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THE FRESHWATER MOLLUSCA OF VICTORIA.

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(Plates I-IV, Figs. 1-43.)

In the Journal of the Linnean Society of London, Vol. xvi, 1882, E. A. Smith published a well illustrated article on The Freshwater Shells of Australia. Since then, however, in this State the fluviatile forms have been somewhat neglected. Confusion prevails as regards both genera and species, and the present paper has been prepared with the object of assisting in identification of the Victorian species. Much has been written on the subject, but as W. L. May remarks in his Revised Census of the Tasmanian Fluviatile Mollusca (Pr. Roy. Soc. Tas. for 1920, p. 65), "overlapping has occurred in previous work, creating many synonyms through the absence of figures and uncertainty as to what previously described species really were. Again, too much stress has been laid on small variation in the erection of species, which variation proves to be individual and not specific." This applies to many Victorian forms, a fact made evident in the large synonymy.

Thirty-three species are herein accepted and are represented as follows: *Melania* 1, *Vivipara* 1, *Bythinella* 3, *Limnaea* 4, *Myxas* 1, *Ameria* 4, *Isidorella* 2, *Planorbis* 3, *Segmentina* 1, *Ancylus* 2, *Gundlachia* 1, *Corbicula* 1, *Sphaerium* 2, *Pisidium* 1, *Hyridella* 2, *Propehyridella* 3, *Protohyridella* 1, together with varieties in *Ameria* (7) and *Isidorella* (3). In comparison with other States, Victoria has few species, but I consider that when our lagoons, rivers and lakes are thoroughly explored additional species will be found.

Through the courtesy of the Director of the National Museum, I have had the Museum collection at my disposal, together with the collections of the late W. Kershaw, T. Worcester, J. H. Young, F. L. Billinghurst, and several others.

Earliest in the field were the French naturalists, Quoy and Gaimard, who, under the name of *Paludina buccinoides,* described and figured one of our smallest species (now known as *Bythinella buccinoides*) collected as dead shells in brackish swamps at Westernport. This mollusc is abundant

throughout the State, but so much misunderstood that I have thought it advisable to reproduce the original description on a later page, together with that of *B. nigra* Q. and G.

In the Transactions of the Royal Society of South Australia, 1882, p. 76, Professor Tate, in a List of Victorian Freshwater Pulmoniferous Snails, includes *Limnaea viridula* Tate, from Murndal, Hamilton, and Dr. Cherry, Proc. Roy. Soc. Vict., 1896, p. 183, identifies a form from the headwaters of the Wimmera as *Limnaea venustula*. After careful search I have failed to locate descriptions of these species and suggest that they are manuscript names only.

Perhaps the most perplexing Victorian freshwater molluscs are the species now referred to the genera *Ameria* and *Isidorella,* but formerly placed under *Physa, Bullinus, Isidora,* and *Amplexa* by various authors. Of recent years these freshwater snails have attracted attention as intermediate hosts for sheep fluke and possible hosts of *Bilharzia.* Hedley, in his Notes on the Victorian Species of *Bullinus* (Rec. Aust. Mus., 1917, p. 1) writes: "This group presents the student with exceptional difficulties. The species appear to vary extremely and to limits not yet ascertained. With the honourable exception of Tate's Essay in the Zoology of the Horn Expedition, the literature has multiplied names and ignored variation. A chance handful from any pool is likely to present individuals with a longer and a shorter spire. The first lesson to be learnt in studying this group is how changeable a character is this elevation of the spire. The presence or absence, spacing or punctuation, of spiral sculpture, can not be used as a safe guide to specific differentiation. These features are the imprint of spiral threads or lines of cilia in the epidermis. But the epidermal coat varies in development according to local conditions, so that lines of cilia, which would apparently be otherwise developed, seem to be repressed in unfavourable environment. Yet some geographical series suggest that there are species which never develop such ciliae. A more abundant supply of lime allows a deposit on the inner lip and hence longitudinal streaks that mark previous rest stages."

Although Hedley adds that no positive conclusions are advanced, his article considerably clarifies the nomenclature of these puzzling forms.

In regard to distribution, haphazard dispersal is effected in many ways; some molluscs are transported by water-plants, others by animals, and by these means newly formed ponds and creeks are populated. B. C. Cotton gives an interesting

account in the South Australian *Naturalist,* 1934, No. 4, p. 113, of a fine specimen of *Hyridella australis* found attached to the foot of a Black Duck, *Anas superciliosa,* shot on the wing near Narracoorte, South Australia.

Pearls are occasionally found in our freshwater mussels.

The types of the two new species herein described and also all specimens illustrated are now in the National Museum of Victoria, with the exception of those shown in figs. 9, 16, 19 and 20.

I am indebted to Mr. C. W. Brazenor of the National Museum for the excellent photographs used to illustrate this paper.

GASTROPODA.

Family **MELANIIDAE.**

Genus MELANIA Lamarck, 1799.

Melania balonnensis Conrad.

(Pl. I, Fig. 1.)

1843 Melania lirata Menke (non Benson), Moll. Nov. Holl, p. 9.
1850 M. balonnensis Conrad, Pr. Acad. Nat. Sci. Phil., v, p. 11.
1850 M. tetrica Conrad, op. cit.
1866 Id., Conrad, Am. Journ. Conch., ii, p. 80, pl. 1, fig. 9.
1866 M. balonnensis Conrad, op. cit., ii, p. 80, pl. 1, fig. 10.
1874 Id., Brot, Conch. Cab., i, Abth. 24, p. 287, pl. 28, figs. 14, a, b,; 15.
1878 M. oncoides Tenison Woods, Pr. Linn. Soc. N.S.W., iii, p. 5.
1882 M. tatei Brazier, n.n. for tetrica Conrad (non Gould), Pr. Linn. Soc. N.S.W., vi, p. 551.
1882 M. Balonnensis Conrad. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 560.
1882 Id., Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 257, pl. 5, figs. 1-3.
1882 M. subsimilis Smith, op. cit., p. 262, pl. 5, fig. 13.
1896 M. balonnensis Conrad. Tate, Horn. Exp. Zool., ii, p. 209.
1896 M. tetrica Conrad. Tate, op. cit.
1897. M. subsimilis Smith. Tate, Tr. Roy. Soc. S. Aust., p. 43.

Size.—Length, 25 mm.; breadth 11 mm.

Localities.—Murray River (J. A. Kershaw); Gayfield, Bannerton (A. C. Nilson); Ned's Corner (F. A. Cudmore).

Vernacular Name.—The Balonne River Melania.

Observations.—In this species, as in other members of the genus, the apex, which is perfect in the juveniles, is usually eroded or truncate in larger specimens. Smith notes its wide distribution in Australia and remarks: "The colour, as well as the sculpture, is subject to considerable variation. Some specimens are uniformly olivaceus, 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 plicae."

Family **VIVIPARIDAE.**

Genus VIVIPARA Lamarck, 1809.

Vivipara hanleyi (Frauenfeld).

(Pl. I, Fig. 2.)

1862 Paludina hanleyi Frauenfeld, Verhandl. Zool. Bot. Ges. Wein., xii, p. 612.
1864 P. intermedia Hanley. Reeve, Conch. Icon., xiv, pl. 9, fig. 57.
1865 P. purpurea Martens, Ann. Mag. Nat. Hist., 3 ser., xvi, p. 428.
1882 P. Hanleyi Frauen. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 561.
1882 Vivipara intermedia Hanley. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 264.
1935 Notopala hanleyi Frauen. Cotton, Rec. S. Aust. Mus., v, no. 3, p. 339, figs. 17, 18 (in text).
1935 Id., Cotton, Vict. Nat., lii, no. 6, p. 96, fig. 1 (in text).

Size.—Length, 25 mm.; breadth, 20 mm.

Localities.—Murray R. (Blandowski Coll., Nat. Mus., Melb.); Chalka Creek (A. S. Kenyon); Irymple (J. H. Young); Bannerton (A. C. Nilson); Swan Hill.

Vernacular name.—Hanley's River Snail.

Observations.—A solid, globose shell with a tendency to angulation towards the base. The periostracum is dark green to brownish and the operculum is horny and concentric. Smith, commenting on the genus *Vivipara,* remarks: "Two peculiarities are constant in all the Australian species of the genus. Every example that has come under my examination exhibits spiral sculpture; and in none of them are colour-bands found below the periphery."

V. hanleyi is no exception, the sculpture consisting of microscopic, granose lirae on the whole of the outer surface. For the reception of the Australian species exhibiting this character, Cotton erected the genus *Notopala.* This type of sculpture, however, is not confined to Australian forms; for instance, the North American *V. angulata* Lea and *V. decesa* Say have similar sculpture. Whilst retaining *Vivipara,* I think Cotton's genus could be used subgenerically.

The animal, which is ovoviparous, lives in mud below low-water mark, in freshwater rivers and lakes. It is common in the Lower Murray, where the shells are often found on sites of native camps.

V. hanleyi (Frauenfeld) is the genotype of *Notopala.*

Family **HYDROBIIDAE.**

Genus BYTHINELLA Moquin-Tandon, 1851.

Bythinella nigra (Quoy and Gaimard).

(Pl. I, Figs. 3, 3a.)

1835 Paludina nigra Q. and G., Zool. Astrolabe, iii, p. 174, pl. 58, figs. 9-12.
1871 Paludestrina legrandiana Brazier, P. Z. S. Lond., p. 678.
1871 P. wisemaniana Brazier, op. cit., p. 679.
1875 Bithinia petterdiana Brazier, Pr. Linn. Soc. N.S.W., i, p. 19.
1876 B. legrandi Tenison Woods, Pr. Roy. Soc. Tas., p. 76.
1876 B. unicarinata Ten. Woods, op. cit., p. 77.
1876 B. tasmanica Ten. Woods, op. cit., p. 77.
1879 Bythinella exigua Ten. Woods, op. cit., p. 71, n.n. for legrandi Ten. Woods.
1882 Bithyinella nigra Q. and G. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 564.
1889 Potamopyrgus nigra Q. and G. Petterd, Pr. Roy. Soc. Tas., p. 69, pl. 3, figs. 2-8.
1893 P. niger Q. and G. Tate, Tr. Roy. Soc. S. Aust., xvii, p. 200.
1920 Bithinia legrandiana Brazier. May, Pr. Roy. Soc. Tas., p. 72, pl. 11, fig. 23.
1920 B. legrandi Ten. Woods. May, op. cit., p. 72, pl. 11, fig. 24.
1920 B. unicarinata Ten. Woods. May, op. cit., p. 72, pl. 11, fig. 25.
1920 B. tasmanica Ten. Woods. May, op. cit., p. 72, pl. 11, fig. 26.
1920 B. exigua Ten. Woods. May, op. cit., p. 72.
1921 Potamopyrgus nigra Q. and G. May, Check-List Moll. Tas., p. 56, No. 501.
1923 Id., May, Ill. Index Tas. Shells, pl. 26, fig. 3.

Size.—Length, 4·5 mm.; breadth, 2·25 mm.

Localities.—Mordialloc (Nat. Mus., Melb.); Echuca (J. A. Kershaw); Dromana (T. Worcester); Tanti Creek, Mornington (Rev. G. Cox); Koroit (W. Paterson); Hall's Gap (C. Oke); Ballarat (J. H. Young); Lake Connewarre (F. S. Colliver); Reservoir, Studley Park (C. J. Gabriel).

Vernacular Name.—The Black Bythinella.

Observations.—This is the largest species of the genus in Victoria; it is plentiful and widely distributed throughout the State. The type locality is small freshwater creeks, D'Entrecasteaux Channel, Tasmania. Quoy and Gaimard's original description is as follows: *"Paludina, testa minima, ovato-turrita, nigra; anfractibus quarternis obliquis, convexis; spira obtusa; apertura subcirculari, prominente"*—the authors noting operculum membranous with concentric lines. That this has proved a much misunderstood species is evidenced in the large and confusing synonymy. As Petterd remarks: "In size, with the relative length of spire and aperture, it varies almost indefinitely, so much so that almost

every little stream or pool has its own special variety, so that it is quite impossible and certainly unnecessary to enumerate all the modifications. In many localities the whorls are more or less sharply carinated, with sometimes the additional ornamentation of a line of interrupted pointed spines, but plain, carinated and spinose specimens are often found living in the same pool. The same peculiarity has been noticed in one or two of the New Zealand forms of the genus. In clear running streams, the shells are often substranslucent and of a pale yellowish horn colour, but in quiet still water they are usually coated with a thick covering of decaying vegetable matter, generally of a rusty brown colour."

