrum regularly curved and rounded."

*Hab.* Bogan River, N. S. Wales.

58. *PHYSA NEWCOMBI*, *A. Adams & Angas*.

*Physa Newcombi*, *A. Adams & Angas, Proc. Zool. Soc.* 1863, p. 416; *Sowerby, Con. Icon.* fig. 21.

*Hab.* Pond near Mount Margaret, Central Australia (*Angas*).

This species is remarkable for the rapid enlargement of the body-whorl and the large size of the aperture. It is also umbilicated, and the great development of the labium is very unusual in this genus.

59. *PHYSA INFLATA*, *A. Adams & Angas*.

*Physa inflata*, *A. Adams & Angas, Proc. Zool. Soc.* 1864, p. 39; *Sowerby, Con. Icon.* fig. 4 a-b.

*Hab.* Wakefield River, S. Australia (*Angas*).

The types of this species, presented to the British Museum by Mr. G. F. Angas, display even greater inflation of the whorls than is represented in the figure in the 'Conchologia Iconica.'

*P. Newcombi* is very like this species, but it is rather longer, has a higher spire, a shallower suture, and the whorls are less swollen. The aperture, too, is not so broad and rounded, and the colour is different, being of a brownish tint, whilst that of *P. inflata* is greenish olive.

60. *PHYSA BADIA*, *A. Adams & Angas*.

*Physa badia*, *A. Adams & Angas, Proc. Zool. Soc.* 1863, p. 416; *Sowerby, Con. Icon.* fig. 51 a-b.

*Hab.* A tributary of the Adelaide River, Arnheim's Land, N. Australia (*Angas*).

This dull heavy-looking species is not unlike an elongate form of *P. pectorosa*.

61. *PHYSA FERRUGINEA*, *A. Adams & Angas*.

*Physa ferruginea*, *A. Adams & Angas, Proc. Zool. Soc.* 1863, p. 416; *Sowerby, Con. Icon.* fig. 25.

*Hab.* Same as the preceding species.

This species is readily distinguished from all others in the genus by the deep vinous-red colour, a character but very indifferently rendered in the figure by Sowerby.



62. *PHYSA CONCINNA*, *A. Adams & Angas*. (Plate VI. figs. 13-14.)

*Physa concinna*, *A. Adams & Angas*, *Proc. Zool. Soc.* 1863, p. 417;  
*Sowerby*, *Con. Icon.* fig. 35.

*Hab.* Arnheim's Land, N. Australia (*Angas*).

Sowerby's figure, taken from the type presented to the Museum by Mr. Angas, is not at all good. The somewhat flattened dextral outline of the body-whorl is incorrect. It should be curved, and the upper volutions are also convex. The columella, too, does not exhibit the broad white callosity portrayed in the figure. The surface is minutely decussated, the apex brownish, and the suture generally bordered by a narrow brownish line.

63. *PHYSA OLIVACEA*, *A. Adams & Angas*. (Plate VI. fig. 15.)

*Physa olivacea*, *A. Adams & Angas*, *Proc. Zool. Soc.* 1863, p. 416;  
*Sowerby*, *Con. Icon.* fig. 34.

*Hab.* Arnheim's Land, N. Australia (*Angas*).

The description in the 'Conchologia Iconica' is very misleading. Sowerby there describes the "whorls rather angular, the apical one mamillated; last whorl posteriorly angular; aperture chestnut within." On the contrary, the single specimen in the Museum, which is the type and the shell he figured, has slightly convex whorls, without the faintest indication of angulation. As the apex is eroded, a fact mentioned by Angas in his description, it is absurd to state that the apical whorl is mamillated. I presume he did not examine the specimen with a lens, but merely described the appearance to the naked eye. The last whorl also is not the least angular, and the aperture is of the same olivaceous tint as the exterior, and not chestnut. In the figure the columellar fold is placed too high up, and is much too prominent.

64. *PHYSA (ISIDORA) HAINESII*, *Tryon*.

*Physa Hainesii*, *Tryon*, *Amer. Journ. Conch.* ii. p. 9, pl. ii. fig. 9.

*Physa latilabiata*, *Sowerby*, *Con. Icon.* fig. 33 a-b.

*Hab.* Victoria River and Depuch Island, N. Australia.

This is a very distinct species, and readily recognized by its pallid colour and the great expansion of the peristome over the umbilicus.



65. *PHYSA* (*BULINUS*) *ACUTISPIRA*, *Tryon*. (Plate VI. fig. 16, after Tryon.)

*Physa* (*Bulinus*) *acutispira*, *Tryon*, *American Journ. Conch.* vol. ii. p. 9, pl. ii. fig. 10.

"Shell cylindrically ovate, elongated, very thin, transparent, highly polished; spire elevated, very acute, suture slightly impressed; whorls 5, oblique, slightly convex; aperture narrow-ovate, two thirds the total length; columella a little folded, and somewhat turned back at the base. Very light horn-colour."

Length 12 millim., diam. 6.

*Hab.* Australia.

66. *PHYSA* *PYRAMIDATA*, *Sowerby*. (Plate VI. fig. 17.)

*Physa pyramidata*, *Sowerby*, *Con. Icon.* fig. 62.

*Hab.* Flinder's Island, Bass's Straits (*J. Milligan*); Victoria, S. Australia (*Brazier*).

Both the figure and description of this species are bad. The former represents the penultimate whorl not sufficiently convex, the aperture too large, and the columellar fold too prominent. The description may thus be emended:—

Shell solid, livid horn-colour, pyramidal; spire produced; whorls 7, rather convex, the penultimate somewhat inflated, the last, elongate, a little ventricose. Aperture auriform, of the same colour within as the exterior, but with a broad purplish-brown stain within the lip, which extends along the base and gradually becomes broader. Columellar fold not at all prominent, unless the shell is turned so that the eye sees far within the aperture.

67. *PHYSA* *DISPAR*, *Sowerby*.

*Physa dispar*, *Sowerby*, *Con. Icon.* fig. 66 a-b.

*Hab.* Sydney (*Sowerby*); Swan River (*Mus. Cuming*).

68. *PHYSA* *ACICULATA*, *Sowerby*.

*Physa aciculata*, *Sowerby*, *Con. Icon.* fig. 59.

*Hab.* New South Wales.

A very distinct species, on account of the great length of the spire.

69. *PHYSA* *SUBINFLATA*, *Sowerby*.

*Physa subinflata*, *Sowerby*, *Con. Icon.* fig. 6 a, species 5.

*Hab.* South Australia (*Sowerby*).



70. *PHYSA PROTEUS*, Sowerby.

*Physa proteus*, Sowerby, *Con. Icon.* fig. 43 a-b (non c, = *gibbosa*, Gould).

Var. jun. = *P. brisbanica*, Nelson & Taylor, *Journ. Conch.* ii. p. 288, pl. i. fig. 7 (bad).

*Hab.* North, East, and South Australia.

This species seems to be pretty generally distributed; for in the Museum there are specimens from the River Isaacs, Moreton Bay, Adelaide, Brisbane, Adelaide River, Murray River, and Rockhampton.

It is extremely variable in form, and the length of the spire differs most remarkably in series of specimens from the same locality. Very probably certain varieties will eventually prove to be the *P. novæ-hollandiæ* of Blainville and the *P. Lessonii* (*novæ-hollandiæ*, Lesson).

The shell described under the name of *P. brisbanica*, which has been submitted to me for examination, appears to be the young state of a variety of this species. The figure of it represents the spire too long and much stouter.

71. *PHYSA SUBUNDATA*, Sowerby.

*Physa subundata*, Sowerby, *Con. Icon.* fig. 61.

*Hab.* St. Margarets, South Australia (Sowerby); Cardwell, Rockingham Bay, Queensland (Brazier).

The colour of this species, judging by the figure and specimens sent by Mr. Brazier to the Museum, is rather pale horn-colour than "olive-brown" as described by Sowerby. The spiral striation will distinguish this species from *P. pectorosa*, which it somewhat resembles in form.

72. *PHYSA TENUISTRIATA*, Sowerby.

*Physa tenuistriata*, Sowerby, *Con. Icon.* fig. 85.

*Hab.* Torrens River, South Australia (Sowerby).

73. *PHYSA TEXTURATA*, Sowerby.

*Physa texturata*, Sowerby, *Con. Icon.* fig. 95.

*Hab.* South Australia (Sowerby); Sutton Grange, Victoria (R. Etheridge).

The extreme upper margin of the whorls is bordered with a fine white thread-like line, beneath which there is a narrow dark band. The light brownish stripe within the aperture is an internal thickening.



74. *PHYSA BULLATA*, Sowerby.*Physa bullata*, Sowerby, *Con. Icon.* fig. 97.*Hab.* South Australia (Sowb.); Botanic Gardens, Sydney (Brazier).

The whorls are  $5\frac{1}{2}$  in number, whereof the three or four upper ones are conspicuously small. Perhaps only a variety of *P. gibbosa*.

75. *PHYSA DUPLICATA*, Sowerby.*Physa duplicata*, Sowerby, *Con. Icon.* fig. 100.*Hab.* Wide Bay, Australia (Sowb.).76. *PHYSA PUNCTURATA*, Sowerby.*Physa puncturata*, Sowerby, *Con. Icon.* fig. 91 a-b.*Hab.* Australia (Sowb.).77. *PHYSA FUSIFORMIS*, Nelson & Taylor. (Plate VI. fig. 18.)*Physa fusiformis*, Nelson & Taylor, *Journal of Conchology*, vol. ii. p. 289, pl. i. fig. 9.*Hab.* Richmond River, New South Wales.

This species, the types of which have been kindly submitted to me for examination, exhibits the usual striæ of growth, and transverse rather remote puncture-lines. The whorls are six in number, slightly convex, and separated by a very oblique suture. The lip, viewed laterally, appears arched and prominent in the middle, and feebly sinuated near the suture. The figure in the 'Journal of Conchology' represents the body-whorl too convex on the left side and the aperture a trifle too long.

78. *PHYSA BEDDOMEI*, Nelson & Taylor. (Plate VI. fig. 19.)*Physa Beddomei*, Nelson & Taylor, *Journal of Conchology*, 1879, vol. ii. p. 289, pl. i. fig. 8.

Shell elongate, slender, semitransparent, pale horn-colour, at long intervals with yellowish stripes marking stages of growth, generally coated with a very black earthy deposit. Spire slender, regular; apex acute, brown. Whorls 7-8, moderately convex, regularly increasing, divided by a rather oblique suture, bordered above by a very narrow thread-like white line, rather coarsely striated by the lines of increment, which are minutely decussated by excessively fine spiral striæ. Last whorl but little inflated, stained with rich brown within the aperture at the base of the columella. Aperture narrow, sometimes hardly about as long as, or a little longer than, half the shell; labrum, viewed laterally,



arcuate and prominent in the middle, a little sinuated near the suture, and receding towards the base. Columellar twist thinish, moderately prominent, covered with a greyish callosity, which is reflexed in the umbilical region and extends to the lip above.

Length 18 millim., greatest diam.  $7\frac{1}{2}$ ; aperture  $8\frac{1}{2}$  long,  $3\frac{1}{2}$  wide.

*Hab.* Townsville, Queensland (*Pettard*); Cleveland Bay, Queensland (*Brazier*); Clarence River, N. S. Wales (*Strange*).

Both those from the latter locality in the Cumingian Collection and the three specimens sent by Mr. Brazier are covered with a very black earthy deposit. *P. acutispira*, Tryon, is a smaller species with a much shorter spire. The spiral striae vary in distinctness, in some examples being scarcely observable. In Messrs. Taylor and Nelson's figure the whorls are rather too convex.

79. *PHYSA GRACILENTA*, n. sp. (Plate VI. fig. 20.)

Shell narrow, elongate, yellowish horn-colour, sometimes striped at intervals with opaque yellow periodic marks of growth upon the last whorl. Volutions 6, a little convex, regularly but rapidly enlarging, very faintly constricted beneath the suture, striated by the lines of growth and minute interrupted striae in the same direction, which give the surface a very finely wrinkled appearance, visible only under a lens. Aperture narrow, inversely auriform, pale bluish or pinkish white within, generally less than half the length of the shell. Columellar fold distinct, thickish, united to the upper termination of the outer lip by a thin callosity. Labrum, viewed laterally, much curved in the middle, slightly sinuated close to the suture, and very receding at the lower part.

