ON SOME TASMANIAN FRESHWATER UNIVALVES.

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[*Read 7th October*, 1878.]

On the 9th August, 1875, I read before this Society a paper on the Freshwater Shells of Tasmania, which was incorporated in the Proceedings, and appears in the volume for 1875, p. 66. In dealing with certain of the univalves, I stated my reasons for regarding them as true *Bythiniæ*, and for not including them in the genus *Paludestrina*, of D'Orbigny. Since that time I have been able to compare the Tasmanian shells with good types of the European *Bythinæ*, and I have come to the conclusion that our shells differ in so many important respects from them that they cannot be considered the same. I do not think, however, that they should be considered as *Paludestrinæ*. That is a genus erected for South American shells, characterised thus:—

Shell semi-globose, thick, solid, with a short obtuse spire, and few smooth whorls; aperture large, oval, entire; peristome continuous, inner lip callous. Animal with subulate tentacles, at the external base of which the eyes are situated. The operculum is horny, oval, and paucispiral. Small species found in fresh or brackish waters in the West Indies or South America.* (See D'Orbigny. *Mollusques de l'Ile de Cuba*, 1841, vol. 1., p. 199, and vol. 2., 1842, p. 7; also *Palæontologie Français, Ter. Cret.*). M. Chenu, in his *Manuel de Conchyliologie*, looks upon this genus as synonymous with one proposed by J. K. von Muhlfeldt (J. D. W. Hartmann. *Von Hartmannsruthi. System der Erd und Flusschnecken der Schweiz. Sturms Fauna* VI., *Heft* 5., p. 57), the etymology of which was derived from λίθος γλύφω, stone sculpture. It was separated by the authors as a division of *Paludina*, of which *P. naticoides*, *Ferussac*, was the type. Gray, in the *Philosophical Transactions*, 1835, p. 308, unites the genus *Lithoglyphus* with *Littorinæ;* but Pfeiffer, in 1841, in Weigmann's *Archifür Naturgeschichte* (Berlin Arch. 1, p. 228), retains it. Hermannsen, in his *Indicis Genera Malacozoorum* (Cassel, vol. 1, 1846; vol. 2, 1847-8), in vol. 2, p. 191, makes the genus *Paludestrina* a synonym of *Hydrobia*. The latter was, according to Mons. P. Fischer (*Journal de Conchy.*, 1878. Note *sur la synonomie*

* One has been described from New Zealand, by M. Crosse.

du genre Hydrobia et des genres voisins, p. 133*) only proposed nominally in 1821 (*Sturm Deutsch. Fauna, Heft* 5, p. 46), without any generic definition; and this name was followed by three other specific names, without authors, viz.:— *Hydrobia acuta, H. vitrea, and H. minuta.* Of these the first is a saltwater species, the second freshwater, and the third, says Mons. Fischer, is unknown. The idea of Hartmann was (says Mons. Fischer) to separate *Paludinæ* with spiral opercula from those of concentric structure, which is the division of *Vivipara* and *Bythinia* of authors.

The same author draws attention to the fact, with regard to *Paludestrina*, that Mons. D'Orbigny says expressly that he intended his genus to apply to marine and freshwater species, but that it included all the marine *Paludinæ*; so that *Paludestrina* became exactly synonymous with *Hydrobia.* It is probable that the only definition of Hartmann for the latter genus was that it was intended for *Paludinæ* with an elongate and acute spire. Subsequently he regarded it only as a sub-genus of *Paludina.* (1840. *Syst. Uebers, ita Hermannsen loc. cit.*)

Dr. P. P. Carpenter, in his most careful and elaborate *Catalogue of Mazatlan Shells*, which is one of the British Museum catalogues, at page 30 has the following references: —Genus *Hydrobia, Hart. ut supra Phil. Hand. Conch. Leachia, Risso*, 1826. *Paludinella, Loven, (? Paludinella*, Pfeiffer†) Dr. Carpenter then remarks—and the observation is one which bears in an important manner on the subject of this paper—that the Mazatlan shells of *Hydrobia ulvæ*, after careful microscopic examination, are not seen to have the slightest specific variation from the British specimens, and it did not seem allowable to impose on them a new name merely from geographic considerations. Mr. J. E. Gray, in his *Guide to* the *Systematic Dist. of Moll.* (British Museum catalogues) p. 89, says of *Lithoglyphus* that Dr. Philippi has placed that genus, and *Hydrobia* with spiral opercula, as sub-genera of *Paludina;* but *Paludomus* with annular opercula he places as a sub-genus of *Melania.*‡ Mr. Gray does not define *Hydrobia* in the way adopted by Messrs. Adams, in their *Genera of Recent Mollusca*, though they both distinguish *Lithoglyphus* from that genus, and reject *Paludestrina.*

* This paper was written, but not published, before Mons. Fischer's article reached me. In consequence I have revised the whole of my MS., as the additional information it supplied was new and valuable, though our conclusions, formed independently, were nearly identical.