Petterd's remarks apply equally to Victorian forms, many specimens showing variation towards the varieties *legrandiana* Brazier and *unicarinata* Ten. Woods. W. L. May adopts this synonymy, and I agree with the conclusions of these Tasmanian workers.

Bythinella buccinoides (Quoy and Gaimard).
(Pl. I, Fig. 4.)

1835 Paludina buccinoides Q. and G., Zool. Astrolabe, iii, p. 175, pl. 58, figs. 13, 14.
1858 Hydrobia tasmanica Von Martens, Weig. Arch. Nat. Sci., i, p. 185, pl. 5, fig. 12.
1865 Amnicola diemense Frauenfeld, Verhandl. Zool. Bot. Ges. Wien, xv, p. 529, pl. 10, 2 figs.
1875 Bythinia dulvertonensis Ten. Woods, Pr. Roy. Soc. Tas., p. 77.
1878 Bithinia victoriae Ten. Woods, Pr. Roy. Soc. Vict., xiv, p. 65.
1878 Bythinella victoriae Ten. Woods, Pr. Roy. Soc. Tas., p. 71.
1882 Bithynia Dulvertonensis Ten. Woods. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 563.
1882 Hydrobia buccinoides Q. and G. Smith, Journ, Linn. Soc. Lond., Zool., xvi, p. 269.
1882 H. victoriae Ten. Woods. Smith, op. cit., p. 270, pl. 7, fig. 20.
1882 H. Angasi Smith, op. cit., p. 271, pl. 7, fig. 22.
1888 Potamopyrgus woodsi Petterd, Pr. Roy. Soc. Tas., p. 71, pl. 1, fig. 12.
1889 Amnicola diemense Frauen. Petterd, Pr. Roy. Soc. Tas., p. 81.
1913 Littoridina diemensis Frauen. Hedley, Pr. Linn. Soc. N.S.W., xxxviii, Pt. 2, p. 284, pl. 17, fig. 52.
1914 Bythinella nigra Q. and G. Chapman, Mem. Nat. Mus. Melb., No. 5, p. 57.
1917 Id., Chapman and Gabriel, Pr. Roy. Soc. Vict., xxx (n.s.), Pt. 1, p. 9.
1920 Potamopyrgus woodsi Petterd. May, Pr. Roy. Soc. Tas., p. 73, pl. 12, fig. 29.
1920 Bythinia dulvertonensis Ten. Woods. May, Pr. Roy. Soc., Tas., p. 72, pl. 12, fig. 28.
1921 Potamopyrgus tasmanica Von Martens. May, Check-list Moll. Tas., p. 56, No. 503.
1923 Id., May, Ill. Index Tas. Shells, pl. 26, fig. 4.

Size.—Length, 2·5 mm.; breadth, 1·5 mm.

Localities.—Western Port (Type); Gippsland (Nat. Mus. Melb.); Merri Creek (W. Kershaw); Lake Connewarre (F. S. Colliver); Werribee R. (R. Hall); Queenscliff (J. A. Kershaw); Lake Gnotuk (J. Searle); Geelong (J. Mulder); Port Albert, Lakes Entrance, Longford, Tarraville, Dromana, Frankston (T. Worcester); Moorabool R. (J. H. Young); Colac (Rev. G. Cox); Portland (W. H. Dillon); Merri Creek, Coburg (Mrs. W. Hanks); Merri R., Warrnambool.

Vernacular Name.—The Whelk-like Bythinella.

Observations.—An extremely variable species, approaching *B. nigra,* but distinguished by its shorter spire, more inflated whorls and a rounder mouth. The following is Quoy and Gaimard's original description: *"Paludina, testa minima ovato-conica, apice subacuta; lacvi, flavescente, vitta fulva bicincta; anfractibus senis, convexis; apertura ovali";* the authors remarking that all specimens were dead shells collected in brackish swamps at Westernport. Smith, under the name of *Hydrobia angasi,* described a form from the Compasely River (Campaspe), which I consider is merely a variant of *buccinoides,* slightly broader in contour, but otherwise inseparable. This form has been noted from several districts throughout the State. Specimens of *Bythinella* from a shell-bed underlying volcanic tuff near Warrnambool were determined by Chapman and Gabriel as *nigra* Q. and G.; but re-examination of this material forces us to change our opinion and to accept *buccinoides* Q. and G., as the correct nomination. In several localities specimens are more or less carinated, but less so than *B. nigra.* Like *nigra, buccinoides* is frequently coated with decaying vegetable matter.

Bythinella grampianensis sp. nov.

(Pl. I, Fig. 5.)

Shell minute, turbinately elongate; whorls about $4\frac{1}{2}$, much rounded, sutures well impressed. Aperture small, pyriform, continuous, inner lip reflected; colour brown.

Size of Type.—Length, 2 mm.; breadth, 1 mm.

Locality.—Dairy Creek, near Silver-Band Falls, Grampians. Collected by F. E. Wilson.

Vernacular Name.—The Grampians Bythinella.

Observations.—A very small species with much rounded whorls. Its nearest ally is perhaps the Tasmanian *Hydrobia*

gunni Frauen., from which it may be distinguished by its smaller size and more turbinate form.

Type in the National Museum, Melbourne. Reg. No. 71209.

Family **LIMNAEIDAE.**

Genus LIMNAEA Lamarck, 1799.

Limnaea lessoni Deshayes.

(Pl. I, Fig. 6.)

1830 Limnea lessoni Desh., Magasin de Zool., p. 16, figs. 1, 2.
1830 Lymnaea lessonii Desh. Lesson, Voy. Coquille, Zool., p. 330, pl. 15, fig. 1.
1830 Lymnaea lessonii Desh. Lesson, Centurie Zoologique, p. 120, pl. 44 (shell and animal).
1850 Lymnea perlevis Conrad, Pr. Acad. Nat. Sci. Phil., v, p. 11.
1854 Amphipeplea strangei Pfiffer, Malak. Blatt., p. 64.
1854 Id., Novit. Conch., p. 6, pl. 2, figs. 5, 6.
1854 Amphipeplea melbournensis Pfeiffer, op. cit., p. 70, pl. 19, figs. 14, 15.
1859 Limnaea (Neristoma) lessoni, Desh. Chenu. Man. de Conch., i, p. 480, fig. 3542.
1862 Limnea lessoni Desh. Küster, Conch. Cab., pl. 5, figs. 16, 17.
1866 Amphipeplea perlevis Conrad, Am. Journ. Conch., ii, p. 80, pl. 1, fig. 5.
1873 Limnaea melbournensis Pfr. Reeve, Conch. Icon., xviii, pl. 6, fig. 39.
1873 L. strangei Pfr. Sowerby, Conch. Icon., xviii, pl. 6, fig. 40.
1873 L. globosa Sby. Reeve, Conch. Icon., xviii, pl. 12, fig. 84.
1882 Lymnaea Lessoni Desh. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 554.
1882 Limnaea (Amphipeplea?) Lessoni Desh. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 271.
1882 L. melbournensis Pfr. Tate, Tr. Roy. Soc. S. Aust., iv, p. 76.
1894 L. lessoni Desh. Whan, Geelong. Nat., iv, No. 10, p. 9.
1896 Id. Fielder, Vict. Nat., xii, No. 11, p. 140.
1917 Id. Cherry, "Bilharziosis," p. 4, fig. 11.
1932 Id. Cotton and Godfrey, S. Aust. Nat., xiii, p. 158, pl. 2, fig. 3.

Size.—Length, 24 mm.; breadth, 18 mm.

Localities.—Melbourne (Nat. Mus. Melb.); South Brighton (W. Kershaw); Lake Koollamuth (Rev. Whan); Heidelberg (Rev. W. Fielder); Malvern (Rev. G. Cox); Sale (T. Worcester); Bannerton (A. C. Nilson); Shelford, Avoca (J. H. Young); Lake Hattah (J. E. Dixon).

Vernacular Name.—Lesson's Pond-Snail.

Observations.—A thin, globose, pale horn-coloured shell, the largest of the genus in Victoria; variable in shape, many examples having somewhat flattened sides, a feature in Conrad's *L. perlevis*. It is abundant and widely distributed throughout Victoria.

Limnaea subaquatilus Tate.

(Pl. I, Fig. 7.)

1880 Limnaea subaquatilus Tate, Tr. Roy. Soc. S. Aust., iii, p. 103, pl. 4, figs. 6a, 6b.
1881 Lymnaea subaquatilus Tate. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 555.
1882 Limnaea subaquatilus Tate. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 274.
1894 Amphipiplea subaquatilus Tate. Whan, Geelong Nat., iv, No. 10, p. 8.
1932 Limnaea subaquatilus Tate. Cotton and Godfrey, S. Aust. Nat., xiii, No. 4, p. 158, pl. 2, fig. 2.

Size of Type.—Length, 9 mm.; breadth, 3·75 mm.

Localities.—Stawell (F. L. Billinghurst); Geelong (J. Mulder).

Vernacular Name.—The Subaquatic Pond-Snail.

Observations.—An ovate, thin, shining, pale horn-coloured species allied to the Tasmanian *L. huonensis* Ten. Woods, but the last whorl is relatively narrower, and in consequence the revolution of the whorls is less oblique. The columella fold is thin, opaque white, and reflected.

Limnaea gunni Petterd.

(Pl. I, Fig. 8.)

1889 Limnaea Gunni Petterd, Pr. Roy. Soc. Tas., p. 66, pl. 2, fig. 10; pl. 3, figs. 9 and 12 (animal) .
1920 Id. May, Pr. Roy. Soc. Tas., p. 69.
1921 Id. May, Check-list Moll. Tas., p. 89.
1923 Id. May, Ill. Index Tas. Shells, pl. 41, fig. 8.

Size of Type.—Length, 7 mm.; breadth, 5·5 mm.

Locality.—Tarraville (T. Worcester).

Vernacular Name.—Gunn's Pond-Snail.

Observations.—A very thin, fragile, yellowish-horn coloured shell; the animal, as observed by the author, is pale bluish-white; its habitat is clear, gently-flowing water among submerged rocks, over which the mollusc smoothly glides without the jerky motion so characteristic of *L. subaquatilus* var. *neglecta* Petterd.

Limnaea victoriae Smith.

(Pl. I, Fig. 9.)

1882 Limnaea victoriae Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 274, pl. 5, fig. 16.

Size of Type.—Length, 6 mm.; diameter, 2 1-3 mm.

Localities.—Bairnsdale (Brit. Mus., from W. F. Petterd); Omeo (J. A. Kershaw, collected by A. W. Howitt).

Vernacular Name.—The Victorian Pond-Snail.

Observations.—In his description, Smith states that he has seen only two specimens, and remarks: "It is much narrower than *L. brazieri* or any of the Australian species of the 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."

Two specimens from Omeo in my cabinet confirm Smith's opinion that the shells described are adults and not the juvenile form of another species.

Genus MYXAS (Leach) J. Sowerby, 1822.

Myxas papyracea (Tate).

(Pl. I, Fig. 10.)

1880 Limnaea papyracea Tate, Tr. Roy. Soc. S. Aust., iii, p. 103, pl. 4, figs. 5a-5c.
1881 Lymnaea papyracea Tate. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 555.
1882 Limnaea papyracea Tate. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 274.
1893 Amphipeplea papyracea Tate. Billinghurst, Vict. Nat., x, p. 62.
1894 Amphipiplea papyracea Tate. Whan, Geelong Nat., iv., No. 10, p. 8.
1932 Myxas papyracea Tate. Cotton and Godfrey, S. Aust. Nat., xiii, No. 4, p. 159, pl. 2, fig. 1.
1936 Id. Cotton, S. Aust. Nat., xvii, Nos. 1-4, p. 83, fig. 39.

Size of Type.—Length, 12 mm.; breadth, 5 mm.

Localities.—Merrigum (J. F. Bailey); Daylesford (F. L. Billinghurst); Geelong (J. Mulder); Meredith (J. H. Young); Birregurra (A. C. Nilson).

Vernacular Name.—The Freshwater Paper Shell.