Length 16 millim., greatest width 6.

*Hab.* Endeavour Creek or River, Queensland.

This species is of a more opaque texture than *P. Beddomei*, and has fewer and more rapidly enlarging whorls. It is also of a different colour, has a less shining surface, lacks the brown stain at the base of the last whorl seen within the aperture, and the columella is thicker.

Five out of six specimens before me have the apex of the spire broken or naturally eroded, leaving but four of the whorls remaining.



80. *PHYSA PRODUCTA*, n. sp. (Plate VI. fig. 21.)

Shell elongate, of a yellowish olivaceous colour, somewhat strongly striated by the lines of growth; spire elongate, acuminate. Whorls 6-7, convex, regularly increasing, the last sometimes faintly constricted beneath the suture, which is very oblique and occasionally narrowly marginate. Last volution elongate, a little inflated. Aperture obliquely inversely auriform, acute above, generally less than half the entire length of the shell, but sometimes longer. Columellar fold thin, moderately prominent, white. Callus on the paries thin, extending to the lip above. Labrum, viewed laterally, obliquely arcuate, very slightly sinuated near the suture.

Length 26 millim., diam. 10; aperture  $12\frac{1}{2}$  long, 5 broad.

*Hab.* South Grafton, Clarence River (*Brazier*); Hunter River (*Dr. A. Sinclair, R.N.*).

This species is rather narrower in the body-whorl than *P. gibbosa*, var. *Adamsiana*, Canefri, and those of the spire are perhaps more regular in their enlargement. The colour, too, is not so olivaceous, being rather yellower in tint. *P. attenuata*, Sowerby, from Tasmania, has a less acuminate spire, and the body-whorl is conspicuously narrow in proportion to the preceding whorls. *P. gibbosa*, however, may eventually include this species, as certain slender forms approach it very closely.

81. *PHYSA BRAZIERI*, n. sp. (Plate VI. fig. 22.)

Shell short, ovate, subglobose, glossy, pellucid, horny brown, striated feebly by the lines of growth, and crossed by spiral, more or less punctate striæ, some of which are rather remote. Whorls 4, rapidly enlarging, convex; last large, subglobose. Aperture broadly subauriform, acutish above, rounded below, occupying about two thirds of the whole length. Columella simple, arcuate, exhibiting no fold, covered with a greyish callosity extending to the lip above and reflexed in the umbilical region, thus producing a narrow rimation. Labrum, viewed laterally, almost straight, not arcuate in the middle.

Length 12 millim., greatest diameter  $7\frac{1}{3}$ ; aperture  $7\frac{1}{2}$  long, 4 broad.

Var. *a*. Shell of a pale horn-colour.

Var. *b*. Shell larger than type, spire a little shorter, aperture a little longer. Colour of a pale horn tint.

*Hab.* Ashfield, near Sydney (*Brazier*).



a. Var. *pallida*. Rooty Hill, near Chatsworth, N. S. Wales (*Brazier*).

b. Var. *major*. Burnett River, Queensland (*Brazier*).

This is a pretty glossy species, of a bright horn-brown colour, and, like *P. inflata*, characterized by the absence of a twist or fold on the columella. However, it is less inflated than that species, of a different colour, has a longer spire, and the suture is not so deep. I feel much pleasure in naming this interesting form after Mr. John Brazier of Sydney, to whom the British Museum is indebted for a very valuable series of freshwater shells from Australia and some of the Pacific islands, besides many curious marine species from these localities. *P. subinflata* of Sowerby is very like this species; but the columella presents a slight twist, and its dimensions are greater.

## 82. *PHYSA QUEENSLANDICA*, n. sp. (Plate VI. fig. 23.)

Shell small, semitransparent, acuminate above, light horn-colour, not very glossy, somewhat coarsely striated by the lines of growth, and exhibiting at times indications of spiral striæ, chiefly at the upper part of the whorls near the suture. Spire acute; apex small, brown. Whorls 6, narrowly bordered with white, rather convex, pretty regularly increasing; last long, only a little inflated. Aperture narrow, occupying rather less than three fifths of the entire length, acute above, with a brown stain at the base, sometimes extending parallel with the lip to its junction with the whorl, and a little thickened. Columellar fold inconspicuous, narrowly reflexed, whitish. Lip like that of *P. Beddomei*.

Length  $12\frac{1}{2}$  millim., greatest diameter  $6\frac{1}{3}$ ; aperture 7 long,  $2\frac{3}{4}$  wide.

*Hab.* Dawson River, Queensland (*Brazier*).

This species differs from *P. Beddomei* in being smaller, in having a shorter and more suddenly acute spire and a less pronounced columellar twist. The colour is similar, but the black pseudo-epidermis is wanting.

Tryon's *P. acutispira* appears to be more "highly polished," without the basal brown mark, and a little longer in the aperture; still, on comparison, it may eventually prove to be the same as the present species. *P. fusiformis*, Nelson & Taylor, has a narrower body-whorl, and is sculptured with strongly punctured striæ.



83. *PHYSA QUOYI*, n. sp. (Plate VI. fig. 24.)

Shell elongate, narrow, pale horn-colour, scarcely semitransparent, not very glossy, striated moderately distinctly by the lines of growth. Spire somewhat produced, rather suddenly diminishing, and becoming acute above the penultimate whorl. Apex brown, small. Whorls 6, convex, penultimate inflated, very oblique; last subcylindrical, narrow, convex, rather rapidly descending near the lip. Aperture small, inversely subauriform, narrow, less than half the shell in length, feebly stained with brown within at the base. Lip, viewed laterally, very oblique, having an almost straight edge, and exhibiting scarcely any arcuation or sinuosity. Columellar fold rather high up, not prominent, reflexed, thus producing an umbilical rimation.

Length 15 millim., greatest diameter 6; aperture 7 long, 3 broad.

*Hab.* King George's Sound, South-west Australia (*Brazier*).

This species is remarkable for the cylindrical body-whorl and manner in which it descends on approaching the aperture; the latter, too, is small, and the sutural line very oblique. The species is named after one of the authors of the molluscan portion of the 'Voyage de l'Astrolabe,' who has described the only other species hitherto known from the south-western part of Australia.

84. *PHYSA ETHERIDGII*, n. sp. (Plate VI. fig. 25.)

Shell small, ovate, acute, very pale horn-colour and transparent, streaked at intervals longitudinally with opaque creamy stripes, brownish at the apex. Spire rather acute, frequently eroded at the tip. Whorls 4-4½, convex, rapidly increasing; last narrow, ovate, somewhat attenuated at the base. Aperture elongate, auriform, narrow, occupying nearly three fourths of the entire length of the shell. Columellar twist rather high up, thin. Labrum oblique, arcuate in the middle, and feebly sinuated beneath the suture. Sculpture consisting of fine lines of growth and more or less indistinct spiral striæ.

Length 11 millim., greatest diameter 6; aperture 7 long, 3 wide.

*Hab.* Yan-Yean Reservoir, Plenty district, Victoria, S. Australia (*Etheridge*).

This species resembles in some respects *P. acutispira*, Tryon. The spire, however, appears to be not so slender, and the colour also is different. The opaque creamy stripes seem to be a character



not met with in *P. acutispira*; there are three or four of them on the last whorl.

I name this species after my friend and colleague Mr. Etheridge, by whom the specimens were collected and presented to the Museum.

85. *PHYSA PILOSA*, *Tenison-Woods*.

*Physa pilosa*, *Tenison-Woods*, *Trans. Roy. Soc. Victoria*, 1878, vol. xiv. p. 63.

Shell subumbilicated, thin, glossy, inflated, obliquely broadly ovate, milky white or fulvous, subpellucid; whorls 3, last inflated and oblique, two apical ones small, acute, regularly longitudinally striated; periostraca luteous, with regular pilose or punctate lines; suture coronated; aperture oblique, ovate, produced anteriorly; labrum thin; labium reflexed.

Lat. 6 mill., long. 11.

*Hab.* Melbourne.

"This may possibly be only a variety of *P. crebriciliata*. It differs from it in being thinner, lighter in colour, with a very thin periostraca—the extremely small spire, with the oblique and inferiorly produced aperture."

86. *PHYSA ARACHNOIDEA*, *Tenison-Woods*.

*Physa arachnoidea*, *Tenison-Woods*, *Trans. Roy. Soc. Victoria*, 1878, vol. xiv. p. 63.

Shell elongately ovate, or subcylindrical, rather solid, opaque, shining or clothed with a periostraca; shell brown or yellow, with white spots; apex acute. Whorls 6, rapidly decreasing, slightly convex and sloping, striate lengthwise and transversely; striæ granularly dotted, which is only visible under the lens, dots disposed in spiral lines. Aperture oblique, pyriform, produced anteriorly, chalky white inside; plait thick, but visible only by looking, as it were, upwards through the umbilicus.

Long. 12 mill., lat.  $5\frac{1}{2}$ ; long. apert. 7, lat.  $3\frac{1}{2}$ .

*Hab.* Mordialloc, Victoria.

"This species is probably ciliated in the young or fine condition."

87. *PHYSA YARRAENSIS*, *Tenison-Woods*.

*Physa yarraensis*, *Tenison-Woods*, *Trans. Roy. Soc. Victoria*, 1878, vol. xiv. p. 64.

"Shell subumbilicate, thin, diaphanous, pale horny, shining;



spire acute; whorls 4, convex, sloping, two spiral ones small, finely striate lengthwise; aperture elongate, pyriform; labrum very thin, produced anteriorly; lip inconspicuous; plait a little thickened."

*Hab.* Upper Yarra, Victoria.

"A shell with no very determinate characters, of small size, and thin."

88. *PHYSA KERSHAWI*, *Tenison-Woods*.

*Physa Kershawi*, *Tenison-Woods*, *Trans. Roy. Soc. Victoria*, 1878, vol. xiv. p. 64.

Shell small, narrowly ovate, clothed with a sordid rugose periostraca, slightly diaphanous, dusky in colour; whorls  $3\frac{1}{2}$  to 4, conspicuously angulate, and flattened above, at the angle (and on the last whorl distinctly) keeled; keels rounded, raised; at the suture narrowly canaliculate; aperture oval, produced anteriorly; labrum thin, sinuous at the keels; inner lip reflexed, subumbilicate.

Long. 8 mill., lat.  $4\frac{1}{2}$ .

*Hab.* Upper Yarra, Victoria.

"There is a faint resemblance between this shell and the New-Zealand *P. tabulata* of Gould."

89. *PHYSA CREBRECILIATA*, *Woods*.

*Physa crebreciliata*, *Tenison-Woods*, *Trans. Roy. Soc. Victoria*, 1878, vol. xiv. p. 63.

"Shell umbilicate, thin, inflated, broadly ovate, horny, dusky, or whitish, and diaphanous, completely covered with a ciliated periostraca; whorls  $3\frac{1}{2}$ , the two apical ones small, the penultimate very oblique, thickly striate lengthwise, and furnished with close spiral ciliated lines; sutures crowned by the periostraca; aperture broadly ovate, slightly thickened or bilabiate; lips conspicuously reflexed."

Long. 7 mill., lat. 15.

*Hab.* Caulfield, Melbourne.

"The cilia in this shell are in regular equidistant spiral lines, and at the sutures the periostraca seems to mass itself in small rough folds, so as to make a spinous ridge."

90. *PHYSA BREVICULMEN*, n. sp. (Plate VI. fig. 26.)

Shell narrowly ovate, semitransparent, sometimes more opaque, light brownish horn-colour, with two or three periodical opaque creamy stripes on the last whorl. Apex minute, dark brown.



Suture with a fine white line beneath. Whorls  $4\frac{1}{2}$ -5; three first very small, only a little convex, penultimate very swollen; last rather inflated above, subcylindrical. Sculpture consisting of lines of growth strongly decussated by spiral, more or less punctured, striæ. Aperture narrow, occupying rather less than two thirds the entire length of the shell, broadly margined with brown within the lip; the latter is oblique, a little arched in the middle, and faintly sinuated towards the suture. Columella oblique, straightish, with only a slight and not prominent twist.