† This can hardly be, as Pfeiffer sustains the name *Lithoglyphus.*

‡ *Handbuch der Conch.*, 1853, pp. 167 and 168.

It may be as well if I give, in the very words of Mons. Fischer, what he says of some of the synonymous genera :— "*(Litorinella*, Braun, 1842.). Braun proposed this new genus for *Paludinæ* with spiral opercula. In 1845 Thoma applied the name *Littorinella* to the *Cyclostoma acutum* of Draparnaud *(Jahrbuch des Vereins für Naturkunde in Herzogthume Nassau, Heft.* 2, p. 125). We must conclude that *Littorinella* ought to be reserved for marine or brackish water shells. The genus *Paludinella* was erected in 1841 by Pfeiffer (*Wiegm. Arch.* 1, p. 227) for the *Helix littorina* of Delle Chiaje—a marine species regarded as a *Truncatella* by Philippi, and placed in the genus *Assiminea* by all modern naturalists. Relying on the marine habitat of Pfeiffer's type, Lovèn, in 1846, placed Pennant's *Turbo ulvæ* amongst *Paludinella;* but it is difficult to explain why, quite recently, Frauenfeld, Kreglinger, Kobelt, Paladilhe, &c., have distinguished all the little fluviatile *Paludinas* by the name of *Paludinella.* It is one of the most astounding blunders in nomenclature, and proves how persistently one author follows another without the least examination. The genus *Amnicola* of Gould and Haldeman *(Supplement to a Monograph of the Limniadæ*, p. 3. 1849) is defined thus :—Head proboscidiform, shell like *Paludina*, operculum corneous and subspiral. No species is named as a type, but it is certain that the authors had in view only fluviatile species. Ultimately Gould, in the *Invertebrata of Massachusetts*, characterised the genus with more detail, and took for a type *Paludinæ* with few whorls. Stimpson *(On Hydrobia*, 1865, p. 13) gives a figure of the operculum of *Amnicola*, and attributes to it a peculiar structure which is not found in pretended *Amnicola* of the old world. I consider, therefore, that the genus *Amnicola* should be restricted to American species. Frauenfeld has adopted a very arbitrary mode of distinguishing the genus all over the world, *i.e.*, the globular form and short spire. *Bythinella* is a genus erected by Moquin-Tandon in 1855. He divides the genus *Bythinia* into two groups. *(a). Bythinella*—shells with a cochleariform operculum, and an eccentric nucleus. *(b). Elona*—operculum paralleliform, nucleus central. In reality the genus is no more than *Bythinia* and *Bythinella*, the latter including all the little French fluviatile species with a spiral operculum. *Peringia* is a genus recently erected by Paladilhe for *Turbo ulvæ*, a marine species." The latter does not concern us, but I mention it lest its use should cause confusion.

From all these considerations, therefore, it will be seen that, in any case, the genus *Paludestrina* cannot be maintained under that name. It is not received by any modern system writer except Chenu, and even he admits the priority

of *Lithoglyphus*. But since *Lithoglyphus* (Muhlfeldt) and *Hydrobia* are both maintained, though probably under conditions different from those originally contemplated by these authors, it remains to be seen under which genus we are to place the small freshwater shells of Tasmania which I regarded as *Bythinia*. It seems to me that in this matter our safest and best plan is to follow the arrangement of Messrs. Adams, because that is the one which is generally adopted, and that seems to be most natural and most in accord with the claims of priority in the nomenclature. I admit, however, that where the claims are so various and on such different grounds, and where we do not follow the authors' definitions, there is too much confusion for any one to decide on a generic name from priority alone.

According to the authors of the *Genera of Recent Mollusca*, *Lithoglyphus* is placed in the family of *Littorinidæ*, and is thus defined:—Shell semi-globose, thick, solid; spire short, obtuse; whorls few, smooth; aperture large, ovate, entire; peristome continuous; inner lip callous; outer lip simple; umbilicus rimate. They add that the typical species of this genus is from the river Danube; a few other species are inhabitants of the fresh waters of South America, and have been described by Mons. D'Orbigny under the name of *Paludestrina*.*

It is very clear that this definition will not correspond with those of Tasmania with which we are now dealing.