Observations.—An oblong-ovate, pale horn-coloured, very smooth and shining shell. The columella fold is slender; the inner lip widely and thinly spread. *Myxas* replaces the familiar *Amphipeplea,* for as Kennard and Woodward (Pr. Mal. Soc. Lond., xvi, 1924, p. 125) remark: "the true date of publication of S. Nilsson's *Historia Molluscorum Sveciæ* proving to be 1823 instead of 1822 (as stated on the title page (antea, p. 23)) causes his genus *Amphipeplea* to yield place on ground of priority to *Myxas* of Leach. Leach's name was given currency by J. Sowerby in his *Genera of Recent and Fossil Shells,* No. vii, published June 29, 1822 (article 'Limnea' (p. 3)), where 'Myxas, Leach's MS.' appears as

Section I of the genus Limnea, having as monotype *Helix glutinosa* Mont., which was also the monotype of Nilsson's genus."

Genus AMERIA H. Adams, 1861.

Ameria aliciae (Reeve).

(Pl. I, Fig. 11.)

1862 Physa (Ameria) aliciae Reeve, P. Z. S. Lond, p. 106, fig. in text.
1874 Id. Sowerby, Conch. Icon., xix, pl. 1, figs. 6a, b.
1878 Physa kershawi Ten. Woods, Tr. Roy. Soc. Vict., xiv, p. 64.
1881 Amplexa turrita Tate, Pr. Linn. Soc. N.S.W., vi, p. 409.
1882 Physa Aliciae Reeve. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 558.
1882 Physa Kershawi Ten. Woods. Tate and Brazier, op. cit.
1882 Physa turriculata Tate. Tate and Brazier, op. cit.
1882 Physa (Glyptophysa) aliciae Reeve. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 293.
1882 Physa Kershawi Ten. Woods. Smith, op. cit., p. 290.
1882 Aplexa turrita Tate, Tr. Roy. Soc. S. Aust., iv, p. 76.
1882 Aplexa kershawi Ten. Woods. Tate, op. cit.
1885 Physa aliciae Reeve. Clessin, Conch. Cab., i, Abth. 17, p. 298, pl. 43, figs. 2-5.
1885 Physa kershawi Ten. Woods. Clessin, op. cit.
1885 Physa cingulata Clessin, Conch. Cab., i, Abth. 17, p. 364, pl. 51, fig. 8.
1889 Physa aliciae Reeve. Cooke, P. Z. S., Lond., p. 140, figs. 5, 5a.
1893 Bulinus aliciae Reeve, var. cingulatus (Clessin). Billinghurst, Vict. Nat., x, p. 63.
1894 Bulinus aliciae Reeve. Whan, Geelong Nat., iv, No. 10, p. 8.
1917 Bullinus aliciae Reeve. Hedley, Rec. Aust. Mus., xii, No. 1, p. 5, pl. 1, fig. 14; pl. 2, figs. 17-18.
1932 Ameria aliciae Reeve. Cotton and Godfrey, S. Aust. Nat., xiii, No. 4, p. 161, pl. 2, fig. 11.
1936 Ameria aliciae Reeve. Cotton, S. Aust. Nat., xvii, Nos. 1-4, p. 83, fig. 38.

Size of Type.—18·75 mm.; breadth, 9·37 mm.

Localities.—Avoca, Meredith, Gunbower, Lal Lal Falls (Nat. Mus. Melb.); Lake Wendouree (R. Tate); Meredith (J. H. Young); Hamilton (T. Worcester); Mornington (Rev. G. Cox); Chalka Creek near R. Murray (R. McCaw); Castlemaine (F. L. Billinghurst).

Vernacular Name.—The Keeled Pond-Snail.

Observations.—A thin, spirally-ridged, whitish shell, covered with a pale dirty straw-coloured epidermis; whorls conspicuously angulate above. The number of ridges varies considerably, some examples showing mere traces. Its peculiar shape makes it the most readily recognized species of the genus in Victoria.

Ameria tenuistriata (Sowerby).

(Pl. I, Fig. 12.)

1874 Physa tenuistrata Sowerby, Conch. Icon., xix, pl. 10, fig. 85.
1874 P. texturata Sby., op. cit., pl. 12, fig. 95.
1882 P. tenuistriata Sby. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 556.
1882 P. texturata Sby. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 557.
1882 P. tenuistriata Sby. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 283.
1882 P. texturata Sby. Smith, op. cit., p. 283.
1886 P. tenuistriata Sby. Clessin, Conch. Cab., i, Abth. 17, p. 313, pl. 45, fig. 12.
1886 P. texturata Sby. Clessin, op. cit., p. 306, pl. 44, fig. 12.
1893 Bulinus tenuistriatus Sby. Billinghurst, Vict. Nat., x, No. 4, p. 63.
1896 Id. Barnard, Vict. Nat., xii, No. 10, p. 123.
1896 Isidora (Bulinus) texturata Sby. Fielder, Vict. Nat., xii, No. 11, p. 140.
1896 Isidora (Bulinus) tenuistriatus Sby. Fielder, op. cit.
1896 Physa tenuistriata Sby. Tate, Rept. Horn Exped., ii, Zool. p. 212.
1896 Physa texturata Sby. Tate, op. cit.
1917 Bulinus tenuistriatus Sby. Cherry, "Bilharziosis," p. 4, fig. 8.
1917 Bulinus texturatus Sby. Cherry, op. cit., p. 4, pl. 1, fig. 9.
1917 Bullinus tenuistriatus Sby. Hedley, Rec. Aust. Mus., xii, No. 1, p. 3, pl. 1, figs. 1, 2.
1917 Bullinus tenuistriatus Sby. var. texturatus (Sby.). Hedley, op. cit., figs. 3, 4.
1932 Ameria tenuistriata Sby. Cotton, S. Aust. Nat., xiii, No. 4, p. 160, pl. 2, fig. 6.
1936 Id. Cotton, op. cit., xvii, Nos. 1-4, p. 83.

Size of Average Specimen.—Length, 13 mm.; breadth, 9 mm.

Localities.—Heywood, Bunyip, Gunbower, Murtoa, Fernshaw, Kyneton (Coliban River), Botanic Gardens, Melbourne (Nat. Mus. Melb.); Swan Hill; St. Arnaud; Caulfield (F. L. Billinghurst); Colac (A. C. Nilson); Loddon River at Eddington (J. H. Young); Echuca; Heidelberg (F. G. A. Barnard); Lake Hattah (J. E. Dixon); Dartmoor (R. A. Keble); Overland Corner (F. H. Taylor). *Forma texturata* —Fern Tree Gully (Nat. Mus. Melb.); Dunolly (T. Worcester); Wimmera R. (Cox Coll.); Benalla (G. B. Pritchard); Stawell (F. L. Billinghurst); Mt. Alexander (R. Etheridge); Caulfield; N.E. Victoria (Rev. W. Fielder).

Vernacular Name.—The Thinly-Striated Pond Snail.

Observations.—Careful study of numerous specimens of the two forms described as *tenuistriata* and *texturata* from New South Wales, Victoria, and the type localities in South Australia leaves no doubt as to their specific identity. *Tex-*

turata merges so gradually into *tenuistriata* that they must be considered one species. As depicted in Hedley's excellent illustration, *texturata* is certainly a little more elongated, but the intermediates prevent its acceptance as a species. A typical specimen of *tenuistriata* from Overland Corner, Victoria, figured by Hedley is 13 mm. long and 9 mm. broad. He remarks: "the suture is margined beneath by a narrow pale line followed by a broader dark band. There is also a broad dark stripe within the outer lip. The sculpture consists of exceedingly delicate radial threads which may or may not be broken into short lengths by spiral striae." Of *Physa texturata,* Sowerby writes: "under a lens this appears as if impressed with a fine woven fabric"; does this not equally apply to *tenuistriata?*

In his paper on the Generic Position of the so-called Physae of Australia (P. Z. S. Lond., 1889, p. 136), Cooke, in a footnote, indicates that he considers the following synonymous: *proteus* Sby., *pyramidata* Sby., *dispar* Sby., *pectorosa* Conrad, *breviculmen* Smith, *badia* Ad. and Angas, *concinna* Ad. and Angas, *texturata* Sby.

Ameria tenuistriata (Sowerby) var. *pyramidata* (Sowerby).

(Pl. I, Fig. 13.)

1873 Physa pyramidata Sowerby. Reeve, Conch. Icon., xix, pl. 8, fig. 62.
1882 Id. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 557.
1882 Id. Smith, Journ. Linn. Soc. Lond., xvi, p. 282.
1886 Id. Clessin, Conch. Cab., i, Abth., 17, p. 243.
1920 Bullinus pyramidatus (Sby.). May, Pr. Roy. Soc. Tas., p. 70.
1921 Ameria pyramidata (Sby.). May, Check-list Moll. Tas., p. 90.
1923 Id. May, Ill. Index Tas. Shells, pl. 41, fig. 14.
1932 Id. Cotton and Godfrey, S. Aust. Nat., xiii, No. 4, p. 161, pl. 2, fig. 8.
1933 Isidorella pyramidata (Sby.). Quick, Journ. Conch., xix, No. 10, p. 322, figs. 1-15 (in text).

Size.—Length, 35 mm.; breadth, 15 mm.

Localities.—Meredith (Nat. Mus. Melb., and J. H. Young); Portland (C. J. Gabriel); Shelford (J. H. Young).

Vernacular Name.—The Pyramidal Pond-Snail.

Observations.—This, the largest of our Victorian sinistral Pond-Snails, is very variable, differing from the dominant form in being longer and with the earlier whorls more inflated. Hedley, in the Records of the Australian Museum, 1917, notes the suggestion of Cooke (P. Z. S. Lond., 1889) in uniting *tenuistriatus* and *pyramidatus.* May (1920) regards *pyramidatus* as worthy of specific rank and places the fol-

lowing Tasmanian forms in synonymy: *eburnea* Sby., *attenuata* Sby., *bruniensis* Sby., *huonensis* Ten. Woods, *legrandi* Ten. Woods, *tasmanica* Ten. Woods, *tasmanicola* Ten. Woods, *? huonicola* Ten. Woods.

The anatomy of the animal is described by Dr. H. E. Quick, who also gives an interesting account of his aquarium observations.

Ameria tenuistriata (Sowerby) var. *waterhousei* (Clessin).

(Pl. I, Fig. 14.)

1886 Physa waterhousei Clessin, Conch. Cab., i, Abth. 17, p. 361, pl. 51, fig. 6.
1917 Bullinus tenuistriatus (Sby.) Hedley, Rec. Aust. Mus., xii, No. 1, p. 3, pl. 1, figs. 7, 8.

Size.—Length, 20 mm.; breadth, 11 mm.

Localities.—Murray R. (W. Kershaw); Gunbower, Wimmera R. (Cox. coll.); Mordialloc (E. H. Matthews); Portland (W. H. Dillon); Lake Boga; Caulfield.

Vernacular Name.—Waterhouse's Pond-Snail.

Observations.—A form with much rounded whorls; it may be compared with *pyramidata* Sby., which, however, has a much longer spire. The accompanying illustrations will serve to show that this variety is much more inflated than the typical form.

Ameria tenuistriata (Sowerby) var. *arachnoidea* (Tenison Woods.)

(Pl. II, Fig. 15.)

1878 Physa arachnoidea Ten. Woods, Tr. Roy. Soc. Vict., xiv, p. 63.
1882 Aplexa arachnoidea (Ten. Woods) Tate, Tr. Roy. Soc. S. Aust., iv, p. 76.
1882 Physa arachnoidea Ten. Woods. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 556.
1882 Id. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 289.
1885 Id. Clessin. Conch. Cab., i, Abth, 17, p. 359.
1917 Bullinus tenuistriatus (Sby.) var. arachnoideus (Ten. Woods). Hedley, Rec. Aust. Mus., xii, No. 1, p. 3, pl. 2, fig. 15.

Size of Type.—Length, 12 mm.; breadth 5·5 mm. Aperture length, 7 mm; breadth, 3·5 mm.

Localities.—Mordialloc (Nat. Mus. Melb); Castlemaine (F. L. Billinghurst); Gardner's Creek (Dr. Cherry); Echuca (Cox coll.); Overland Corner (F. H. Taylor); Dimboola (J. Mulder); Werribee R.; Merri Creek; Williamstown.

Vernacular Name.—The Spider-web Pond-Snail.