Length 15 millim., greatest diameter 8; aperture  $8\frac{1}{2}$  long,  $3\frac{1}{2}$  wide.

*Hab.* King George's Sound, South-west Australia (*Brazier*).

This species is peculiar on account of its remarkably small apex, the bulging nature of the penultimate whorl, and the distinct decussated sculpture. The latter characteristic and the smaller size separate it from the *P. proteus*. *P. tenuistriata* appears to be similarly sculptured; but broader, longer in the aperture, and the whorls are said to be "slightly angular," a feature entirely absent in the present species.

#### 91. *PHYSA TENUILIRATA*, n. sp. (Plate VI. fig. 27.)

Shell acuminate ovate, olivaceous horn-colour, usually with one or more periodic yellowish stripes upon the last whorl. Volutions 5, convex; three apical ones small, stained with dark brown, penultimate suddenly and comparatively larger; last elongate, rapidly descending. Sculpture consisting of lines of growth, and very distinct and elevated spiral wavy lines, which vary considerably in number in different specimens. Aperture narrow, exhibiting a buff or yellowish thickened ridge within the labrum, and generally another further within, occupying about five eighths of the entire length of the shell. Columellar fold scarcely defined; the callosity reflexed, whitish.

Length 12 millim., greatest diameter 6.

*Hab.* Swan River, W. Australia (*Mus. Cuming.*); Perth (*Pet-terd*).

There are several specimens of this species in the Museum, all exhibiting about the same relative proportions with regard to the length of the aperture and the total length. An example from Perth sent to me for examination by Mr. J. W. Taylor of Leeds has, however, the spire unusually elongated, so that the aperture occupies scarcely more than half the entire length.



The distinct elevated spiral lines are far less raised than in the *P. aliciae* of Reeve, yet more so than in several other Australian forms. It is in reality a link connecting the genus *Glyptophysa* of Crosse with *Physa* proper. The lines of growth are very distinct, and, crossing the spiral lirulæ, give the surface a minutely cancellated appearance.

Two specimens from Bunyip River, Victoria, sent by Mr. Petterd to Mr. Taylor, who has submitted them to me, appear to belong to this species. They differ in being of a brownish olivaceous colour, and in having much fewer spiral lines. Neither of them present the yellowish stripe or mark of periodic growth on the last volution, which occurs in most of the examples from Western Australia.

92. *PHYSA EXARATA*, n. sp. (Plate VI. fig. 28.)

Shell ovately fusiform, pale horn-colour, marked with very distinct spiral striæ and lines of growth. Whorls 4, convex. Apex rather large, not acute. Last volution elongate, attenuated at the base. Aperture narrow, acute above, and rather so inferiorly. Columellar fold very slightly prominent.

Length 6 millim., diam. 3.

*Hab.* Depuch Island, Port Essington, N. Australia.

The specimens here described may not be adult. The species is remarkable for the comparatively large apex and the deep horizontal striæ; these are about four in number on the penultimate whorl, and eighteen on the last.

93. *PHYSA (AMERIA) CARINATA*, *H. Adams*.

*Physa (Ameria) carinata*, *H. Adams*, *Proc. Zool. Soc.* 1861, p. 143; *Sowerby, Con. Icon.* fig. 18 a-b.

*Hab.* Boyne River, Queensland.

The aperture is feebly, indeed scarcely perceptibly, tinted with rose, and certainly not the deep rosy colour represented by Sowerby's figure.

It is questionable whether this and the four following so-called species are more than varieties of one form.

94. *PHYSA (AMERIA) TRUNCATA*, *H. Adams*.

*Physa (Ameria) truncata*, *H. Adams*, *Proc. Zool. Soc.* 1861, p. 144; *Sowerby, l. c.* fig. 20.

*Hab.* Calliope River, Burdekin River, and Rockhampton, Queensland.



95. *PHYSA (AMERIA) OBESA*, *H. Adams*.

*Physa (Ameria) obesa*, *H. Adams*, *Proc. Zool. Soc.* 1861, p. 144;  
*Sowerby*, *l. c.* fig. 24 *a-b*.

*Hab.* Fitzroy River, Queensland.

96. *PHYSA (AMERIA) CUMINGII*, *H. Adams*.

*Physa (Ameria) Cumingii*, *H. Adams*, *Proc. Zool. Soc.* 1861, p. 144;  
*Sowerby*, *l. c.* fig. 44.

*Hab.* Port Essington and Queensland.

97. *PHYSA (AMERIA) REEVII*, *A. Adams & Angas*.

*Physa (Ameria) Reevii*, *A. Adams & Angas*, *Proc. Zool. Soc.* 1863,  
p. 417; *Sowerby*, *l. c.* fig. 40.

*Hab.* Arnheim's Land.

The colour of this species is light olive, and not reddish as it is coloured in the 'Conchologia Iconica.'

98. *PHYSA (AMERIA) BONUS-HENRICUS*, *A. Adams & Angas*.  
(Plate VI. fig. 29.)

*Physa (Ameria) bonus-henricus*, *A. Adams & Angas*, *Proc. Zool. Soc.*  
1863, p. 417; *Sowerby*, *l. c.* fig. 38 *a, b*.

*Hab.* Arnheim's Land, N. Australia.

Like the majority of the figures in Sowerby's monograph of this genus, that of the present species is altogether different from nature.

The type is of a pale olivaceous horn-colour, and not the vivid red represented in the work referred to. The form, too, is incorrectly drawn; for in neither of the two specimens in the Museum are the sides of the last whorl flattened as there delineated.

99. *PHYSA (GLYPTOPHYSA) ALICIAE*, *Reeve*.

*Physa aliciae*, *Reeve*, *Proc. Zool. Soc.* 1862, p. 106, woodcut; *Sowerby*,  
*Con. Icon.* fig. 6 *b*.

*Hab.* Murray and Gawler rivers, South Australia; River Onkapinga, at Noarlunga (*Molineux*).

The description of this species by Sowerby is incorrect with regard to colour; and the locality "India" is also wrong. The shell is whitish, clothed with a pale dirty straw-coloured epidermis. The Museum possesses two specimens of an interesting variety presented by Mr. Gerard Krefft; they differ from the normal form of the species in having the spiral ridges both fewer and less elevated.



Genus *PHYSOPSIS*.100. *PHYSOPSIS JUKESII*, *H. Adams*.

*Physopsis Jukesii*, *H. Adams*, *Proc. Zool. Soc.* 1861, p. 144; *Sowerby*,  
*l. c.* fig. 71 *a-b*.

*Hab.* Port Essington, N. Australia (*Jukes*).

Sowerby incorrectly quotes A. Adams as the author of this interesting species.

Genus *PLANORBIS*.101. *PLANORBIS GILBERTI*, *Dunker*. (Plate VI. figs. 30-32.)

*Planorbis Gilberti*, *Dunker*, *Proc. Zool. Soc.* 1848, p. 40; *Sowerby*, *Con.*  
*Icon.* fig. 37 *a-b*.

*Hab.* East Australia (*Mus. Cuming*); Brisbane, Queensland  
 (*Petterd*).

Dunker describes this species as having the whorls obtusely angular both on the upper and under sides. This feature is decidedly more conspicuous in the latter place. He also states that the acute keel is situated below the middle of the whorls; but on very careful examination of the three typical specimens in the Cumingian collection, I can affirm with certainty that it is central upon the upper whorls, and becomes a little subcentral upon the last, especially towards the aperture. All three specimens exhibit, to a small extent, fine, but not close, spiral striæ. The whorls are  $3\frac{1}{2}$  in number, whereof the first two are sunken above, the last and the penultimate being almost on the same level.

102. *PLANORBIS FRAGILIS*, *Brazier*. (Plate VII. figs. 1-3.)

This species is more compressed than *P. Gilberti* and more acutely keeled. Being flatter, the lower surface is less sunken in the middle.

*Hab.* Ipswich, Queensland (*Brazier*).

The above name I have seen attached to specimens of this species sent by Mr. C. E. Beddome, of Hobart Town, to Mr. J. Taylor, of Leeds; but as yet I have not seen the published description of such a species. This form is spirally striated, in which respect it differs from *P. essingtonensis* and *P. macquariensis*, than either of which species it is more sharply carinated.

103. *PLANORBIS ESSINGTONENSIS*, n. sp. (Plate VI. figs. 33-35.)

Shell white, discoid, compressed, striated by lines of growth.



Spire sunken a little below the last whorl. Volutions 4, equally convex above and beneath; the last in adult specimens carinated, not very acutely, a little below or at the middle. Lower surface sunken in the centre about as much as the upper. Aperture almost horizontal.

Greatest diameter 5 millim., height  $1\frac{1}{4}$ .

*Hab.* Freshwater lagoons, Point Smith, Port Essington (*Brit. Mus.*).

This species is flatter than *P. Gilberti*, has no spiral striation, is not so much sunken beneath, and the whorls have no indication of the feeble angulation observable in that species.

104. *PLANORBIS MACQUARIENSIS*, n. sp. (Plate VII. figs. 4-6.)

Shell smaller than *P. essingtonensis*, not quite so compressed, more sunken in the umbilical region, less acutely keeled and corneous. Whorls  $3\frac{1}{2}$ . Aperture not so narrow perpendicularly as in the above-named species, and scarcely as horizontal.

Greatest diameter  $4\frac{1}{3}$  millim., height  $1\frac{1}{3}$ .

*Hab.* Macquarie River, New South Wales (*Rev. D. Landsborough*).

This species is smaller than *P. Gilberti*, has no faint angulation on the lower side of the last whorl, is a little less acutely keeled, and has not spiral striæ.

105. *PLANORBIS OBTUSUS*, *Deshayes*.

*Planorbis obtusus*, *Desh. MS. Mus. Cuming*; *Sowerby, Con. Icon.* fig. 39 a-b.

*Hab.* Adelaide (*Mus. Cuming*).

Although stated by Sowerby to be described in the *Proc. Zool. Soc.*, I have searched in vain for any description of this species in that publication. Neither can I find that Deshayes has described it elsewhere. Indeed the only ground for including it in the Australian fauna rests upon the fact that four specimens in Cuming's collection have a label "Adelaide" attached to them.

Sowerby's figure 39 b is very incorrect. The shell is represented as acutely keeled at the base, the keel terminating at the aperture, which appears flat beneath. This is not the case in any of the four shells in the Museum. The whorl also on the left-hand side appears to slope very much, forming a somewhat acute angle at the base.

The last whorl in reality has a slight and not prominent carina



a little above the base, and beneath it is convex; and on the left the lateral outline is less oblique than Sowerby represents it. The aperture is equally curved at the base and above, and the subbasal keel scarcely affects the curve of the right margin.

106. *PLANORBIS SPIORBIS*, Müller.

*Hab.* Great Britain and Europe. North Australia (*Mus. Cuming*).

There are two tablets containing several specimens of this species in the Cumingian collection labelled North Australia; and it is for this reason that I include it in the Australian list. If there had been but a single set of them, I should have been inclined to think that possibly the label had been misplaced; but since there are two series, it becomes more probable that they are indeed Australian examples.

Genus SEGMENTINA.

107. *SEGMENTINA AUSTRALIENSIS*, n. sp. (Plate VII. figs. 7-10.)

Shell dextral, glossy, chestnut, rather acutely keeled a little below the middle of the last whorl, obliquely convex above the keel, and rather flattened at the base. Spire sunken in the middle. Whorls 4, convex, separated by a deep suture. Umbilicus deepish, occupying about one third of the diameter of the base. Aperture horizontal, much encroached upon by the whorl, flat at the base, rather acute on the right.

Greatest diameter 5 millim., smallest diameter 4, height  $1\frac{1}{3}$ .

*Hab.* Penrith, N. S. Wales (*M'Gillivray, Voyage of the 'Rattlesnake'*).

The internal lamellæ are somewhat difficult of observation through the shell. Those nearest the aperture are situated at about one third of the extent of the whorl from the peristome; they are three in number, whereof the basal one is the largest, that upon the parieties next in size, and the third (upon the outer wall of the whorl above the keel) the smallest.

The rich chestnut colour, the very glossy surface, and especially the flat under-surface are the chief characteristic points of this interesting species.