Observations.—Four specimens from near Melbourne in the National Museum, Melbourne, constitute the types. One of these is figured by Hedley, who remarks: "It is a comparatively small and slender form. Even among the type lot there is a difference in sculpture; all have fine dense radial hair lines, on one no spiral sculpture is perceptible, on another there are spiral lines of rather distant ciliae, which correspond to spiral lines on the bare shell."

Ameria tenuistriata (Sowerby) var. *confluens* (Hedley).
(Pl. II, Fig. 16.)

1917 Bullinus tenuistriatus var. confluens Hedley, Rec. Aust. Mus., xii, No. 1, p. 4, pl. 1, figs. 9, 10.

Size of Type.—Length, 21 mm.; breadth, 12 mm.

Localities.—Echuca (Type) and Gunbower (Cox coll.); Lake Hattah (J. E. Dixon).

Vernacular Name.—The Echuca Thinly-striated Pond-Snail.

Observations.—A large and thin, narrowly umbilicate variety, with short spire and concave outline. Hedley remarks: "this form makes a nearer approach to *Physa australiana* Conrad, than to any other figured species. But that is shown with the anterior lip contracted to a gutter and with a more gibbous shoulder. Conrad's species is 18 mm. long and comes from the Bogan River, New South Wales. Probably the type of it is still preserved in the Museum at Logan Square, Philadelphia."

Ameria acutispira (Tryon).

Pl. II, Fig. 17.

1866 Physa (Bulinus) acutispira Tryon, Am. Journ. Conch., ii, p. 9, pl. 2, fig. 10.
1882 P. acutispira Tryon. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 557.
1882 P. (Bulinus) acutispira Tryon. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 282, pl. 6, fig. 16 (after Tryon).
1885 P. acutispira Tryon. Clessin, Conch. Cab., i, Abth. 17, p. 242, pl. 34, fig. 1.
1917 Bullinus acutispira (Tryon). Hedley, Rec. Aust. Mus., xii, No. 1, p. 5, pl. 1, figs. 11, 12, 13 (varieties).
1919 Bullinus acutispira (Tryon). Chapman, Pr. Roy. Soc. Vict., xxxii (n.s.), p. 26, pl. 3, fig. 4.

Size of Type.—Length, 12 mm.; breadth, 6 mm.

Localities.—Mordialloc Creek, Muddy Creek, Bunyip River, Oakleigh, Eltham, Lal Lal Falls, Inverloch, Narracan

River (Nat. Mus. Melb.); Williamstown; Horsham; Geelong; Lake Hattah (J. E. Dixon); Box Hill (R. Hall); Studley Park (C. J. Gabriel).

Vernaeular Name.—The Sharp-point Pond-Snail.

Observations.—A very thin, cylindrically ovate, light horn-coloured shell with a sharply pointed and elevated spire. Chapman (op. cit.) remarks that *B. tasmanieus* closely resembles the above species, but the apex is not so acute, nor is the aperture so open.

Ameria aeutispira (Tryon) var. *yarraensis* (Tenison Woods).

(Pl. II, Fig. 18.)

1878 Physa yarraensis Ten. Woods, Tr. Roy. Soc. Vict., xiv, p. 64.
1882 Aplexa yarraensis (Ten. Woods). Tate, Tr. Roy. Soc. S. Aust., iv, p. 76.
1882 Physa Yarraensis Ten. Woods. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 557.
1882 Id. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 289.
1885 Id. Clessin, Conch. Cab., i, Abth. 17, p. 358.
1917 Bullinus acutispira (Tryon) var. yarraensis (Ten. Woods). Hedley, Rec. Aust. Mus., xii, No. 1, p. 5, pl. 2, fig. 16.

Size of Type.—Length, 11 mm.; breadth, 6 mm.

Loealities.—Upper Yarra (Type, Nat. Mus. Melb.); Williamstown; Carrum Creek (T. Worcester).

Vernacular Name.—The Yarra River Sharp-point Pond-Snail.

Observations.—A thin, horny, shining shell, finely longitudinally striate, and with distant spiral lines of ciliae. Differing from *aeutispira* Tryon by its less acuminate spire.

Ameria aeutispira (Tryon) var. *etheridgii* (E. A. Smith).

(Pl. II, Fig. 19.)

1882 Physa Etheridgii Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 288, pl. 6, fig. 25.
1885 Id. Clessin, Conch. Cab., i, Abth. 17, p. 242, pl. 34, fig. 1.
1917 Bullinus acutispira Tryon var. etheridgii Smith. Hedley, Rec. Aust. Mus., xii, No. 1, p. 5.

Size of Type.—Length, 11 mm.; breadth, 6 mm. Aperture, 7 mm. long; 3 mm. wide.

Loeality.—Yan Yean Reservoir.

Vernaeular Name.—Etheridge's Sharp-point Pond-Snail.

Observations.—Smith remarks: "This species resembles in some respects *P. aeutispira* 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."

Hedley, with whom I agree, regards this form worthy of varietal distinction only.

Ameria acutispira (Tryon) var. *tenuilirata* (Smith).

(Pl. II, Fig. 20.)

1882 Physa tenuilirata Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 291, pl. 6, fig. 27.

1917 Bullinus acutispira (Tryon) var. tenuilirata Smith. Hedley, Rec. Aust. Mus., xii, No. 1, p. 5.

Size of Type.—Length, 12 mm.; breadth, 6 mm.

Locality.—Bunyip River (E. A. Smith).

Vernacular Name.—The Thinly Striated Pond-Snail.

Observations.—The type came from Western Australia. Smith remarks: "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. The lines of growth are very distinct, and, crossing the spiral lirulae, give the surface a minutely cancellated appearance. Two specimens from the 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."

Ameria producta (E. A. Smith).

(Pl. II, Fig. 21.)

1882 Physa producta Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 286, pl. 6, fig. 21.

Size of Type.—Length, 26 mm.; breadth, 10 mm. Aperture, 12·5 mm. long, 5 mm. broad.

Locality.—Wimmera River (Nat. Mus. Melb.).

Vernacular Name.—The Lengthened Pond-Snail.

Observations.—This species is recorded from various parts of New South Wales, but the Victorian record is based on two specimens, each 25 mm. long and 10 mm. broad, presented to the National Museum in 1895 by the late Mr. C. French. Smith remarks: "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."

Genus ISIDORELLA Tate, 1896.

Isidorella newcombi (A. Adams and Angas).

(Pl. II, Fig. 22.)

1864 Physa Newcombi A. Adams and Angas, P. Z. S., Lond, p. 416.
1874 Id. Sowerby, Conch. Icon., xix, pl. 3, fig. 21.
1874 Physa subinflata Sowerby, op. cit., fig. 6a, sp. 5.
1882 Physa Newcombi Ad. and Ang. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 555.
1882 Id. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 280.
1882 Physa Brazieri Smith, op. cit., p. 286, pl. 6, fig. 22.
1885 Physa newcombi Ad. and Ang. Clessin, Conch. Cab., i, Abth. 17, p. 299, pl. 43, fig. 6.
1887 Id. Cooke, J. Conch., v., p. 242.
1887 Limnaea physopsis Cooke, op. cit., p. 243, pl. 2, figs. 1-4.
1889 Id. Cooke, P. Z. S. Lond., pp. 137-140, figs. 7, 7a (radula).
1892 Bulinus Newcombi (Ad. and Ang.) Bednall, Tr. Roy. Soc. S. Aust., xvi, p. 67.
1906 Isidorella newcombi (Ad. and Ang.) Tate, Rept. Horn Exped., ii, Zool., p. 213, pl. 19, fig. 25.
1917 Isodora newcombi (Ad. and Ang.) Odhner, K. Sv. Vet. Ak. Handl., lii (16), p. 74.
1917 Id. Hedley, Rec. Aust. Mus., xii, No. 1, p. 8.
1932 Isodorella newcombi (Ad. and Ang.) Cotton and Godfrey, S. Aust. Nat., xiii, No. 4, p. 159, pl. 2, fig. 4.

Size of Type.—Length, 21 mm.; breadth, 14·6 mm.

Localities.—Cheltenham, St. Kilda, Tatura (Nat. Mus., Melb.); Meredith (J. H. Young); Stawell, Bacchus Marsh (F. L. Billinghurst); Serviceton (T. Worcester); Werribee (W. T. Bednall); Larpent (A. C. Nilson); Melbourne University Lake.

Vernacular Name.—Newcomb's Pond-Snail.

Observations.—A thin, ovate-globose, brownish shell with finely, spirally-striated whorls. Tate, in dealing with the Horn Expedition Mollusca from Central Australia, recorded this species and made the following observations: "*I. newcombi* and its varieties have the test covered by a horny periostracum raised into spiral fringes of hairs and into

imbricating folds at the suture; the spiral rows of hairs are superimposed on the spiral striae of the test; the periostracum is more developed in some individuals than in others, may be partly or wholly removed by abrasion in adult shells, and is usually lost in dead ones. This feature has been unnoticed by the describers of the several species, which may be explained on the probability that their types were dead shells. The colour of the test is mainly light-horn, but varies from olive-green to brown and reddish, and cannot be used as a specific character. *I. newcombi* and its varieties have the habit of burrowing in the mud on the drying up of the water of the pool in which they live, and of forming a hemispheric operculum of fine silt, thus closing the aperture. The fine nature of the material forming the operculum contrasts strongly with the varied texture of the mud of the pool, which leads me to infer that the fine sediment has been selected by swallowing and ejected per anum." Tate further states *brazieri* merges so gradually into the typical form that it can only be regarded as a mere individual variation of *I. newcombi*; with this I agree. Hedley regarded *brazieri* as a variety of *hainesii,* not of *newcombi.*

Isidorella newcombi (Adams and Angas) var. *hedleyi* (Clench).

(Pl. II, Fig. 23).

1864 Physa inflata Adams and Angas, P. Z. S., Lond., p. 39.
1874 Id. Sowerby, Conch. Icon., xix, pl. 1, figs. 4a, b.
1882 Id. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 280.
1886 Id. Clessin, Conch. Cab., i, Abth. 17, p. 300, pl. 43, fig. 7.
1894 Bulinus inflatus (Ad. and Ang.) Whan, Geelong Nat., iv, No. 10, p. 8.
1896 Isidorella inflata (Ad. and Ang.). Tate, Rept. Horn Exp., ii, Zool., p. 213.
1917 Isodora newcombi var. inflata (Ad. and Ang.) Hedley, Rec. Aust. Mus., xii, No. 1, p. 8.
1926 Isidora newcombi hedleyi Clench, Journ. Conch., xviii, No. 1, p. 12 (new name for inflatus preocc.).

Size of Type.—Length, 16·6 mm.; breadth, 12·5 mm.

Localities.—Mount Hope (C. Hedley); Cheltenham (T. Worcester); Irymple (J. H. Young); Birregurra (A. C. Nilson).

Vernacular Name.—Hedley's Inflated Pond-Snail.

Observations.—The type came from the Wakefield River, South Australia. It is a fine, inflated, bulbous form with the upper whorls usually semi-opaque and fuscous, and the lower whorls more pellucid and of a pale greenish horn-

colour. The epidermis is ornamented with regular transverse rows of short hairs. Generally known under the name *inflata* which, through preoccupation, is not available.

Isidorella newcombi (Adams and Angas) var. *pilosa* (Tenison Woods).

(Pl. II, Fig. 24).

1878 Physa pilosa Ten. Woods, Tr. Roy. Soc. Vict., xiv, p. 63.
1882 Id. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 556.
1882 Id. Smith, Journ, Linn. Soc. Lond., Zool., xvi, p. 289.
1885 Id. Clessin, Conch. Cab., i, Abth. 17, p. 358.
1917 Isodora hainesii (Tryon) var. pilosa (Ten. Woods). Hedley, Rec. Aust. Mus., xii, No. 1, p. 7, pl. 2, figs. 19, 20.

Size of Type.—Length, 11 mm.; breadth, 6 mm.

Localities.—Melbourne University Ponds (Types, Nat. Mus., Melb.); Melbourne (J. A. Kershaw); Birregurra (A. C. Nilson); Elaine (J. H. Young); Meredith (E. H. Matthews).

Vernacular Name.—Newcomb's Hairy Pond-Snail.

Observations.—In the National Museum, Melbourne, are four specimens of *P. pilosa* Ten. Woods labelled as the types and registered as 35994-7. One of them, 13 mm. long and 8 mm. broad, is illustrated by Hedley. This figure excellently depicts the shell but, in my opinion, it is a variety of *newcombi* Ad. and Ang., and not of *hainesii* Tryon. It is very close to the variety *crebreciliata* Ten. Woods, but differs in being thinner, lighter in colour, and in having a very thin epidermis, an extremely small spire, and an oblique and interiorly produced aperture. From *newcombi* Adams and Angas, the varieties *pilosa* Ten. Woods and *crebreciliata* Ten. Woods may be distinguished by their smaller, less inflated spires.

Isidorella newcombi (Adams and Angas) var. *crebreciliata* (Tenison Woods).

(Pl. II, Fig. 25).

1878 Physa crebreciliata Ten. Woods, Tr. Roy. Soc. Vict., xiv, p. 63.
— Physa hirsuta Ten. Woods MS.
1882 Physa crebreciliata Ten. Woods. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 556.
1882 Id. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 290.
1882 Aplexa crebreciliata (Ten. Woods). Tate, Tr. Roy. Soc. S. Aust., iv, p. 76.
1886 Physa crebreciliata Ten. Woods. Clessin, Conch. Cab., i, Abth. 17, p. 351, pl. 49, fig. 10.

1914 Bulinus crebreciliatus (Ten. Woods). Chapman, Mem. Nat. Mus., Melb., No. 5, p. 58, pl. 1, fig. 1.
1917 Isodora hainesii (Tryon) var. crebreciliata (Ten. Woods). Hedley, Rec. Aust. Mus., xii, No. 1, p. 7, pl. 2, fig. 21.

Size of Type.—Length, 15 mm.; breadth, 7 mm.

Localities. — Caulfield (Type); Brighton (Nat. Mus., Melb.); Horsham (W. Kershaw); Melbourne (E. H. Matthews); Sandringham.

Vernacular Name.—The Ciliated Pond-Snail.

Observations.—Hedley gives a good figure of the presumed type of *Physa crebrcciliata* Ten. Woods and makes the following comments: "The type of *P. crebreciliata* does not exist under that name in the collection of the Museum at Melbourne. But I have received four specimens, marked '36028-31, *Physa hirsuta* Ten. Woods, Caulfield.' No such species was published by Tenison Woods. The locality, description and comparison of *P. crebrcciliata* suit *'hirsuta'* exactly. I presume, therefore, that the name was changed in course of publication, and that the real types of *'crebreciliata'* are the specimens marked *'hirsuta.'* These specimens are less globose than the original figure published by Clessin and closely correspond to *Physa brazieri* Smith var. *major,* from the Burnett River, Queensland. There are on the body whorl about thirty-two spirals of fine ciliae, decussated by fine, close longitudinal lamellae. The latter, as in the case of *I. newcombi,* rise round the suture into a sort of ruff, or collar. But the epidermis is rarely preserved in so perfect a state. Of the four type specimens, the one which is drawn (Pl. II, Fig. 21) has a comparatively elevated spire, while in the other three the spire is much more depressed. It is 12 mm. long and 8 mm. broad."

Careful study of the type specimens leads me to concur with Hedley's remarks, but I do not agree with him in regarding the form as a variety of *haincsii* Tryon.

Isidorella haincsii (Tryon).

(Pl. II, Fig. 26).

1866 Physa (Isidora) Hainesii Tryon, Am. Journ. Conch., ii, p. 9, pl. 2, fig. 9.
1873 Physa latilabiata Sowerby, Conch. Icon., xix, pl. 5, fig. 33.
1882 Physa Hainesii Tryon. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 556.
1882 Physa (Isidora) Hainesii Tryon. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 281.
1886 Physa hainesii Tryon. Clessin, Conch. Cab., i, Abth. 17, p. 366, pl. 49, fig. 1.

1886 Physa ciliosa Clessin, MSS., op. cit., p. 351.
1886 Physa schrayeri Clessin, MSS., op. cit., p. 366.
1887 Physa hainesii Tryon. Cooke, Journ. Conch., p. 241.
1917 Isodora hainesii (Tryon). Hedley, Rec. Aust. Mus., xii, No. 1, p. 7 (in part).

Size of Type.—Length 9·5 mm.; breadth, 7 mm.

Localities.—Bairnsdale (Miss E. Clark); Bannerton (A. C. Nilson); Geelong, Dimboola (J. Mulder); Keilor (F. S. Colliver); Plenty River, Dandenong (T. Worcester); Bacchus Marsh (F. L. Billinghurst and E. H. Matthews); Reservoir Studley Park (C. J. Gabriel).

Vernacular Name.—Haines's Pond-Snail.

Observations.—Smaller and more elongate than *I. newcombi* Ad. and Ang.

Family **PLANORBIDE**

Genus PLANORBIS Geoffrey 1767.

Planorbis tasmanicus Tenison Woods.

(Pl. III, Fig. 27, 27a, 27b).

— Planorbis McCoyi Ten. Woods MS.
1876 Planorbis tasmanicus Ten. Woods, Pr. Roy. Soc. Tas. for 1875, p. 79.
1879 Id. Johnston, Pr. Roy. Soc. Tas., for 1877, p. 28.
1889 Id. Petterd, Pr. Roy. Soc. Tas., for 1888, p. 68, pl. 2, figs. 8, 9.
1896 Planorbis gilberti Dunker. Fielder, Vict. Nat. xii, No. 11, p. 140.
1917 Id. Cherry, "Bilharziosis," p. 4, figs. 7, 7a.
1920 Planorbis tasmanicus Ten. Woods. May, Pr. Roy. Soc. Tas., p. 70, pl. 10, figs. 13, 14.
1921 Id. May, Check-list Moll. Tas., p. 90, No. 885.
1923 Id. May, Ill. Index Tas. Shells, pl. 41, fig. 19.

Size of Type.—Length 5 mm.; breadth, 3·5 mm.; height, 1 mm.

Localities.—Warburton, Oakleigh, Bairnsdale, Melbourne Botanic Gardens (Nat. Mus., Melb.); R. Murray (J. A. Kershaw); Heidelberg (Rev. W. Fielder); Longford, Tarraville, Lorne (T. Worcester); Lake Hattah (J. E. Dixon); Geelong (H. W. Davey); Birregurra (A. C. Nilson); Meredith (J. H. Young); Sydenham (F. S. Colliver); Blackburn Lake (A. C. McLachlan); Belgrave, Hall's Gap (C. Oke); Studley Park Reservoir (C. J. Gabriel).

Vernacular Name.—Tasmanian Flat-coil or Ram's horn Pond-Snail.

Observations.—These flatly-discoidal little shells are generally found harbouring among weeds in stagnant and slow-

running water. It is the commonest and most widely distributed of the Victorian *Planorbidae*. It is subject to considerable variation, more particularly in the sharpness and position of the keel; that these features are individual variations I am convinced after examining thousands of specimens from all parts of the State. Three shells labelled Type in the National Museum collection, Reg. No. 36083-5, with locality Melbourne, appear under the name of *Planorbis mccoyi* Ten. Woods. I have failed to find any evidence that this name has been published. These specimens are inseparable from the species under discussion. Tenison Woods (Pr. Roy. Soc. Tas., 1879, p. 72) withdrew *P. tasmanicus* in favour of *P. meridionalis* Braz., under the impression that he had redescribed the same shell, an opinion not accepted by Petterd or May. From the original descriptions and figures provided by these authors, I am inclined to agree that *tasmanicus* and *meridionalis* are distinct species.

Planorbis scottiana Johnston.

(Pl. III, Figs. 28, 28a, 28b).

1879 Planorbis scottiana Johnston, Pr. Roy. Soc. Tas., for 1878, p. 26.
1889 Id. Johnston, ibid. for 1888, p. 86, pl. 6, figs. 2a, b, c.
1920 Id. May, Pr. Roy. Soc. Tas., p. 70, pl. 10, fig. 12.
1921 Id. May, Check-list Moll. Tas., p. 90, No. 884.
1923 Id. May, Ill. Index Tas. Shells, pl. 41, fig. 18.

Size of Type.—Greatest diam., 2·5 mm.; smallest diam., 2 mm.; height, 0·5 mm.

Locality.—Tarraville (T. Worcester).

Vernacular Name.—Scott's Flat-coil or Ram's horn Pond-Snail.

Observations.—A very minute, thin, pale, horny-coloured shell, somewhat flattened above and below; finely transversely striated. It is the smallest representative of the genus in Victoria and is easily distinguished from our other species.

Planorbis waterhousei Clessin.

(Pl. III, Figs. 29, 29a, 29b).

1886 Planorbis waterhousei Clessin, Conch. Cab., i, Abth. 17, p. 188, pl. 28, fig. 2.

Size of Type.—Diameter, 4·5 mm., height, 0·7 mm.

Locality.—Portland (W. H. Dillon).

Vernacular Name.—Waterhouse's Flat-coil or Ram's-horn Pond-Snail.

Observations.—The National Museum, Melbourne, has fine examples of this species from Clarence River, New South Wales, the type locality. The Victorian record is based on a series from the cabinet of the late Mr. W. H. Dillon, and although the whorls are a little rounder than those of *waterhousei* from the type locality, these shells are otherwise indistinguishable. Clessin remarks that specimens collected by Waterhouse are in the Berlin Museum under the name of *olivaceus,* an unpublished appellation by Cox; this name was not available, being preoccupied by Spix.

Genus SEGMENTINA Fleming 1838.

Segmentina victoriae Smith.

(Pl. III, Figs. 30, 30a, 30b).

1882 Segmentina victoriae Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 296, pl. 7, figs. 11-13.
1894 Planorbis victoriae (Smith). Whan, Geelong Nat., iv, No. 10, p. 9.
1896 Id. Fielder, Vict. Nat., xii, No. 11, p. 140.
1920 Segmentina victoriae Smith. May, Pr. Roy. Soc. Tas., p. 70.
1921 Id. May, Check-list Moll. Tas., p. 90, No. 886.
1923 Id. May, Ill. Index Tas. Shells, pl. 41, fig. 20.
1932 Id. Cotton and Godfrey, S. Aust. Nat., xiii, p. 163, pl. 3, fig. 13.
1936 Id. Cotton, S. Aust. Nat., xvii, Nos. 1-4, p. 85, fig. 45.

Size of Type.—Greatest diam., 4 mm.; smallest diam., 3·5 mm.; height, 1·3 mm.

Localities.—Melbourne Botanic Gardens, Studley Park (Nat. Mus., Melb.); Heidelberg (Fielder); Meredith (J. H. Young); Birregurra (A. C. Nilson); Lake Wendouree (J. Searle); Melbourne University Lake (J. A. Kershaw); Sale (W. Kershaw).

Vernacular Name.—The Victorian Segmentina.

Observations.—A thin, glossy, chestnut, disc-like shell, rather acutely keeled a little below the middle of the last whorl. It resembles *S. australiensis* Smith from Penrith, New South Wales, but is not so flattened beneath, the sunken spire is smaller, and the umbilicus narrower; internal lamellae absent. Smith remarks: "It appears inconsistent to place a shell in the genus *Segmentina* lacking the essential character of internal lamellae. However, its '*tout-ensemble*' is so Segmentinoid, that I feel sure that it is an abnormal form of that group."

This species frequents stagnant water and slow-running streams.

Family **ANCYLIDAE**

Genus ANCYLUS Geoffroy 1767.

Ancylus australicus Tate.

(Pl. III, Figs. 31, 31a).

1880 Ancylus Australicus Tate, Tr. Roy. Soc. S. Aust., iii, p. 102, pl. 4, figs. 4a-b.
1882 Id. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 559.
1882 Id. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 297, pl. 7, figs. 36, 37.
1893 Id. Billinghurst, Vict. Nat., x, p. 63.
1896 Id. Tate, Rept. Horn Exp., Zool., ii, p. 216.
1917 Id. Odhner, K. Sv. Vet. Ak. Handl., lii, (16), p. 74.
1917 Id. Cherry, "Bilharziosis," p. 4, figs. 12, 12a.
1932 Id. Cotton and Godfrey, S. Aust. Nat., xiii, No. 4, p. 164, pl. 3, fig. 11.
1936 Id. Cotton, S. Aust. Nat., xvii, Nos. 1-4, p. 84, fig. 41.

Size of moderately large example. — Length, 4 mm.; breadth, 2·5 mm., height 1·5 mm.