108. *SEGMENTINA VICTORIÆ*, n. sp. (Plate VII. figs. 11-13.)

Shell like *S. australiensis*, but not so flattened beneath; last



whorl proportionally larger, and the sunken spire smaller; umbilicus narrower; internal lamellæ none.

Greatest diameter 4 millim., smallest diam.  $3\frac{1}{2}$ , height  $1\frac{1}{3}$ .

*Hab.* Victoria; S. Australia.

In colour and general aspect this species closely resembles the preceding. On careful comparison, however, it proves to differ in the particulars above referred to. It appears inconsistent to place a shell in the genus *Segmentina* lacking the essential character of internal lamellæ. However, its *tout-ensemble* is so *Segmentinoid*, that I feel sure it is an abnormal form of that group.

#### Genus ANCYLUS.

109. *ANCYLUS AUSTRALICUS*, Tate? (Plate VII. figs. 36-37.)

*Ancylus australicus*, Tate?, *Trans. & Proc. Roy. Soc. South Australia*, vol. iii. 1880, p. 102, pl. iv. fig. 4 a-b.

*Hab.* North Australia: collected during the Port-Essington Expedition, October 14th, 1844. River Torres, Adelaide (Tate).

The two specimens in the British Museum from North Australia (*vide* figs. 36-37) appear to agree fairly with Mr. Tate's description; but a comparison with authentic examples of the species will be necessary to prove their identity.

#### Genus NERITINA.

Of this genus, as far as I can ascertain, only two species undoubtedly live in fresh water, namely *N. crepidularia* and *N. pulligera*.

110. *NERITINA CREPIDULARIA*, Lamarck.

For the synonymy of this species see Martens, *Conch.-Cab.* p. 37.

*Hab.* "Inlet next to Percival Bay, fresh water" (*Dr. Richardson*); Port Essington (*Capt. Wickham, R.N., and J. B. Jukes*); Swan River (*Brit. Mus.*); swamp two miles north of Cardwell, Queensland (*Brazier*). O-Taïti (*Lesson*); Katow River, New Guinea, on trees and roots (*Brazier, Proc. Linn. Soc. N. S. W.* 1875, p. 22).

111. *NERITINA PULLIGERA*, Linn., var. *SULCATA*, Ten.-Woods.

*Neritina pulligera*, Linn., var. *sulcata*, Ten.-Woods, *Proc. Linn. Soc. N. S. Wales*, 1878, iii. p. 3.

*Hab.* In the mountain-streams of the Bellenden Kerr ranges, North Queensland.



112. *NERITINA OUALANIENSIS*, Lesson.

*Neritina oualaniensis*, Lesson, *Voy. Coquille, Zoologie*, vol. ii. p. 379.

For synonymy see Martens in Küster's *Con.-Cab.* p. 193.

*Hab.* Port Essington (*J. B. Jukes*).

This species is widely distributed from the Indian Ocean to the South Pacific, and is a marine form.

113. *NERITINA DRINGII*, Récluz\*.

*Neritina Dringii*, Récluz; Reeve, *Con. Icon.* pl. xxix. fig. 132 a-b.

*Nerita Doingii*, Récluz, *Proc. Zool. Soc.* 1845, p. 121.

*Hab.* Hanover Bay, N. Australia (*T. E. Dring*).

This species may be only a variety of the preceding, and is probably marine.

114. *NERITINA RANGIANA*, Récluz.

*Nerita Rangiana*, Récluz, *Revue Zoologique Soc. Cuvier*, 1841, p. 339;

Reeve, *Con. Icon.* fig. 142 a-b (*Neritina*); Angas, *Proc. Zool. Soc.* 1871, p. 95.

*Nerita viridis*, var. *major*, Rang, *Bull. Sci. Féru.* 1827, vol. x. p. 412.

*Hab.* Port Jackson harbour (*Angas, l. c.*); Darnley Island, Torres Straits, 25-30 fms., and New Hebrides (*Brazier*); island of Negros, Philippines (*Cuming*); Madagascar (*Récluz*).

115. *NERITINA SOUVERBIANA*, Montrouzier.

*Neritina Souverbiana*, Montrouzier, *Journ. Conch.* 1863, vol. xi. pp. 75

& 175, pl. v. fig. 5; Martens, *Con. Cab.* p. 251, pl. xxiii. figs. 29-31.

*Neritina* (*Vitta*) *pulcherrima*, Angas, *Proc. Zool. Soc.* 1871, p. 19, pl. i. fig. 25.

*Hab.* New Caledonia (*Montrouzier*); Port Jackson (*Angas*); Cape Grenville, N.E. Australia, 20 fms., Cape York, 7 fms., and Darnley Island, 5-30 fms. (*Brazier*).

116. *NERITINA TRITONENSIS*, Le Guillou.

*Neritina tritonensis*, Le Guillou; Reeve, *Con. Icon.* fig. 68 a-b.

*Hab.* North Australia.

117. *NERITINA BACONI*, Reeve.

*Neritina Baconi*, Reeve, *Con. Icon.* fig. 127.

*Hab.* Swan River (*Dr. Bacon*).

\* Although Récluz in *P. Z. S.* 1845 quotes the collector and names the species *N. Doingii*, we have reason to suspect this to be a clerical error.



118. *NERITINA AURICULATA*, *Lamarck*.

The species is quoted by Reeve as Australian, but without any authority; and it is probably not an inhabitant of the continent.

119. *NERITINA PRICHARDI*, *Dohrn*.

*Neritina Prichardi*, *Dohrn*, *Proc. Zool. Soc.* 1861, p. 206, pl. xxvi. fig. 2; *Martens*, *Con. Cab.* p. 159, pl. xvi. figs. 24-26.

*Hab.* North Australia (*Mus. Cuming*); Fiji Islands (*Dohrn*).

There are three specimens of this species in the Cumingian collection marked North Australia. They are much eroded on the spire, and present only a slight indication of the raised ridge from which the tubulous spines arise in the normal form, and only one of them exhibits a single short spine. In other respects they are identical.

120. *NERITINA LEACHII*, *Récluz*.

*Neritina Leachii*, *Récluz*, *Rev. Zool.* 1841, p. 312; *Proc. Zool. Soc.* 1843, p. 199.

*Hab.* New Holland.

Genus *NAVICELLA*.121. *NAVICELLA ENTRECASTAUXI*, *Récluz*.

*Navicella entrecastauxi*, *Récluz*, *Revue Zoologique*, 1841, p. 380; *Reeve*, *Con. Icon.* fig. 32 a-b.

*Hab.* Point Entrecastaux, King George's harbour, S.W. Australia.

Genus *CORBICULA*.

The species of this genus are excessively difficult of determination; and without accurate knowledge of exact localities and a good series of specimens, it is very troublesome to define with any degree of precision what may be the essential characters of the different forms. Of the nine species enumerated, two (*C. debilis* of Gould and *C. baronialis* of Prime) are known to me only by description or a figure.

122. *CORBICULA OVALINA*, *Deshayes*. (Plate VII. figs. 24-25.)

*Corbicula ovalina*, *Deshayes*, *Proc. Zool. Soc.* 1854, p. 343; *Cat. Conch.*

*Brit. Mus.* p. 229; *Prime*, *Cat. Corb.*, *Amer. J. Conch.* vol. v. p. 134;

*Clessin*, *Conch. Cab.* p. 203.

*Cyrina ovalina*, *Desh.*, *Sowerby*, *Con. Icon.* fig. 77.

*Hab.* Port Essington.



Sowerby's figure is both badly drawn and coloured, and the description is also incorrect. The sulci are coarser than there represented, the epidermis is blacker, and the posterior side is not "broadly truncated," but curved.

123. *CORBICULA PROLONGATA*, *Prime*.

*Corbicula prolongata*, *Prime*, *Journal de Conch.* vol. ix. p. 356, vol. x. p. 389, pl. xiv. fig. 6; *Cat. Corbic.*, *Amer. Journ. Conch.* vol. v. p. 135; *Clessin, Con. Cab.* ed. 2, p. 191, pl. 38. fig. 1.

*Cyrena prolongata*, *Prime*, *Sowerby, Con. Icon.* fig. 94.

*Hab.* Wide Bay, East Australia.

This species, published in 1861, figured and redescribed in the following year, and since twice quoted in catalogues of the genus by Prime, is stated by Sowerby to be "—? MS. Hanley's collection," a statement characteristic of this careless monograph.

124. *CORBICULA NEPEANENSIS*, *Lesson*. (Plate VII. figs. 26–27.)

*Cyclas nepeanensis*, *Lesson, Voy. Coquille, Zoologie*, vol. ii. p. 428, *Atlas*, pl. xiii. fig. 14; *Sowerby, Con. Icon.* (*Cyrena*), fig. 75 (bad).

*Cyrena australis*, *Deshayes, Ency. Méthod.* 1830, *Vert.* ii. no. 12, p. 50; *Anim. sans Vert.* ed. 2, vol. vi. p. 278.

*Corbicula australis*, *Desh. Cat. Conchifera Brit. Mus.* p. 230; *Prime, Americ. Journ. Conch.* vol. v. Appendix, p. 128, part.

*Non Cyrena australis*, *Desh.*, *Sowerby, Con. Icon.* fig. 82 *a, b*.

*Hab.* Nepean River, N. S. Wales (*Lesson and Brazier*); Lochinvar, Hunter River, and Port Curtis (*Brit. Mus.*); Peel River and Mulgoa, New South Wales, also Brisbane River, Queensland (*Brazier*).

This species, regarding which there is much confusion, was described by Lesson in the 'Voyage of the 'Coquille,' the volume (vol. ii.) which contains the description bearing the date 1830 on the titlepage. The description, however, was evidently written before this, as Lesson's preface bears the date January 1828.

I think there can be no doubt that Deshayes likewise described the same shell in the 'Encyclopédie Méthodique,' which also is dated 1830, notwithstanding that he himself subsequently, in the British-Museum Catalogue, holds his species distinct. In his original description he says:—"Jolie petite coquille qui nous a été généreusement communiquée par notre ami, M. Lesson, qui l'a recueillie à la Nouvelle Hollande." From this it appears that



Lesson must have given him some specimens of his species probably before he had named it *nepeanensis*; for had it belonged to another species, we should expect to find it also mentioned in the 'Voyage of the 'Coquille.' The two descriptions display certain discrepancies, however; but this is pardonable in so difficult and variable a genus. Deshayes says it is subdepressed, brown-green in the Latin diagnosis, and black-brown in the French description, with a broad orange spot within; hinge with three very small cardinal teeth.

On the other hand, Lesson describes the form as swollen, the colour brownish fawn ("faune brunâtre"), the interior rosy white at the bottom, bluish on the margins, and the hinge possessing two cardinal teeth.

One character, not mentioned by either author, consists of two purplish stains or rays which are seen in the interior, one on each side beneath the lateral teeth. Still, although not referred to in his description, Lesson depicts them, though feebly, in his figure.

Prime\* and Clessin† appear to have erroneously united the *Cyrena australis* of Deshayes with the *Cyclas australis* of Lamarck. The Australian variety of the latter is, according to Lamarck, a shell only 2 or 3 millim. in diameter. It belongs to the genus *Pisum*.

The species may be described as follows:—

Shell subequilateral, transversely ovate, somewhat prominent at the umbones, and compressed at the lateral and lower margin, equally curved at both ends. Epidermis normally brownish straw-colour, sometimes darker and olive-brown; generally rather eroded at the beaks, which are reddish and a little prominent beyond the dorsal marginal curve. Concentric sculpture fine, becoming more or less obsolete on the posterior side, where the epidermis exhibits a less glossy appearance, and a number of very fine filaments crossing the concentric striæ obliquely. Ligament small, light brown. Interior of the valves bluish white, somewhat reddish or rosy towards the umbones, especially in young specimens, and at times bluish or purplish towards the margins, besides which there are two purplish stains or rays, varying in intensity in different specimens, one on each side beneath the lateral teeth. Hinge with a large double central cardinal tooth in the right valve, with a deep triangular pit on each side of it, with a small

\* Cat. Corbiculadæ, Amer. Journ. Conch. v. Append. p. 128.