Localities.—Melbourne (Tate); Frankston (J. A. Kershaw); Alphington, Melbourne Botanic Gardens (J. Searle); Lake Wendouree, Meredith (J. H. Young); Blackburn Lake (A. L. McLachlan); Tarraville (T. Worcester); Castlemaine, Studley Park (C. J. Gabriel).

Vernacular Name.—Freshwater Limpet.

Observations.—This, our commonest freshwater Limpet, is usually found on the under surface of floating leaves. The shell is pale, thin and delicate; conic depressed, lengthened; sides subrectilinear or slightly convex, diverging slightly forwards; apex blunt post median, with about two-fifths of the shell behind it, inclining backwards, and directed towards the right; the line from the apex to posterior border slightly concave, to the anterior border almost rectilinear; peritreme oval, distinctly narrowed posteriorly. It has a wide distribution, being recorded in South and Central Australia and as far north as Arnheim Land. Odhner, recording it from the Fitzroy River, remarks: "The position of the apex is somewhat variable inasmuch as it may be nearly medium or more distinctly to the right; it is always situated at the posterior third of the shell. The anterior slope is a little more convex than in the figures of E. A. Smith (op. cit.), the shells a trifle more depressed and the apex directed to the right (not to the left as in the figures)."

Ancylus tasmanicus Tenison Woods.

(Pl. III, Figs. 32, 32a).

1875 Ancylus tasmanicus Ten. Woods, Pr. Roy. Soc. Tas., p. 70.
1879 Id. Johnston, Pr. Roy. Soc. Tas., p. 25.
1894 Id. Whan, Geelong Nat., iv, No. 10, p. 9.
1896 Id. Fielder, Vict. Nat., xii, No. 11, p. 140.
1920 Id. May, Pr. Roy. Soc. Tas., p. 71, pl. 10, figs. 15, 16.
1921 Id. May, Check-list Moll. Tas., p. 90.
1923 Id. May, Ill. Index Tas. Shells, pl. 41, fig. 22.

Size of Type.—Length, 3-3·5 mm.; breadth, 1·5-2 mm.; height, 1·5-2 mm.

Localities.—Heidelberg (Rev. W. Fielder); Moorabool R. (J. H. Young); Frankston (J. A. Kershaw and T. Worcester); Nangeela (Rev. Whan); Lorne (C. J. Gabriel).

Vernacular Name.—Tasmanian Freshwater Limpet.

Observations—A very small, ovate, diaphanous, horny shell, concentrically striate and very faintly rugosely radiate, more or less covered and spotted with a black epidermis, apex obtuse. From *A. australicus* Tate, it is distinguished by its proportionately greater height, and its obtuse apex. W. L. May (1920) regards *A. mariae* Petterd as possibly a variant of *tasmanicus* Ten. Woods, but in 1921 records these two forms as distinct species. Petterd, *Journal of Conchology,* iv., 1884, p. 159, remarks: "that his own species *A. assimilis* from Richmond River, New South Wales, is close to *A. tasmanica* Ten. Woods and may prove to be identical. It appears to be broader, with the apex more twisted." Common on eucalyptus leaves, Erskine River, Lorne.

Genus GUNDLACHIA Pfeiffer, 1849.

Gundlachia petterdi Johnston.

(Pl. III, Fig. 33).

1879 Gundlachia petterdi Johnston, Pr. Roy. Soc. Tas., p. 23.
1897 Ancylus woodsii Johnston, Pr. Roy. Soc. Tas., p. 25.
1881 Gundlachia Petterdi Johnston. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 559.
1884 Id. Tate, Pr. Roy. Soc. Tas., p. 216.
1888 Gundlachia beddomei Petterd, Pr. Roy. Soc. Tas., for 1887, p. 41, pl. 44.
1893 Gundlachia petterdi Johnston. Hedley, Vict. Nat., x, No. 9, p. 148, left fig.
1893 Gundlachia beddomei Petterd. Hedley, op. cit., right fig.
1894 Gundlachia petterdi Johnston. Hedley, Pr. Linn. Soc. N.S.W., (2 ser.), viii, p. 509, pl. 24, figs. 1-3, and 7-11.

1894 Gundlachia beddomei Petterd, MS. Hedley, op. cit., p. 513, pl. 24, figs. 4-6.
1895 Id. Hedley, Pr. Linn. Soc. N.S.W., (2 ser.), ix, p. 464.
1920 Gundlachia petterdi Johnston. May, Pr. Roy. Soc. Tas., p. 71.
1921 Id. May, Check-list Moll. Tas., p. 91.
1923 Id. May, Ill. Index Tas. Shells, pl. 41, fig. 25.
1932 Id. Cotton and Godfrey, S. Aust. Nat., xiii, No. 4, p. 164, pl. 3, fig. 12.
1936 Id. Cotton, S. Aust. Nat., xvii, Nos. 1-4, p. 84, fig. 42.

Size of Type.—Length, 2·5-3 mm.; breadth, 1-5-1·75 mm.; height, ·5-·75 mm.

Localities.—Heidelberg (Rev. W. Fielder); Alphington (J. Searle); Blackburn Lake (A. L. McLachlan).

Vernacular Name.—Petterd's Freshwater Limpet.

Observations.—Shell minute, thin, pale horn in colour, diaphanous, spirally oblong in two distinct tiers, apex obliquely inclined posteriorly, concentrically striate and crossed by fine, radiating lirae, apical tier more incrusted with confervoid matter, and appearing partially and obliquely exserted upon the basal tier; projecting portion of apical tier as well as one-third of the basal one closed by a flat horizontal plate, all in the plane of the original aperture of apical tier; outer aperture broadly ovate; lip of basal tier continuous, although modified at junction with apical tier; inner aperture semi-circular, and determined to a great extent by the original aperture of apical tier; inner lip with slightly raised rim continuous, simple. The juvenile shell is simple, and resembles the common *Ancylus*.

G. petterdi is easily recognized. It is common on dead leaves and sticks. The species is also recorded from Tasmania and South Australia. *Ancylus woodsii* Johnston is undoubtedly the immature form.

The genus *Gundlachia* is found in America and in Cuba.

LAMELLIBRANCHIATA.

Family **CORBICULIDAE.**

Genus CORBICULA Megerle, 1811.

Corbicula angasi Prime.

(Pl. IV, Fig. 34.)

1864 Corbicula Angasi Prime, Jour. de Conch., xii, p. 151, pl. 7, fig. 6.
1878 Cyrena Angasi (Prime). Sowerby, Conch. Icon., xx, pl. 17, fig. 90.
1879 Corbicula rivina Clessin, Conch. Cab., p. 139, pl. 25, figs. 3, 4.

1882 Corbicula Angasi Prime. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 566.
1882 Id. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 302.
1887 Id. Tate, Tr. Roy. Soc. S. Aust., ix, p. 94.
1893 Id. Adcock, Hand-List Aquatic Moll. S. Aust., p. 12.
1894 Id. Whan, Geelong Nat., iv, No. 10, p. 9.
1903 Corbicula (Corbiculina) angasi Prime. Dall, Tr. Wag. Inst. Phil., iii, p. 1,449.
1936 Corbicula angasi Prime. Cotton, S. Aust. Nat., xvii, Nos. 1-4, p. 85, fig. 46.

Size.—Length, 20 mm.; breadth, 24 mm.

Localities.—Altona, Skipton, Kerang, Albert Park Lake (Nat. Mus., Melb.); Geelong (J. Mulder); Chalka Creek (A. S. Kenyon); Casterton (Rev. Whan); Hamilton (W. H. Dillon and F. S. Colliver); Shelford (J. H. Young); Gayfield (A. C. Nilson); Lake Hindmarsh (Gresswell); Studley Park (C. J. Gabriel).

Vernacular Name.—Angas's Little Basket Shell.

Observations.—Abundant in Victoria and South Australia. The shells are frequently covered by a reddish earthy deposit, removal of which discloses a straw-coloured epidermis. Externally and internally the colouring is subject to considerable variation. Prime describes it as pale orange, and sometimes whitish, but specimens before me are rich purple, while others are of a distinct pinkish tint, often in bands. Whan records *C. deshayesi* Smith from Colac; not having examined Whan's specimens, I cannot speak with certainty, but, as *C. angasi* is very abundant in this locality and as *C. deshayesi* is recorded from Victoria River and Port Essington, North Australia, Whan's record requires verification. Dall makes *C. angasi* Prime the type of his new section *Corbiculina.*

Family **CYCLADIDAE.**

Genus SPHAERIUM Scopoli, 1777.

Sphaerium tasmanicum (Tenison Woods).

(Pl. IV, Fig. 35.)

1876 Cylas tasmanica Ten. Woods, Pr. Roy. Soc. Tas., p. 82.
1882 Sphaerium Tasmanicum (Ten. Woods). Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 565.
1882 Sphaerium Macgillivrayi Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 305, pl. 7, fig. 34.
1887 Id. Tate, Tr. Roy. Soc. S. Aust., ix, p. 94.
1893 Id. Adcock, Hand-List Aquatic Moll. S. Aust., p. 12.
1914 Sphaerium tasmanicum (Ten. Woods). Chapman, Mem. Nat. Mus. Melb., No. 5, p. 56.

1920 Sphaerium macgillivrayi Smith. May, Pr. Roy. Soc. Tas., p. 68, pl. 9, fig. 1.
1921 Id. May, Check-list. Moll. Tas., p. 21, No. 152.
1923 Id. May, Ill. Index Tas. Shells, pl. 9, fig. 9.
1923 Sphaerium tasmanicum (Ten. Woods). May, Ill. Index Tas. Shells, pl. 9, fig. 9.
1936 Sphaerium macgillivrayi Smith. Cotton, S. Aust. Nat., xvii, Nos. 1-4, p. 85, fig. 48.

Size of Type.—Length, 9 mm.; breadth, 7·5 mm.; height, 5 mm.

Localities.—Melbourne University Lake (Nat. Mus., Melb.); Carrum, Tarraville, Longford (T. Worcester); Meredith, Anakie (J. H. Young); Dandenong (J. A. Kershaw); Moorooduc (Rev. G. Cox); Birregurra (A. C. Nilson); N. Portland (C. J. Gabriel).

Vernacular Name.—Tasmanian Orb Shell.

Observations.—A thin, fragile shell, subquadrate, ventricose, shining, fleshy-yellow, striate, white inside, with lines of growth indicated by three or four silver-like bands of colour; umbones prominent. In South Australia Cotton has recorded this species under the name of *S. macgillivrayi* Smith, but I have no doubt this name is synonymous with the earlier *S. tasmanicum* Ten. Woods. In Tasmania, May regards *tasmanicum* and *macgillivrayi* as distinct, remarking that the latter is less round and has more prominent umbones, variations discernible in the Victorian form.

Sphaerium problematicum sp. nov.

(Pl. IV, 36, 36a, 36b.)

Shell thin, hyaline white, nearly equilateral, moderately inflated, transversely ovate; anteriorly narrower and more acuminate than at the posterior end. Umbones fairly prominent. Surface of shell bearing minute concentric striae. Internally white.

Size of Type.—Length, 4·75 mm.; breadth, 7 mm.

Locality.—Murray River, near Merbein. Collected by F. S. Colliver.

Vernacular Name.—The Oval Orb Shell.

Observations.—A distinctive little species somewhat approaching *S. tasmanicum* Ten. Woods, but more ovate in form.

Type in the National Museum, Melbourne. Reg. No. 71231.

Genus PISIDIUM Pfeiffer, 1875.

Pisidium etheridgii E. A. Smith.

(Pl. IV, Fig. 37.)

1882 Pisidium Etheridgii Smith, Journ. Linn. Soc. Lond., Zool., xvi, 306, pl. 7, fig. 35.
1887 Pisidium Etheridgei Smith. Tate, Tr. Roy. Soc. S. Aust., ix, p. 94.
1893 Pisidium Etheridgei Smith. Adcock, Hand-List Aquatic Moll. S. Aust., p. 12.
1894 Cyclas (Pisidium) etheridgei Smith. Whan, Geelong Nat., iv., No. 10, p. 9.
1936 Pisidium etheridgei Smith. Cotton, S. Aust. Nat., xvii, Nos. 1-4, p. 85, fig. 47.

Size of Type.—Length, 5·5 mm.; breadth, 6·5 mm.; diam., 3·5 mm.

Localities.—Yan Yean Reservoir (R. Etheridge); Port Fairy (Rev. Whan); Fall's Creek Reservoir (Nat. Mus., Melb.); Mt. Baw Baw (J. Searle); Bangholme, Tarraville (T. Worcester); Blackburn Lake (A. C. McLachlan); "The Sanctuary" at Lorne, Studley Park (C. J. Gabriel).

Vernacular Name.—Etheridge's Pea Shell.

Observations.—The smallest Victorian freshwater bivalve. Smith remarks: "Umbones rather prominent, with the young shell forming a more or less distant apical cap. Concentric striae very fine. Not unlike the European *P. casertanum,* but rather less inequilateral."

Family **UNIONIDAE.**

Genus HYRIDELLA Swainson, 1840.

Hyridella australis (Lamarck).

(Pl. IV, Fig. 38.)

1819 Unio australis Lamarck, Anim. S. Vert., Ed. 1, vi, p. 80.
1836 Margarita (Unio) depressus Lea, Syn., p. 32.
1843 Unio australis (Lam.) Hanley, Bivalve Shells, p. 192, pl. 21, fig. 25.
1850 Unio balonnensis Conrad, Pr. Ac. Nat. Sci. Phil., v, p. 10.
1856 U. shuttleworthi Kuster, Conch. Cab., Unio, p. 152, pl. 44, fig. 2.
1861 U. philippianus Kuster, op. cit., p. 235, pl. 79, fig. 2.
1868 U. moretonicus Reeve, Conch. Icon., pl. 24, fig. 118.
1871 U. danieli Villa, Jour. de Conch., xix, p. 328.
1882 U. bednalli Tate, Tr. Roy. Soc. S. Aust., v, p. 56.
1882 U. australis Lam. Tate and Brazier, Pr. Linn. Soc. N.S.W., vi, p. 567.
1882 Id. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 309.
1888 Id. Cox, Pr. Linn. Soc. N.S.W., iii (2), p. 1,253.
1888 Id. Tate, Tr. Roy. Soc. S. Aust., xi, p. 69.

1889 Unio legrandi Pett., Pr. Roy. Soc. Tas., p. 81.
1900 Diplodon australis (Lam.) Hanley. Simpson, Pr. U.S. Nat. Mus., xxii, p. 890.
1900 Diplodon (Hyridella) australis var. legrandi Petterd. Simpson, op. cit., p. 891.
1900 Diplodon moretonicus (Reeve). Simpson, op. cit., p. 891.
1921 Diplodon australis (Lam.). May, Check-list Moll. Tas., p. 21, No. 155.
1921 Diplodon moretonicus (Reeve). May, op. cit., p. 21, No. 156.
1923 Id. May, Ill. Index Tas. Shells, pl. 9, fig. 12.
1923 Diplodon australis (Lam.). May, op. cit., pl. 9, fig. 11.
1932 Hyridella australis (Lam.). Cotton and Gabriel, Pr. Roy. Soc. Vict., xliv, (n.s.), Pt. 2, p. 155, pl. 16, fig. 1.
1934 Id. Cotton, S. Aust. Nat., xv, p. 113, pl. 2.
1934 Velesunio balonnensis (Conrad). Iredale, Aust. Zool., viii, Pt. 1, p. 59, pl. 3, figs. 1-3; pl. 4, figs. 1-3.
1934 Velesunio danellii (Villa). Iredale, op. cit., p. 60, pl. 3, fig. 4; pl. 4, fig. 4.
1934 Velesunio shuttleworthi (Kuster). Iredale, op. cit., p. 60, pl. 3, fig. 5, pl. 4, fig. 5.
1934 Hyridunio australis (Lam.). Iredale, op. cit., p. 69, pl. 5, figs. 1, 2; pl. 6, figs. 2, 3.
1934 Hyridunio australis orion Iredale, op. cit., p. 69.
1934 Velesunio danelli (Villa). Allan, Vict. Nat., li, No. 7, p. 166, fig. in text.
1934 Hyridella australis (Lam.) Thiele, Hdbch. Syst. Weichtierkunde, p. 838.

Size of Average Specimen.—Length, 44 mm.; breadth, 71 mm.

Localities.—R. Yarra; R. Tanjil, near Longford; R. Mitchell; Chalka Creek, near R. Murray; Longerenong (J. L. Gatliff); Birregurra; Lake Lonsdale (C. L. Barrett); R. Glenelg (W. H. Dillon); R. Goulburn; R. Mackenzie (C. J. Gabriel); and many localities (Nat. Mus., Melb.).

Vernacular Name.—The Southern Freshwater Mussel.

Observations.—Our commonest freshwater Mussel, enjoying a wide distribution in all Australian States. After examining thousands of specimens, I am convinced of the specific identity of the many varying forms enumerated in the above synonymy. This species is the genotype of *Hyridella. H. ambigua* (Phil.) from New South Wales and South Australia is distinguished from *H. australis* (Lam.) by being thinner, higher, more compressed and lighter coloured.

Hyridella angasi (Reeve).

(Pl. IV, Fig. 39.)

1856 Unio shuttleworthi Lea, Pr. Ac. Nat. Sci. Phil., viii, p. 94 (nom. preocc.).

1868 U. angasi Sowerby. Reeve, Conch. Icon., p. 55, fig. 282.
1882 U. angasi Reeve. Tate, Tr. Roy. Soc. S. Aust., v, p. 56.
1882 U. Angasi Lea. Smith, Jour. Linn. Soc. Lond., Zool., xvi, p. 307.
1888 U. angasi Sby. Tate, Tr. Roy. Soc. S. Aust., xi, p. 69.
1900 Diplodon (Hyridella) shuttleworthi (Lea). Simpson, Pr. U.S. Nat. Mus., xxii, p. 893.
1917 Diplodon shuttleworthi (Lea). Odhner, K. Sv. Vet. Ak. Handl., lii, (16), p. 74.
1932 Hyridella angasi (Reeve). Cotton and Gabriel, Pr. Roy. Soc. Vict., xliv, (n.s.), Pt. 2, p. 157, pl. 16, fig. 3.
1934 Centralhyria angasi (Reeve). Iredale, Aust. Zool., viii, Pt. 1, p. 66, pl. 5, fig. 4; pl. 6, fig. 1.

Size of Average Specimen.—Length, 58 mm.; breadth, 100 mm.

Locality.—Cramenton; R. Murray (Nat. Mus., Melb.).

Vernacular Name.—Angas's Freshwater Mussel.

Observations.—This elongated form is easily recognized; it is the largest Victorian freshwater Mussel. The nacre, as Smith notes, is sometimes entirely white, bluish, or purplish; but the upper and posterior parts are nearly always more or less stained with livid purple, or olive, or a combination of these colours which is difficult to define.

Genus PROPEHYRIDELLA Cotton and Gabriel, 1932.

Propehyridella nepeanensis (Conrad).

(Pl. IV, Fig. 40.)

1830 Unio depressus Lesson, Voy. Coquille, ii, p. 427, pl. 15, fig. 5 (nom. preocc.).
1850 U. nepeanensis Conrad, Pr. Ac. Nat. Sci. Phil., v, p. 10.
1852 Id. Conrad, Jour. Ac. Nat. Sci. Phil., ser. 2, p. 297, pl. 26, fig. 4.
1865 Unio lessoni Kuster, Conch. Cab., pl. 36, fig. 4.
1865 U. nepeanensis Conrad. Reeve, Conch. Icon., xvi, pl. 23, fig. 10.
1882 Id. Smith, Journ. Linn. Soc. Lond., Zool., xvi, p. 312.
1900 Diplodon (Hyridella) dorsuosus Gould. Simpson, Pr. U.S. Nat. Mus., xxii, p. 889.
1900 Diplodon (Hyridella) lessoni (Kuster). Simpson, ibid., p. 890.
1932 Propehyridella nepeanensis (Conrad). Cotton and Gabriel, Pr. Roy. Soc. Vict., xliv, (n.s.), Pt. 2, p. 158, pl. 16, fig. 5.
1934 Id. Iredale, Aust. Zool., viii, Pt. 1, p. 73 (in part), pl. 5, figs. 11, 12 (not 13); pl. 6, figs. 11, 12 (not 13).
1934 Hyridella (Propehyridella) nepeanensis (Conrad). Thiele, Hdbch. Syst. Weichtierkunde, p. 838.

Size of Average Specimen.—Length, 38 mm.; breadth, 62 mm.

Localities.—Mitchell River at Bairnsdale (J. A. Kershaw,

T. Worcester, and Nat. Mus., Melb.); Gippsland Lakes (Dr. J. C. Cox); Wallagaraugh River, East Gippsland.

Vernacular Name.—The Nepean River Corrugated Mussel.

Observations.—Compared with specimens from the Nepean River, New South Wales. The species is readily identified by the coarse wrinkles upon the umbones and its comparatively square or truncated anterior end. Iredale regards *P. narracanensis* C. and G., as the juvenile form, an opinion not accepted by Cotton and Gabriel (see remarks under *P. narracanensis*). This species is the genotype of *Propehyridella.*

Propehyridella cultelliformis (Conrad).

(Pl. IV, Fig. 41.)

1819 Unio depressus Lamarck, An. S. Vert., vii, p. 79 (nom. preocc. Donovan, 1801).
1841 Id. Delessert, Rec. Coq. Lam., pl. 12, fig. 5.
1850 Unio cultelliformis Conrad, Pr. Ac. Nat. Sci. Phil., v, p. 10.
1850 U. profugus Gould, Pr. Boston Soc. Nat. Hist., p. 295.
1854 U. depressus Lam. Lea, Jour. Ac. Nat. Sci. Phil., p. 295, pl. 26, fig. 2.
1859 U. mutabilis Lea, Pr. Ac. Nat. Sci. Phil., iii, p. 152.
1860 Id. Journ. Ac. Nat. Sci. Phil., iv, p. 248, pl. 28, fig. 127.
1862 U. paramattensis Lea, op. cit., iv, p. 176.
1862 U. (Niaa) depressus Lam. Chenu, Man. de Conch., ii, p. 140, fig. 679.
1866 U. paramattensis Lea, Jour. Ac. Nat. Sci. Phil., ser. 2, vi, p. 60, pl. 20, fig. 59.
1882 U. depressus Lam. Smith, Jour. Linn. Soc. Lond., Zool., xvi, p. 308.
1887 Id. Tate, Tr. Roy. Soc. S. Aust., xi, p. 101.
1900 Diplodon (Hyridella) mutabilis (Lea). Simpson, Pr. U.S. Nat. Mus., xxii, p. 308.
1900 Diplodon (Hyridella) profugus Gould. Simpson, op. cit., p. 891.
1914 Diplodon cultelliformis (Conrad). Simpson, Cat. Naiades, iii, p. 1300.
1914 D. mutabilis (Lea). Simpson, op. cit., p. 1308.
1932 Propehyridella cultelliformis (Conrad). Cotton and Gabriel, Pr. Roy. Soc. Vict., xliv (n.s.), p. 159, pl. 16, fig. 6.
1934 Hyridunio renutus Iredale, Aust. Zool., viii, Pt. 1, p. 69, pl. 5, fig. 3; pl. 6, fig. 4.
1934 Rugoshyria depressa (Lam.). Iredale, op. cit., p. 71.
1934 R. depressa vicinalis Iredale, op. cit., p. 72.
1934 R. cultelliformis (Conrad). Iredale, op. cit., p. 73.

Size.—Length, 41 mm.; breadth, 84 mm.

Localities.—Bunyip (Nat. Mus., Melb.); Glengarry River; Mitchell River, at Bairnsdale; River Yarra at Wooriyallock; R. Erskine at Lorne; R. Wallagaraugh, East Gippsland; Tarra Creek; Heidelberg; Lilydale, Mt. Evelyn (M. E. Gatliff); Mallacoota (C. L. Barrett).

Vernacular Name.—The Little Knife-shaped Mussel.

Observations.—Delessert's figure is that of a juvenile. In very young specimens the uneroded umbones are distinctly wrinkled. When working at this extremely variable form in conjunction with Cotton, we examined a very large series from several localities, and after careful study arrived at the conclusions indicated in the above synonymy. Iredale differed, but, after closely studying his remarks, we hold to our original opinion.

Propehyridella narracanensis Cotton and Gabriel.

(Pl. IV, Fig. 42.)

1932 Propehyridella narracanensis C. and G., Pr. Roy. Soc. Vict., xliv, (n.s.), Pt. 2, p. 159, pl. 16, fig. 8.

1934 Propehyridella nepeanensis narracanensis C. and G. Iredale, Aust. Zool., viii, Pt. 1, p. 74, pl. 5, fig. 13; pl. 6, fig. 13.