† Conch.-Cab. ed. 2, p. 140.



simple tooth on the right of one pit, and a more oblique and thinner one to the left of the other, almost joining the posterior lateral tooth; the latter is about equal in length to the anterior one, both being finely serrated at the edge and striated on both sides. The left valve has a large triangular deep central pit, with a prominent tooth on each side of it, somewhat grooved or double at their apices, these again having a pit on their outsides, that on the posterior side being narrow and very oblique. Lateral teeth double, separated by a groove for the reception of the simple teeth of the opposing valve.

Largest specimen 20 millim. in width,  $15\frac{1}{2}$  long, 11 in thickness. An average example is 15 millim. wide, 12 long, 7 in thickness.

125. CORBICULA MINOR, *Prime*.

*Corbicula minor*, *Prime*, *Proc. Acad. Nat. Sci. Philad.* 1861, p. 127; *Cat. Corbiculadæ*, 1863, p. 4; *Annals Lyc. Nat. Hist. N. York*, vol. viii. p. 80, fig. 29; *Cat. Corb., Amer. J. Conch.* v. p. 133, no. 63; *Clessin, Küster's Con.-Cab.* p. 176, pl. 30. fig. 24.

*Hab.* New Holland (*Prime*); Richmond River and Burnett River (*Brazier*).

126. CORBICULA ANGASI, *Prime*.

*Corbicula Angasi*, *Prime*, *Journ. de Conch.* 1864, vol. xii. p. 151, pl. vii. fig. 6; *Cat. Corb., Americ. J. Conch.* v. p. 128, no. 6; *Clessin in Küster's Con.-Cab.* p. 205, pl. xxxviii. fig. 3; *Sowerby, Con. Icon.* Cyrena, fig. 90 (coarse)!

*Corbicula rivina*, *Clessin, Con.-Cab.* ed. 2, p. 139, pl. xxv. figs. 3, 4.

*Hab.* Murray River, S. Australia (*Angas*); River Onkaparinga, at Noarlunga (*Molineux*).

Mr. Angas has liberally placed a series of this species in the British Museum. On removing the rust-red earthy deposit which covers them, the epidermis is of a straw-colour. The interior of the valves varies considerably in painting. *Prime* describes it as pale orange, and sometimes whitish; but three specimens which I have opened are of a pinkish tint, two of them being much stained with deep purple. The latter colour takes the form of a somewhat triangular spot situated in the deepest part or bottom of the valve, besides which there is a broad concentric band across the middle of the valves.

The specimens described by *Clessin* under the name of *C. rivina* were also collected by *Angas* in the Murray River.



127. CORBICULA BARONIALIS, *Prime*.

*Corbicula baronialis*, *Prime*, *Ann. Lyceum Nat. Hist. New York*, 1870, vol. ix. p. 300; *Clessin, Conch.-Cab.* ed. 2, p. 200.

*Hab.* Port Morton, Australia.

This species is described as ovately transverse, somewhat compressed, subequilateral, with the anterior end rounded, the posterior subtruncate. The umbones are short, the epidermis yellowish, the sulci irregular, more or less obsolete, the valves thin and white within. The length is 17 millim., width 14, diam. 9.

128. CORBICULA DEBILIS, *Gould*.

*Cyrena debilis*, *Gould*, *Proc. Bost. Soc. Nat. Hist.* 1850, p. 293; *id. U.S. Explor. Exped.* vol. xii. p. 427, *Atlas*, fig. 529 a-b; *id. Otia Conch.* p. 86; *Tenison-Woods, Proc. Linn. Soc. N. S. Wales*, 1878, vol. ii. p. 255.

*Corbicula debilis*, *Gould, Deshayes, Cat. Conch. Brit. Mus.* p. 234; *Gould, Otia*, p. 246; *Prime, Cat. Corbic., Am. J. Conch.* vol. v. p. 131.

*Hab.* New Holland? (*Gould, 'Otia'*); Hunter River, New Holland (*Prime*).

This species is remarkable on account of the depressed umbones and its cycladiform appearance.

## 129. CORBICULA DESHAYESII. (Plate VII. figs. 28-29.)

Shell transverse, subtriangularly ovate, inequilateral, rather prominent at the umbones; anterior end shorter, rounded at the margin; posterior a little broader than in front, frequently exhibiting a slightly acute curve at its junction with the basal curved margin. Epidermis more or less zoned with olive, bluish olive, and darker bands, with the outer edge of an orange colour. Umbones eroded, when wetted exhibiting a dark purple or violet ray. Concentric sculpture coarse on the anterior part of the valves, becoming obsolete from the middle posteriorly. Interior whitish in the umbonal region with a violet spot, pale violet at the lower margin, with a spot on the posterior edge beneath the lateral teeth, all of which and the cardinals are almost white; rest of interior dark violet zoned with a paler tint. Besides the central subtrigonal ray, many specimens exhibit two others, one on each side beneath the side teeth radiating from the apex.

*Variety.* Shell covered with a yellowish epidermis, zoned with light reddish bands. Interior pinkish at the margin and umbo, bluish white with darker zones elsewhere.



Width 17 millim., length 13, diameter  $9\frac{1}{2}$ .

*Hab.* Victoria River and Port Essington, North Australia.

The specimens here described were named by Deshayes *C. australis* when he compiled the British-Museum Catalogue of Corbiculidæ. They are, however, quite distinct from that species, which is the same as *C. nepeanensis* of Lesson, and in no way answer the description of *C. australis*. The peculiar colour of the epidermis, the pale lower edge of the interior, and the posterior whitish spot are very characteristic features of this species. It is more inequilateral than *C. minor*, Prime, more coarsely and regularly sculptured and differently coloured. Figures 82 *a* and 82 *b* in the 'Conchologia Iconica' may possibly be intended to represent the variety of this species clothed with a yellowish epidermis.

The locality given by Sowerby, "Isl. of Timor," applies to the *Cyclas australis* of Lamarck, and not to *Cyrena australis* of Deshayes.

130. CORBICULA SUBLÆVIGATA, n. sp. (Plate VII. figs. 30-31.)

Shell equilateral, transversely regularly ovate, with moderately prominent beaks. Ends subequally rounded, if at all, the anterior the more sharply curved. Epidermis pale straw-colour, inclining to brown at the lower margin, and especially on the posterior dorsal slope, where there are one or two irregular corrugated ridges radiating in an irregular manner from the apex. Umbones white, not eroded, smooth. Rest of the surface finely striated; the striæ most regular and strongest anteriorly, becoming fainter upon the middle and hinder portions of the valves. Interior altogether white. Lateral teeth fine.

Width 20 millim., length 15, diameter 10.

*Hab.* Lochinvar, Australia (*Dr. Sinclair, R.N.*).

This species may be recognized among the Australian forms by its simplicity of colouring, its smooth white umbones, the general obsolete character of the concentric sculpture, and the one or two wrinkled ridges down the posterior dorsal slope. *C. nepeanensis* is more regularly and decidedly sculptured, scarcely as equilateral, and exhibits considerable variety of painting. *C. baronialis* agrees in colour; but, from Prime's very brief description, that species appears to be of a different form, having the posterior end subtruncated, whilst there is no trace of such a peculiarity in the present species.



## Genus SPHÆRIUM.

## 131. SPHÆRIUM EGREGIUM, Gould.

*Cyclas egregia*, Gould, *Proc. Bost. Soc. Nat. Hist.* 1850, vol. iii. p. 292 ;  
*id. Otia Conch.* p. 86 ; Wilkes, *Explor. Exped.* p. 245, *Atlas*, figs. 526-  
 526 b ; Prime, *Append.*, *Am. J. Conch.* v. p. 153 ; Tenison-Woods,  
*Proc. Linn. Soc. N. S. Wales*, 1878, vol. ii. p. 255.

*Hab.* New South Wales ? (Gould, 'Otia').

This is a very large species, being seven eighths of an inch in length ; and it is doubtfully Australian.

## 132. SPHÆRIUM TRANSLUCIDUM, Sowerby. (Plate VII. fig. 32.)

*Sphærium translucidum*, Sowerby, *Conch. Icon.* fig. 46.

*Sphærium novæ-zelandiæ*, part., Deshayes, *Proc. Zool. Soc.* 1854 ; *id.*  
*Cat. Corbiculidæ Brit. Mus.* p. 273.

*Hab.* Palm-tree Creek, Australia.

The specimens which received the name *translucidum* were considered by Deshayes to belong to his *S. novæ-zelandiæ* ; and hence it is that the locality New Holland is given in his 'Monograph of Corbiculidæ in the British Museum.'

I must here state that the figure in Mr. Sowerby's monograph is not only utterly useless, but altogether misleading. His description of the form, with the exception of the dorsal margin, which slopes on each side of the umbones, is fairly correct ; but where is the acuminate anterior end in the figure ? The colour is hyaline white, and the mixture of red and yellow observable in the illustration has no existence in reality.

## 133. SPHÆRIUM QUEENSLANDICUM, n. sp. (Plate VII. fig. 33.)

Shell hyaline white, rather inequilateral, somewhat inflated, obliquely subcircular, only a little wider than long ; anterior end longer, slightly acuminate ; posterior shorter, broader, obtusely curved. Ventral margin much curved. Concentric striæ very minute.

Length  $3\frac{1}{2}$  millim., width 4.

*Hab.* Limestone Creek, Burdekin River, Queensland (Brazier).

More inequilateral than *S. translucidum*, longer, with more prominent umbones, more circular, with the anterior end less acuminate, and the posterior not so decidedly truncated.

## 134. SPHÆRIUM MACGILLIVRAYI, n. sp. (Plate VII. fig. 34.)

Shell nearly equilateral, not much inflated, transversely ovate, transparent white ; anteriorly a little narrower and more acumi-



nate than at the opposite extremity, which is broadly arcuate; lower margin regularly widely arcuate. Lines of growth very fine.

Length 5 millim., width 6.

*Hab.* Penrith, New South Wales (*Mac Gillivray, Voyage of the 'Rattlesnake'*).

This species is less narrow and acuminate anteriorly than *S. translucidum*, and not truncated at the hinder end. It is more ovate and less oblique than *S. queenslandicum*.

#### Genus PISIDIUM.

##### 135. PISIDIUM AUSTRALE, *Lamarck*, var.

*Cyclas australis*, *Lamk. Anim. s. Vert.* vol. v. p. 560; *Deshayes*, ed. 2, vol. vi. p. 270; *id. Cat. Corbiculidæ Brit. Mus.* p. 285 (as *Pisum*).

*Hab.* Port King George, New Holland.

The typical form of this species is said by Lamarck to come from the island of Timor. Hence it seems most probable that what he considered a variety from Australia is in fact a distinct species. Carpenter\*, on the authority of Gray, quotes Lamarck's species as synonymous with *Lasea rubra*, Montagu. It has been confused with the *Cyrena australis* of Deshayes by Prime; but that species is a *Corbicula* and synonymous with *C. nepeanensis*, as I have already shown.

##### 136. PISIDIUM SEMEN, *Menke*.

*Pisidium semen*, *Menke, Moll. Nov. Holl.* p. 40; *Deshayes, Cat. Corbiculidæ in Brit. Mus.* p. 284 (as *Pisum*); *Prime, Appendix, Am. J. Conch.* v. p. 173.

*Hab.* On the sand-bank of Swan River.

This species, only a little more than a line in length, is described by Menke as obliquely ovate, ventricose, with turgid umbones, clothed with a yellow corneous epidermis, paler at the margin, very finely transversely striated, and, when decorticated, white or lilac.

##### 137. PISIDIUM ETHERIDGII, n. sp. (Plate VII. fig. 35.)

Shell slightly inequilateral, a little oblique, subcordiform, tumid, whitish, covered with a greyish cuticle; anterior end the longer, acuminate and sharply curved; posterior broadly rounded. Ventral margin regularly curved. Umbones rather prominent, with the

\* 'Mazatlan Cat.' p. 108.



young shell forming a more or less distinct apical cap. Concentric striæ very fine.

Width  $6\frac{1}{2}$  millim., length  $5\frac{1}{2}$ , diam.  $3\frac{1}{2}$ .

*Hab.* Yau-Yean Reservoir, Plenty District, Victoria, South Australia (*R. Etheridge*).

Not unlike the European *P. casertanum*, but rather less inequilateral.