Size of Type.—Length, 15·5 mm.; breadth, 25·3 mm.

Localities.—Narracan River, at Thorpdale, Gippsland (Type, Nat. Mus., Melb), collected by W. Kershaw; Birregurra.

Vernacular Name.—The Narracan River Corrugated Mussel.

Observations.—A small, dull, yellowish-brown species; the Birregurra examples are darker and a little more inflated, but otherwise inseparable.

Iredale remarks: "The species named *narracanensis* by Cotton and Gabriel is undoubtedly the very juvenile form of the specimens regarded by them as *nepeanensis.*" With this opinion we cannot agree. Re-examination of our material endorses our conviction that the two are definite species; they differ consistently in contour and the umbonal wrinkles are of dissimilar design. We cannot conceive that *narracanensis* could develop into the robust *nepeanensis,* which has a comparatively square or truncated anterior end.

Genus PROTOHYRIDELLA Cotton and Gabriel, 1932.

Protohyridella glenelgensis (Dennant).

(Pl. IV, Fig. 43.)

1898 Unio glenelgensis Dennant, Pr. Roy. Soc. Vict., x, p. 112, pl. 4.

1900 Diplodon (Hyridella) glenelgensis (Dennant). Simpson, Pr. U.S. Nat. Mus., xxii, p. 889.

1914 Diplodon glenelgensis (Dennant). Simpson, Cat. Naiades, iv, p. 1290.

1932 Protohyridella glenelgensis (Dennant). Cotton and Gabriel, Pr. Roy. Soc. Vict., xliv (n.s.), Pt. 2, p. 160, pl. 16, fig. 9.
1934 Id. Iredale, Aust. Zool., viii, Pt. 1, p. 74, pl. 5, fig. 14; pl. 6, fig. 14.
1934 Hyridella (Protohyridella) glenelgensis (Dennant). Thiele, Hdbch. Syst. Weichtierkunde, p. 838.

Size of Type.—Length, 23 mm.; breadth, 40 mm.

Localities.—Glenelg River, at Roseneath (Nat. Mus., Melb., Type and Rev. W. Whan); Glenelg River, at Dartmoor (J. Dennant and W. H. Dillon); Wannon Creek, Hamilton (Nat. Mus., Melb.).

Vernacular Name.—The Glenelg River Corrugated Mussel.

Observations.—A small species apparently confined to Victoria. The surface of shell is rough and has two series of ornamentations, one consisting of undulating concentric ridges, a few of which are coarsely crenulated, and the other of five or six rows of irregular, prominent, nodose wrinkles, angularly arranged around the umbo and with deeply-cut interspaces. The latter series of markings is oblique to the former and constitutes a characteristic rib-like ornament. This peculiar sculpturing, which occupies the greater portion of the shell, readily distinguishes it from other Australian freshwater mussels.

This species is the genotype of Protohyridella.

Index of Generic and Specific Names Applied to Victorian Freshwater Mollusca.

Explanation of Plates I-IV.

Plate I.

Fig. 1. Melania balonnensis Conrad. Reg. No. 71204. R. Murray, near Gayfield, Victoria.
Fig. 2. Vivipara hanleyi (Frauenfeld). Reg. No. 71205. R. Murray, near Swan Hill, Victoria.
Fig. 3. Bythinella nigra (Quoy and Gaimard). Reg. No. 71206. Dromana.
Fig. 3a. Bythinella nigra (Quoy and Gaimard) var. Reg. No. 71207. Dromana.
Fig. 4. Bythinella buccinoides (Quoy and Gaimard). Reg. No. 71208. Merri Creek, Coburg, Victoria.
Fig. 5. Bythinella grampianensis sp. nov. Type. Reg. No. 71209. Dairy Creek, near Silver Band Falls, Grampians, Victoria.
Fig. 6. Limnaea lessoni Deshayes. Reg. No. 71210. Longford, Victoria.
Fig. 7. Limnaea subaquatilus Tate. Co-type. Reg. No. 71211. R. Torrens, South Australia.
Fig. 8. Limnaea gunni Petterd. Reg. No. 71212. Tarraville, Victoria.
Fig. 9. Limnaea victoriae Smith. After E. A. Smith, Journ. Linn. Soc. Lond., Zool., xvi, pl. 5, fig. 16. Bairnsdale, Victoria.

Fig. 10. Myxas papyracea (Tate). Reg. No. 71213. Birregurra, Victoria.
Fig. 11. Ameria aliciae (Reeve). Reg. No. 71214. Meredith, Victoria.
Fig. 12. Ameria tenuistriata (Sowerby). Reg. No. 71215. Swan Hill, Victoria.
Fig. 13. Ameria tenuistriata (Sowerby) var. pyramidata (Sowerby). Reg. No. 71216. Portland, Victoria.
Fig. 14. Ameria tenuistriata (Sowerby) var. waterhousei (Clessin). Reg. No. 71217. Caulfield, Victoria.

PLATE II.

Fig. 15. Ameria tenuistriata var. arachnoidea (Ten. Woods). Type. Reg. No. 36001-5. Near Melbourne.
Fig. 16. Ameria tenuistriata var. confluens (Hedley). After Hedley, Rec. Aust. Mus., xii, No. 1, pl. 1, fig. 9. Echuca, Victoria.
Fig. 17. Ameria acutispira (Tryon). Reg. No. 71218. Williamstown, Victoria.
Fig. 18. Ameria acutispira (Tryon) var. yarraensis (Ten. Woods). Type. After Hedley, Rec. Aust. Mus., xii, pl. 2, fig. 16. Upper Yarra, Victoria.
Fig. 19. Ameria acutispira (Tryon) var. etheridgii (Smith). After Smith, Journ. Linn. Soc. Lond., Zool., xvi, pl. 6, fig. 25. Yan Yean Reservoir, Victoria.
Fig. 20. Ameria acutispira (Tryon) var. tenuilirata (Smith). After Smith, Journ. Linn. Soc. Lond., Zool., xvi, pl. 6, fig. 27. Bunyip River, Victoria.
Fig. 21. Ameria producta (Smith). Reg. No. 70033. Wimmera River, Victoria.
Fig. 22 Isidorella newcombi (Adams and Angas). Reg. No. 71219. Meredith, Victoria.
Fig. 23. Isidorella newcombi (Adams and Angas) var. hedleyi (Clench). Reg. No. 71220. Cheltenham, Victoria.
Fig. 24. Isidorella newcombi (Adams and Angas) var. pilosa (Ten. Woods). Type. Reg. No. 35994. University Grounds, Melbourne, Victoria.
Fig. 25. Isidorella newcombi (Adams and Angas) var. crebreciliata (Ten. Woods). Type. Reg. No. 36028. Caulfield, near Melbourne, Victoria.
Fig. 26. Isidorella hainesii (Tryon). Reg. No. 71221. Bacchus Marsh, Victoria.

PLATE III.

Figs. 27, 27a, 27b. Planorbis tasmanicus Ten. Woods. Reg. No. 71222. Upper, Lower and side aspects. Tarraville, Victoria.
Figs. 28, 28a, 28b. Planorbis scottiana Johnston. Reg. No. 71223. Upper, lower and side aspects. Tarraville, Victoria.
Figs. 29, 29a, 29b. Planorbis waterhousei Clessin. Reg. No. 71224. Upper, lower and side aspects. Portland, Victoria.
Figs. 30, 30a, 30b. Segmentina victoriae Smith. Reg. No. 71225. Upper, lower and side aspects. River Yarra, near Botanic Gardens, Melbourne.
Figs. 31, 31a. Ancylus australicus Tate. Reg. No. 71226. Upper and side aspects. Tarraville, Victoria.
Figs. 32, 32a. Ancylus tasmanicus Ten. Woods. Reg. No. 71227. Upper and side aspects. Lorne, Victoria.
Fig. 33. Gundlachia petterdi Johnston. Reg. No. 71228. Blackburn Lake, Blackburn, Victoria.

Plate IV.

Fig. 34. Corbicula angasi Prime. Reg. No. 71229. Hamilton, Victoria.

Fig. 35. Sphaerium tasmanicum (Ten. Woods). Reg. No. 71230. Tarraville, Victoria.

Figs. 36, 36a, 36b. Sphaerium problematicum sp. nov. Type. Reg. No. 71231. External aspect; internal: *a* left valve; *b* right valve. Murray River, near Merbein, Victoria.

Fig. 37. Pisidium etheridgii Smith. Reg. No. 71232. Studley Park Reservoir, Melbourne.

Fig. 38. Hyridella australis (Lamarck). Reg. No. 71233. Diamond Creek, Victoria.

Fig. 39. Hyridella angasi (Reeve). Reg. No. 71234. Murray River, near junction of the Darling (Blandowski Collection).

Fig. 40. Propehyridella nepeanensis (Conrad). Reg. No. 71235. River Mitchell, Bairnsdale, Victoria.

Fig. 41. Propehyridella cultelliformis (Conrad). Reg. No. 71236. Tarra River, Victoria.

Fig. 42. Propehyridella narracanensis Cotton and Gabriel. Type. Reg. No. 71237. Thorpdale, Narracan River, Victoria.

Fig. 43. Protohyridella glenelgensis (Dennant). Type. Reg. No. 58615. Roseneath, Glenelg River, Victoria.

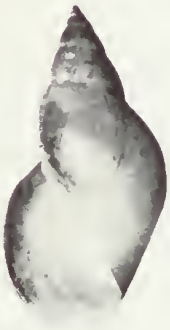
Freshwater Mollusca of Victoria

15

16

17

18



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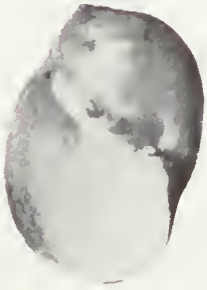
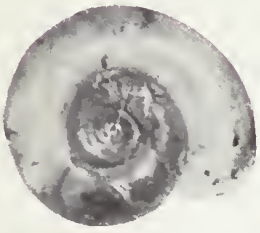


24

Freshwater Mollusca of Victoria



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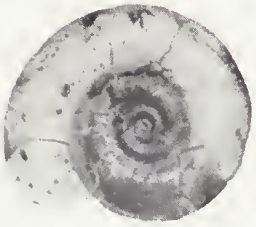

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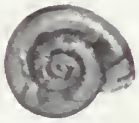

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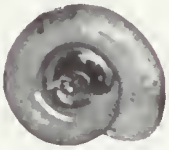

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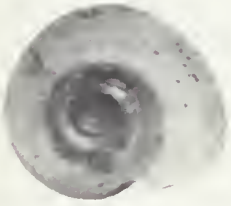

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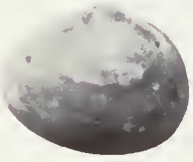
Freshwater Mollusca of Victoria



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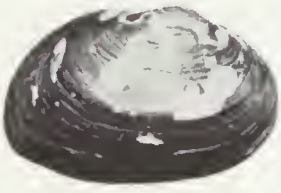

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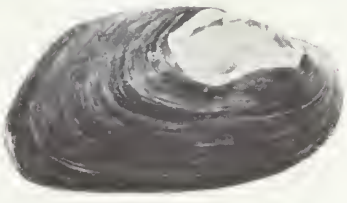

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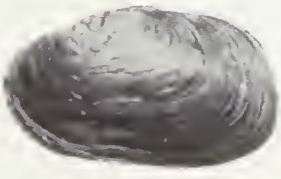

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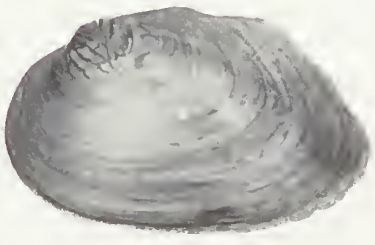

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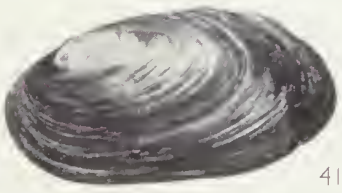

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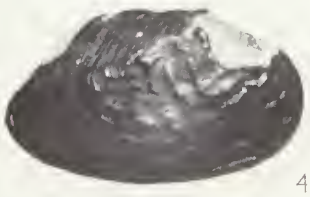

43

Freshwater Mollusca of Victoria