### Genus UNIO.

#### *Chronological List of described Species.*

- 1818. *Unio australis*, Lamarck.
- „ ——— *depressus*, Lamarck.
- 1834. ——— *novæ-hollandiæ*, Gray.
- 1842. ——— *gratiosus*, Parreyss.
- 1843. ——— *cucumoides*, Lea, = *novæ-hollandiæ*.
- 1848. ——— *ambiguus*, Parreyss.
- „ ——— *multidentatus*, Parreyss.
- „ ——— *fulmineus*, Parreyss, = *multidentatus*, var.
- 1850. ——— *nepeanensis*, Conrad.
- „ ——— *cultelliformis*, Conrad, = *depressus*.
- „ ——— *balonnensis*, Conrad, = *ambiguus*.
- „ ——— *profugus*, Gould.
- 1852. ——— *Cumingianus*, Dunker, = *novæ-hollandiæ*.
- 1855. ——— *Lessoni*, Küster, = *nepeanensis*.
- „ ——— *rugulosus*, Charpentier.
- „ ——— *Shuttleworthi*, Charpentier.
- 1856. ——— *Shuttleworthi*, Lea, = Angasi.
- 1859. ——— *mutabilis*, Lea, = *depressus*.
- „ ——— *vittatus*, Lea, = *ambiguus*.
- „ ——— *Wilsonii*, Lea.
- 1861. ——— *philippianus*, Küster, = *ambiguus*.
- 1862. ——— *semiplicatus*, Küster.
- 1863. ——— *Stuarti*, Adams & Angas.
- 1864. ——— *Evansi*, Adams & Angas.
- 1865. ——— *moretonicus*, Reeve, = *australis*, var.
- 1867. ——— Angasi (Lea), Reeve.
- 1871. ——— *Danellii*, Villa.
- 1874. ——— *Jeffreysianus*, Lea.

#### 138. UNIO ANGASI, Lea.

*Unio Shuttleworthii*, Lea (non Charpentier), *Proc. Acad. Nat. Sci.*

*Philad.* 1856, p. 94; *id. Journ. Acad. Nat. Sci. Philad.* 1858, vol. iii.

p. 304, pl. xxviii. fig. 19; Reeve's *Conchol. Icon.* fig. 167.

*Unio Angasi*, Lea, MS.; Reeve's *Con. Icon.* fig. 282.

*Anodon Angasii*, Sowerby, *Con. Icon.* fig. 127.

*Hab.* Balonne River, Brisbane River, and River Isaacs (*Brit. Mus.*); Strangeways River, N. Australia (Angas).

This, the largest of the Australian species, is very elongate transversely, although in this respect it is subject to considerable



variation, as the following measurements of two specimens show. One is 127 millim. long and 65 wide, the other 124 millim. in length and 69 in width. Specimens from the river Isaacs are remarkable for having the hinder half considerably tuberculose. The nacre is sometimes entirely white, bluish, or purplish; but in nearly every instance is more or less stained at the upper part and posteriorly with livid purple, olive, or a combination of these colours, difficult to define.

The name *Shuttleworthi*, which Lea in 1856 imposed upon this species, was in the year previous employed by Küster for another species of this genus, also coming from Australia. The figure and name only of the latter appeared in 1855 in Part 147 of the 'Conchylien-Cabinet,' and the description in the following year. In his "Synopsis of the Family Unionidæ," Lea makes no mention of Küster's species. *U. Angasi*, Lea, which name can be conveniently employed for this species, was described by Reeve from what I take to be the rather young state of this form.

139. UNIO DEPRESSUS, *Lamarck*.

*Unio depressus*, *Lamarck*, *An. s. Vert.* ed. 2, vol. vi. p. 544; *Delessert*, *Recueil des Coq.* pl. xii. fig. 5; *Hanley*, *Recent Shells*, p. 200; *Conrad*, *Journ. Acad. Nat. Sci. Philad.* ser. 2, 1854, vol. ii. part 4, p. 295.

*NonUnio depressus*, *Reeve's Con. Icon.* fig. 81.

*Unio mutabilis*, *Lea*, *Proc. Acad. Nat. Sci. Philad.* 1859, p. 152; *Reeve*, *Con. Icon.* fig. 112.

*Unio cultelliformis*, *Conrad*, *Proc. Acad. Nat. Sci. Philad.* 1850, p. 10; *Journ. Acad. N. S. Phil.* 1854, p. 295, pl. xxvi. fig. 2.

*Hab.* Bogan River (*Conrad* and *Brit. Mus.*); River Nepean (*Mac Gillivray*); Brisbane Water and Murray River.

Conrad is right, I think, in uniting his *U. cultelliformis* with Lamarck's *U. depressus*. The figure in Delessert cannot, however, represent the actual type, which is described as 52 millim. long, for that delineated is only 40. Conrad's specimen is said to be 60 millim. in length, and the largest in the Museum is 77.

All the examples which I have seen have a slight sinuation near the middle of the ventral margin, and a depression radiating from the umbo to that part of the outline. The anterior muscular scar is comparatively deep for so thin a shell, and of an irregular form. A second small, but very deep pit is situated just beneath the anterior or cardinal teeth. This is shown in Delessert's figure, and also pointed out by Conrad (*Journ. Acad. Nat. Sci.*



p. 295). The *U. mutabilis* of Lea has this peculiarity also. The *U. depressus* of the 'Conchologia Iconica,' fig. 81, is a very distinct species, and approaches certain varieties of *U. ambiguus*, the specimen figured being from Tasmania.

140. *UNIO AUSTRALIS* (*Lamarck*), *Philippi*.

*Unio australis*, *Lamarck*, *Anim. s. Vert.* ed. 2, vol. vi. p. 546; *Hanley*, *Recent Shells*, p. 192, pl. xxi. fig. 25; *Philippi*, *Abbild.* vol. iii. p. 81, pl. v. fig. 5.

*Non Unio australis*, *Lamk.*, *Küster*, *Con.-Cab.* p. 230, pl. lxxvii. fig. 6.

*Var.* = *Unio moretonicus*, *Reeve*, *Con. Icon.* fig. 118.

*Hab.* Australia.

This species, *U. balonnensis*, *Conrad*, *U. ambiguus*, *Parreyss*, *U. vittatus*, *Lea*, *U. Danellii*, *Villa*, and *U. profugus*, *Gould*, are very difficult to define. The second and third, I think, are certainly the same. *U. australis*, as determined by *Philippi*, is very like the *U. Shuttleworthii* of *Lea*, but rather less elongate, agreeing with it, however, in the slight ventral sinuation and the narrower anterior end.

*Lamarck's* diagnosis is so brief, that it is utterly impossible to know what species he had before him. I therefore adopt *Philippi's* idea of it. He was the first to describe and figure a shell which he believed to be the *U. australis*. Subsequently *Küster*, in the 'Conchylien-Cabinet,' describes and figures under this name a shell which appears to me different from that represented by *Philippi*. *Küster* makes no reference to the latter author's work. The figure in the 'Conchylien-Cabinet' represents a specimen with a coarsely concentrically striated surface and scarcely attenuating anteriorly. On the contrary, *Philippi's* figure is more finely striated, and the hinder end is considerably broader than the anterior.

141. *UNIO AMBIGUUS*, *Parreyss*.

*Unio ambiguus*, *Parreyss*, *Philippi*, *Abbild.* vol. iii. Lieferung 2, 1848, p. 47, pl. iii. fig. 2; *Reeve's Con. Icon.* fig. 355; *Küster's Con.-Cab.* pl. lxxix. fig. 2.

*Unio balonnensis*, *Conrad*, *Proc. Acad. Nat. Sci. Philad.* 1850, p. 10; *id. Journ. Acad. Nat. Sci. Philad.* ser. 2, vol. ii. p. 295, pl. xxvi. fig. 3; *Lea*, *Synopsis*, ed. 1870, p. 103, as var. of *depressus*, *Lamk.*

*Unio philippianus*, *Küster*, *Con.-Cab.* p. 235.

*Unio vittatus*, *Lea*, *Proc. Acad. Nat. Sci. Philad.* 1859, p. 153; *Reeve*, *Con. Icon.* fig. 83.



*Hab.* Balonne and Bogan rivers (*Conrad*); River Onka-paringa, at Noarlunga (*Molineux*, *U. vittatus*).

The name *ambiguus* was published by Philippi in the second part of the third volume of his 'Abbildungen,' which was completed in 1851. The *Lieferung* in question, however, appears to be undated; but a private mark upon the copy in the British-Museum library shows that it was obtained during the year 1848, or two years previous to the publication of *Conrad's U. balonnensis*.

Philippi's figure does not represent the full size to which the species attains, for one specimen in the Museum from Melbourne has an extreme diameter of  $4\frac{1}{4}$  inches. The nacre is described as bluish, becoming in the umbonal region brassy or flesh-coloured, or pale flesh-colour with brass-coloured stains. Judging from the Museum series, as a rule, the lower or ventral half of the shell is bluish white, and the umbonal region, and, indeed, frequently the upper half of the shell, is stained with a brassy-brown colour. The posterior end, especially upon the muscular scar, displays the greatest iridescence.

I fail to discover any essential difference in the *U. vittatus* of Lea. The types in the Museum from Cuming's collection are of a paler and yellower colour than usual; and consequently two or three of the dark concentric zones marking periods of growth contrast more conspicuously than in deeper-coloured specimens. The form is the same, the sculpture perhaps a trifle finer, and the surface therefore rather smooth. The teeth offer no differences; and the interior, although described by Lea as white, is in reality bluish white on the lower half and brassy brown towards the umbonal region, just as it is in the normal form represented by Philippi.

Küster changed the name *ambiguus* to *philippianus*, because the former had been employed for another species which he includes in the genus *Unio*, although described by Lamarck as a *Castalia*.

#### 142. UNIO PROFUGUS, Gould.

*Unio profugus*, Gould, *Proc. Bost. Soc. Nat. Hist.* 1850, vol. iii. p. 295; *id. Explor. Exped.* p. 429, *Atlas*, pl. xxxviii. fig. 543b; *id. Otia Conch.* p. 88.

*Hab.* Hunter River, N. S. Wales.

This species appears to be rather narrower than *U. ambiguus*, in which respect it approaches *U. Shuttleworthi* of Lea, but it does not



narrow anteriorly like that species. The bifid cardinal tooth of the right valve, remarked upon by Gould, appears to be a character common to most of the Australian species of this genus.

143. *UNIO DANELLII*, *Villa*.

*Unio Danellii*, *Villa*, *Journ. de Conch.* 1871, vol. xix. p. 328.

*Hab.* Brunswick, S. Australia (*Villa*); Yarra River, Victoria (*Crosse*, *l. c.* p. 329).

This species is known to me only by a brief diagnosis. It may be a form of *U. ambiguus*.

144. *UNIO SHUTTLEWORTHII*, *Charpentier*.

*Unio Shuttleworthii*, *Charpentier*, *Küster's Conch.-Cab. Lieferung* 147, 1855, explanation of plates on cover, pl. xlv. fig. 2.

*Unio Shuttleworthii*, *Küster*, description *l. c.*, *Lieferung* 150, 1856, p. 152.

*Hab.* New Holland.

This species appears to be very closely allied to the *U. ambiguus*, Parreyss, but differs chiefly in being proportionally much narrower in front.

145. *UNIO JEFFREYSIANUS*, *Lea*.

*Unio Jeffreysianus*, *Lea*, *Journ. Acad. Nat. Sci. Philad.* vol. viii. 1874, p. 23, pl. vii. fig. 20.

*Hab.* Australia.

The remarkable peculiarity of this species consists in the lateral teeth in both valves being single. In all other respects it agrees with *U. ambiguus*. One specimen of the latter in the British Museum has this irregularity. It is the largest example, and is stated to have been found at Melbourne.

146. *UNIO WILSONII*, *Lea*.

*Unio Wilsonii*, *Lea*, *Proc. Acad. Nat. Sci. Philad.* 1859, p. 153; *id. Journ. Acad. Nat. Sci. Philad.* ser. 2, vol. iv. p. 256, pl. xl. fig. 137; *Reeve's Con. Icon.* fig. 472 (*Lea's* figure reversed).

*Hab.* "Eastern branch of Isaac's plain, New South Wales."  
—*Lea*.

147. *UNIO STUARTI*.

*Unio* (*Alasmodon*) *Stuarti*, *A. Adams & Angas*, *Proc. Zool. Soc.* 1863, p. 417; *Reeve's Con. Icon.* pl. xlv. fig. 279, pl. xlv. fig. 279 a.

*Anodon Stuarti*, *Sowerby*, *Reeve's Con. Icon.* fig. 136 a-b.

*Hab.* Lagoon near Mt. Margaret, Central Australia (*Angas*); Umbum, forty miles south of Peake (*J. Chandler*).



It is in keeping with Mr. Sowerby's work that this species should appear in 1866 as a *Unio* and in 1870 as an *Anodon*.

148. *UNIO RUGULOSUS*, *Charpentier*.

*Unio rugulosus*, *Charpentier*, *Küster's Con.-Cab.* 1855, part 147, pl. xlv. fig. 5; *id. l. c.* 1856, part 150, p. 154.

*Hab.* New Holland.

149. *UNIO NEPEANENSIS*, *Conrad*.

*Unio nepeanensis*, *Conrad*, *Proc. Acad. Nat. Sci. Philad.* 1850, vol. v. p. 10; *id. Journ. Acad. Nat. Sci. Philad.* ser. 2, vol. ii. p. 296, pl. xxvi. fig. 4; *Reeve's Con. Icon.* fig. 110.

*Unio depressus*, *Lesson*, non *Lamarck*, *Voy. Coquille*, p. 427, pl. xv. figs. 5-5 a.

*Unio Lessonii*, *Küster*, 1855, *Con.-Cab.* p. 135, pl. xxxvi. fig. 4 (copy of Lesson's figure).

*Hab.* Nepean River, N. S. Wales (*Conrad*, *Lesson*, and *MacGillivray*).

This species is readily distinguished by the coarse wrinkles upon the umbones. These in Lesson's specimen appear to be much eroded; hence this peculiarity probably escaped his notice. The form of his shell, however, with the comparatively square or truncated anterior end, corresponds with that of *U. nepeanensis*; and since the locality quoted by him and Conrad is identical, I am inclined, with the latter, to consider them belonging to the same species.

150. *UNIO EVANSI*, *A. Adams & Angas*.

*Unio* (*Alasmodon*) *Evansi*, *A. Adams & Angas*, *Proc. Zool. Soc.* 1864, p. 39; *Reeve's Con. Icon.* fig. 285.

*Hab.* Lagoons of Lower Murray River, South Australia (*Angas*).

151. *UNIO NOVÆ-HOLLANDIÆ*, *Gray*.

*Unio novæ-hollandiæ*, *Gray*, *Proc. Zool. Soc.* 1834, p. 57; *Hanley, Recent Shells*, p. 182.

*Unio cucumoides*, *Lea*, *Trans. Amer. Phil. Soc.* 1843, vol. viii. pl. vii. fig. 2; *Reeve's Con. Icon.* fig. 89; *Küster's Con.-Cab.* p. 219, pl. lxxiv. fig. 1.

*Unio Cumingianus*, *Dunker*, *Zeitsch. f. Mal.* 1852, vol. ix. p. 53.

*Hab.* Richmond River and Hunter River (*coll. Cuming*); Brisbane River, N. S. Wales (*J. MacGillivray*); Macquarrie River (*Gray*).

I can positively affirm the identity of the *U. cucumoides* of Lea



and this species, as the two valves upon which Gray founded his description are now in the Museum, having been presented by him a few years ago. Upon one the locality Macquarrie River is written, and upon the other the name is in his own handwriting.

152. *UNIO MULTIDENTATUS*, *Parreyss*.

*Unio multidentatus*, *Parreyss*, *Philippi*, *Abbild.* vol. iii. p. 46, pl. iii. fig. 4; *Küster's Con.-Cab.* pl. xxxvi. fig. 5.

*Var.* = *Unio fulmineus*, *Parreyss*, *Philippi*, *l. c.* figs. 5-6; *Küster*, p. 286, pl. xvi. figs. 2, 3.

*Hab.* Australia (*Parreyss*).

The differences in outline and dentition pointed out by *Philippi* in the two forms which he considered specific are not, I think, more than individual variations. The Museum purchased of *Parreyss*, in 1841, four specimens labelled *U. fulmineus*, which represent both types. The older the shell, the more *multidentate* becomes the cardinal tooth.

153. *UNIO GRATIOSUS*, *Parreyss*.

*Unio gratiosus*, *Parreyss*, *Philippi*, *Abbild.* vol. i. pl. i. fig. 5; *Küster's Con.-Cab.* p. 239, pl. lxxx. fig. 3.

*Hab.* Australia (*Parreyss*).

This species has a more finely corrugated surface than *U. multidentatus*, and is narrow.

154. *UNIO SEMIPLICATUS*, *Küster*.

*Unio semiplicatus*, *Küster*, *Con.-Cab.* p. 279, pl. xciv. fig. 4.

*Hab.* Australia.

A narrow form with the posterior end coarsely wrinkled.

Genus *MYCETOPUS*.

155. *MYCETOPUS RUGATUS*, *Sowerby*.

*Mycetopus rugatus*, *Sowerby*, *Conchol. Iconica*, vol. xvi. fig. 7; *Smith*, *Voy. Erebus & Terror*, pl. iv. fig. 1; *Clessin*, *Küster's Con.-Cab.* p. 205, pl. lxvii. fig. 3; *Lea*, *Synopsis*, ed. 4, pp. 90 & 147.

*Hab.* Victoria River, N. Australia (*Capt. Wickham*, *R.N.*, and *mus. Cuming.*).

It is very remarkable that Australia and South America should possess species so much alike as *M. siliquosus* and the above.



*Pseudo-Australian Species.*

The following species have, erroneously I think, been quoted as inhabiting Australia.

1. *PHYSA BRUNNIENSIS*, Sowerby, *Con. Icon.* fig. 99 *a-b*.

*Hab.* Brunni Island, Australia.

This island is situated near the south coast of Tasmania, and therefore I do not include this species among the Australian *Physæ*.

2. *PHYSA APERTA*, Sowerby, *Con. Icon.* fig. 88 *a-b*.

*Hab.* "Near Hamilton, Australia."

This species, too, like the preceding, is not Australian, the town of Hamilton being in Tasmania.

3. *PHYSA SINUATA*, Gould.

*Hab.* "New South Wales" (Sowerby, *Con. Icon.* fig. 55 *a-b*).

This species is described by Gould as having been brought from the Fiji Islands; and the locality assigned to it by Sowerby is apparently one of very many errors of this description occurring in the 'Conchologica Iconica.'

4. *PHYSA TONGANA*, Quoy & Gaimard.

*Hab.* "Australia" (*Con. Icon.* fig. 54).

The authors of this species give the Tonga or Friendly Islands as the locality of this species; and Sowerby is most probably again in error in citing Australia as the habitat; for it is unlikely that the same species of this genus occurs both in Tonga and Australia.

5. *PHYSA AURICULATA*, Gassies.

*Hab.* Australia (*Sow. Con. Icon.* pl. ix. fig. 67, pl. xii. fig. 67 *b*).

I must here correct Sowerby in stating that his figure was drawn from a specimen in the British Museum. This species was not in the National Collection at the time when his monograph was published. The locality, too, given by Sowerby is incorrect, unless he considers New Caledonia, whence the species was described by M. Gassies, to be in Australia.

6. *PHYSA KANAKINA*, Gassies.

*Hab.* "Kanakina," Australia (Sowerby, *Con. Icon.* fig. 68).

Like the preceding, this species also is an inhabitant of New Caledonia. M. Gassies imposed this name (*kanakina*) upon the species because it was met with in a locality peopled by a tribe called the "kanakas." The fact of Mr. Sowerby giving "kanakina" (an adjective) as a place situated in Australia, shows the entire



absence of care in the preparation of his monograph. The 'Journal de Conchyliologie' must have been in his hand, for the figure there given is copied, though badly as regards colour; and yet the text could not have been consulted, or such an unpardonable error could never have been committed, and such an absurdity as "the Kanakina Physa" would never have appeared.

7. *PHYSA CASTANEA*, Sowerby.

*Hab.* Australia (Sowb. Con. Icon. fig. 86).

The shell here figured was formerly considered by Sowerby ('Genera of Recent and Fossil Shells,' *Limnea*, pl. ii. fig. 7) the *Physa castanea* of Lamarck. This is European in its distribution. As Sowerby has merely copied the original figure, and does not know in whose possession the shell now is, it appears to me unjustifiable on his part to state that it is Australian. The description of the figure, too, is incorrect, for neither in the original nor the copy of it do the whorls appear "angular." *Physa castanea* of Sowerby's 'Conchological Manual,' pl. xiv. f. 310, is, again, a distinct species.

8. *PHYSA ATTENUATA*, Sowerby, *Con. Icon.* fig. 94.

*Hab.* Dulverton Lake, Australia.

This is a Tasmanian species, and not from Australia. Lake Dulverton is quoted by the Rev. Tenison-Woods, in his "Monograph of the Freshwater Shells of Tasmania," as the locality for *P. mamillata*, Sowerby (Proc. Roy. Soc. Tasmania, 1875, p. 73).

AMPULLARIA.

The two following species are not considered Australian, as the authenticity of the localities rests solely upon the statement in the 'Conchologia Iconica,' a work notable for incorrect or erroneous habitats.

9. *AMPULLARIA POLITA*, Deshayes; *Con. Icon.* fig. 35.

*Hab.* Port Jackson, Australia.

10. *AMPULLARIA TURBINOIDES*, Reeve, *Con. Icon.* fig. 37.

11. *UNIO SUPERBUS*, Lea.

*Unio superbus*, Lea, *Trans. Amer. Phil. Soc.* 1846, vol. ix. p. 281, pl. xlii. fig. 11; Reeve's *Con. Icon.* fig. 281.

*Unio velaris*, Benson, Hanley, *Bivalve Shells, Appendix*, p. 385, pl. xxiii. fig. 42.



*Hab.* New Holland (*Lea*), Danu-Luar River, Sumatra (*Dunker*, teste *Lea*); Bugis, Celebes (*Hanley*).

This species is erroneously considered Australian by *Lea*.

12. *ANODONTA PURPUREA*, *Valenciennes*.

*Anodonta purpurea*, *Valenciennes*, *Humboldt & Bonpland's Voyage, Zoologie*, vol. ii. pl. xlviii. bis, fig. 3; *Hanley, Cat. Recent Shells*, p. 218 *Lea, Synops.* ed. 4, p. 106; *Clessin in Küster's Conch.-Cab.* p. 77, pl. xix. fig. 1.

*Hab.* Philippines (*Valenciennes*, *Hanley*, *Clessin*); Australia (*Lea*).

13. *CORBICULA SEMISULCATA*, *Deshayes*, *P. Z. S.* 1854, p. 343.

*Hab.* Victoria River (*Deshayes*).

Prime has pointed out that this species is the same as *C. limosa* of Maton, a South-American form; and in this decision I fully concur.

14. *CORBICULA OBLONGA*, *Clessin*.

*Hab.* "Apparently Australia."

This species is merely supposed to be Australian by *Clessin* (*Con.-Cab.* p. 261), on account of its similarity in outline to other forms from that continent.

EXPLANATION OF THE PLATES.

PLATE V.

Figs. 1-3. *Melania balonnensis*.  
4-8. *M. denisoniensis*.  
9-10. *M. venustula*.  
11. *M. queenslandica*.  
12. *M. Elseyi*.  
13. *M. subsimilis*.  
14. *Limnæa affinis*.

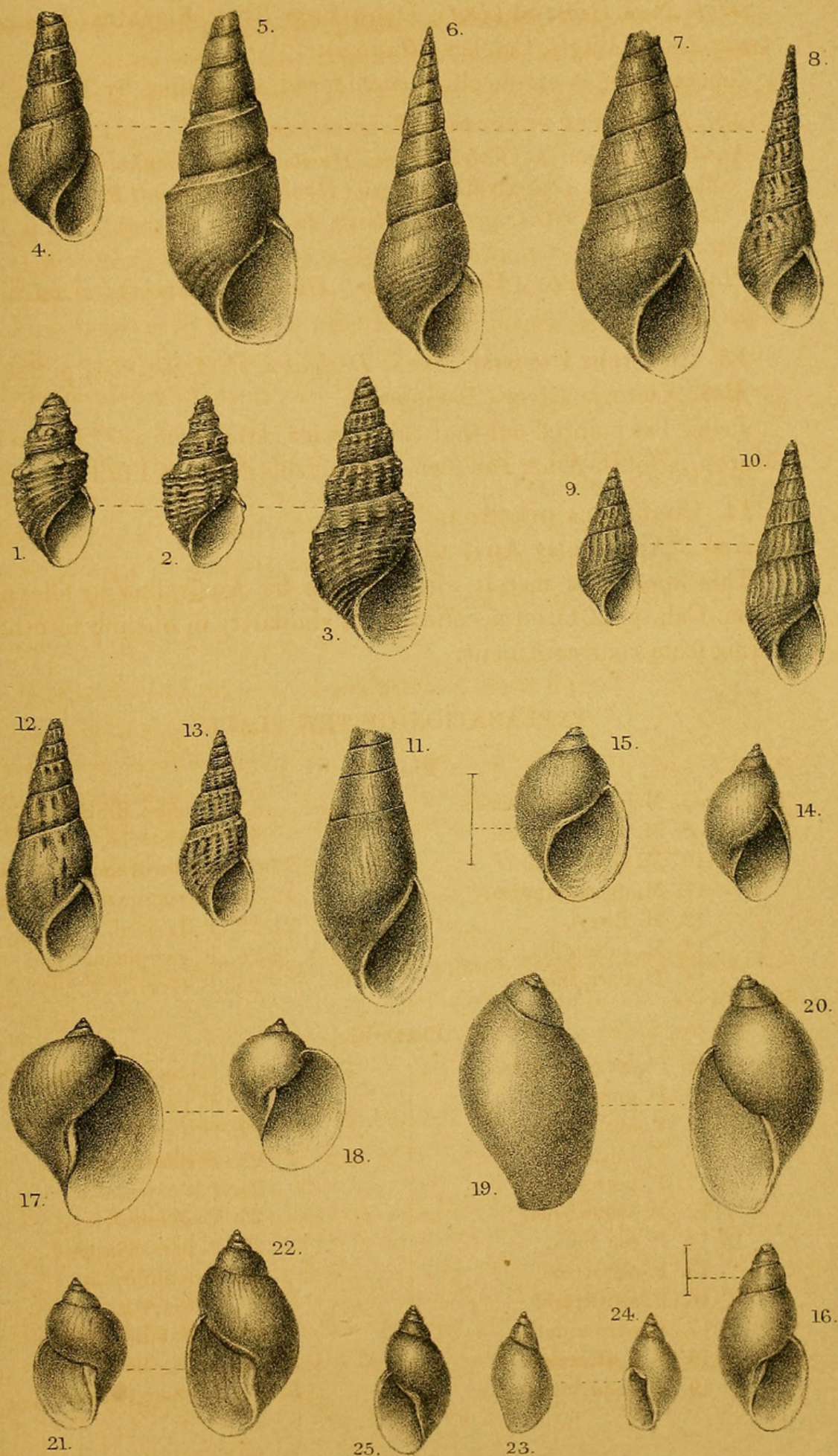
Figs. 15. *Limnæa Brazieri*.  
16. *L. victoriae*.  
17-18. *L. brevicauda*.  
19-20. *Physa novæ-hollandiæ*.  
21-22. *P. Lessoni*.  
23-24. *P. georgiana*.  
25. *P. Grayi*.

PLATE VI.

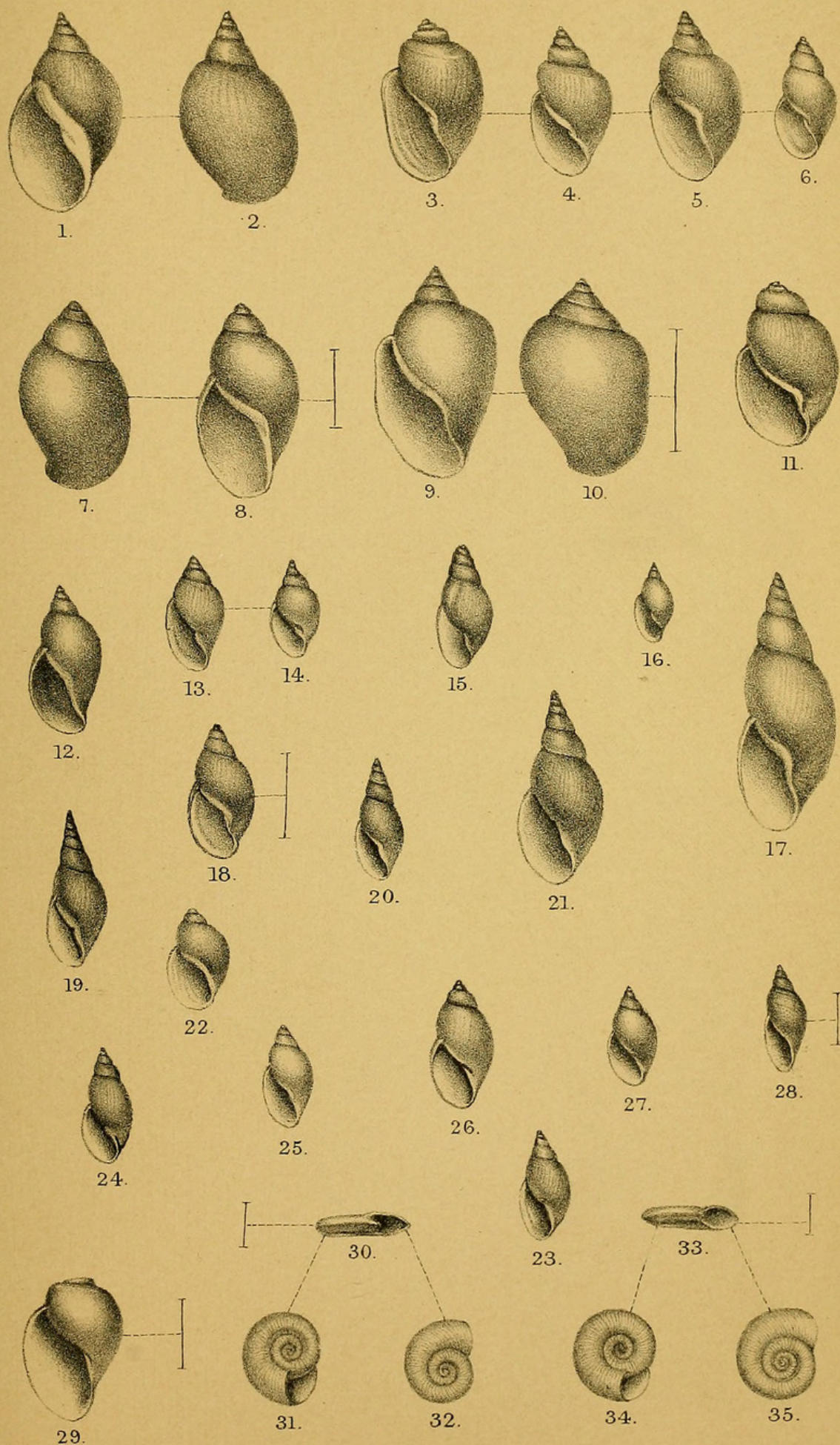
Figs. 1-2. *Physa marginata*.  
3-6. *P. gibbosa*.  
7-8. *P. australis*.  
9-10. *P. Ludwigii*.  
11. *P. pectorosa*.  
12. *P. australiana*.  
13-14. *P. concinna*.  
15. *P. olivacea*.  
16. *P. acutispira*.  
17. *P. pyramidata*.  
18. *P. fusiformis*.  
19. *P. Beddomei*.

Figs. 20. *Physa gracilentia*.  
21. *P. producta*.  
22. *P. Brazieri*.  
23. *P. queenslandica*.  
24. *P. Quoyi*.  
25. *P. Etheridgii*.  
26. *P. breviculmen*.  
27. *P. tenuilirata*.  
28. *P. exarata*.  
29. *P. bonus-henricus*.  
30-32. *Planorbis Gilberti*.  
33-35. *P. essingtonensis*.

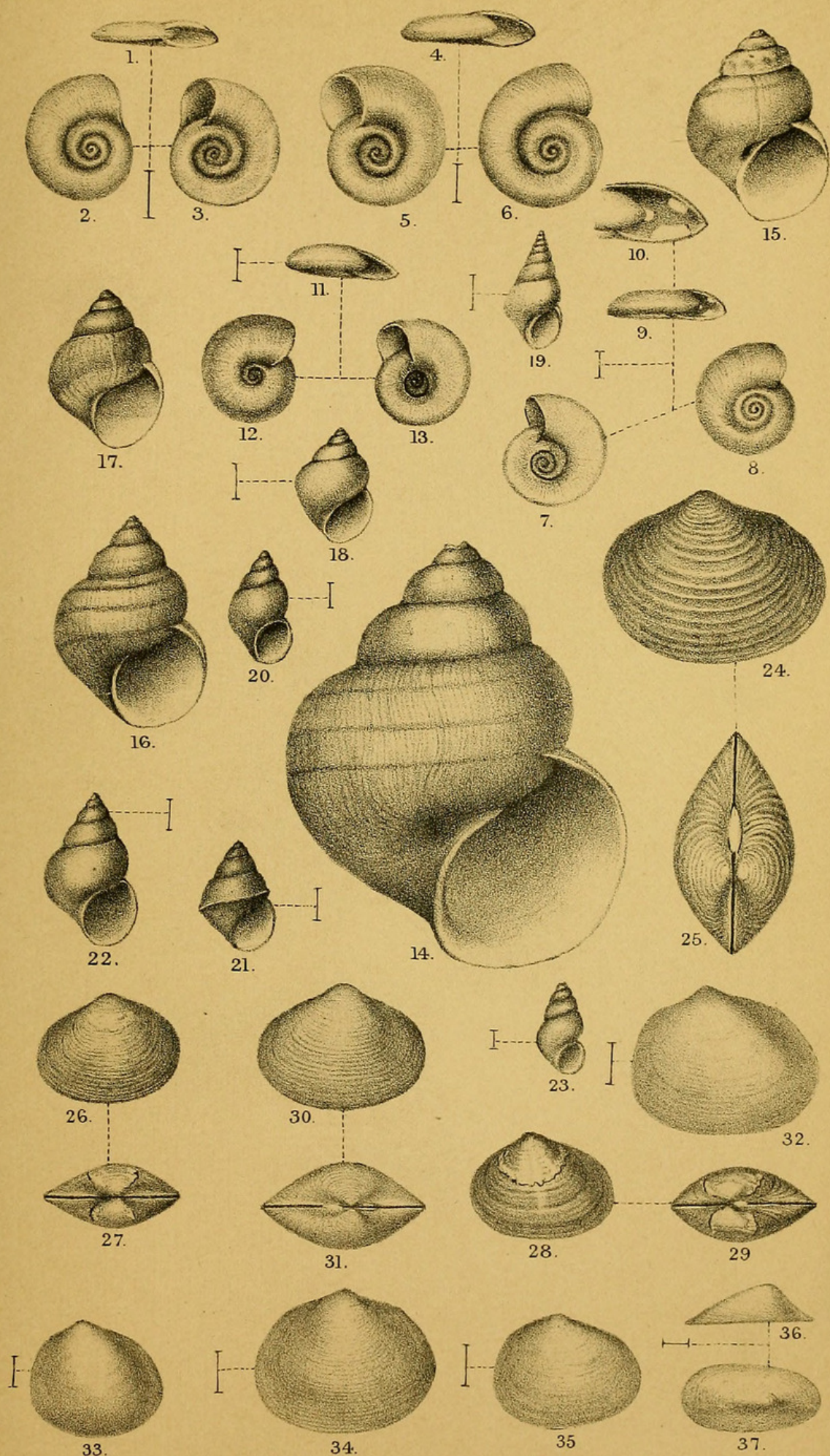
















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