Hydrobia, on the other hand, is placed by the same authors in the family *Rissoidæ*, and is defined thus:—Operculigerous lobe simple; operculum sub-spiral; shell elongately conical, thin, smooth, covered with an olivaceous epidermis; axis imperforate; aperture oval; peritreme continuous; outer lip simple, acute. Syn. *Leachia* (Risso), not Lesueur or Johnst. *Littorinella* (Braun). Example—*H. ulvæ* (Pennant, *loc. cit.*, p. 335). I may add that the animal has the eyes at the base of the tentacles, the foot is broadly wedge-shaped, the broad end under the muzzle. Messrs. Adams say that the tentacles are subulate. There are 30 species known—one from New Zealand, described by Gray (*H. Zelandiæ*), two described by Gould (*H. badia* and *H. egena*) and two by Mons. P. Fischer (*H. Saleana* and *H. Cumingiana*). There is one described from Western Australia named *H. Preissii* (Phil).

There can be no doubt that the most of our shells belong to this genus, as far as the shells can guide us; but further observations are required upon the animal. There is only one genus with which it can be confounded, and that is

* *Genera Recent Mollusca*, vol. 1, p. 320.

Paludinella (Pfeiffer), one of the family *Assiminiidæ*; but the shell in that case is umbilicate, and the eyes of the animal are on the middle of the tentacles.

But should the genus be called *Hydrobia?* Clearly not; because, as we have seen, this is meant to include marine shells, while ours are entirely fluviatile. *Bythinella* seems the only genus under which they can be ranged—that is, of course, if our species are similar to those described by Mons. Moquin-Tandon, from France. Some of our species differ in a remarkable degree, as I shall specify hereafter; but in the meantime I shall regard the majority as *Bythinella.*

In future, therefore, the shells inhabiting our fresh and brackish water, marshes, and streams, which have an appearance like very small *Paludinæ*, must be regarded as belonging to the genus *Bythinella.* They are generally entangled in the confervæ or green slime which lines the sides of the creeks and swamps, and sometimes in freshwater streams.* They must not be confounded with the American genus *Amnicola*, which has the axis of the shell perforate.

I must further remark that, since preparing my monograph, I have been able to consult Mr. John Brazier, and examine the type specimens of the two species described by him in the *Zool. Proc.* for 1871, p. 696, and named *Paludestrina Legrandiana* and *P. Wisemaniana.* It will be remembered, perhaps, that I said of them that I had been unable to find either of the above shells, or anything like them. Mr. Brazier was then in New Guinea, and I could not communicate with him. I find now that *Paludestrina Legrandiana* is my *Bythinia unicarinata*, and the solid, stunted, hair-like spines seen under the lens, spoken of by Mr. Brazier in his diagnosis, are the remains of the interrupted keel described by me. *Paludestrina Wisemaniana* is, I believe, my *Bythinia tasmanica*, which is common in all the creeks near Hobarton; but I think we should amend both descriptions by stating that the suture is well impressed, not grooved.

I find, also, that just before my paper was read to the Society—that is, in July, 1875—a paper was read by Mr. Brazier, on March 29, 1875, before the Linnæan Society of New South Wales, on some species of Australian and Tasmanian land and freshwater shells. In this paper I find I have been anticipated in some of my species. Mr. Brazier's *Amnicola Simsoniana* is my *Bythinia pontvillensis.* My *Planorbis tasmanica* is *Planorbis meridionalis* of Mr. Brazier's paper. I need scarcely say that I had no opportunity of seeing Mr. Brazier's paper, as it was not published until a

* River Jordan, at Brighton; Derwent, at Dunrobin.

long time after, and the whole volume in which it is incorporated did not appear until 1877.

I should remark, also, that Professor Tate has forwarded me many shells, collected by him in South Australia and Western Victoria, which come so very close to our Tasmanian species that, except in point of size and color, I really could not see any difference. Knowing what a very wide distribution our freshwater shells have in Australia, and how many I have found common to Tasmania and Victoria, I very much question if the whole of the species may not have to be reduced to one or two. But this should not be done until the animals have been carefully observed. The mere resemblance of shells is not sufficient, for, as Mr. J. E. Gray has well observed, shells in every way similar may belong to totally different genera. He says—"About 15 years since I first observed, in the marshes near the banks of the Thames, between Greenwich and Woolwich, in company with species of *Valvata*, *Bythinia* and *Pisidium*, a small univalve shell agreeing with the smaller species of the littoral species *Littorina*, in every character both of shell and operculum. Yet this very peculiar and apparently local species has an animal which at once distinguishes it from the animal of that genus, and from all other Ctenobranchrous mollusca. Its tentacles are very short and thick, and have the eyes placed at their tips, while the *Littorinæ*, and all other animals of the order to which they belong, have their eyes placed on small tubercles on the outer side of the base of the tentacles, which are generally more or less subulate." Taking this in conjunction with the preceding, we have here instances of univalve shells apparently belonging to the same genus, the one found in fresh, the other in salt, water, proving, when these animals are examined, to belong to genera essentially distinct."* He also gives similar instances among the bivalves. I may add that in making an examination of the animals of some of our land shells, with the aid of the experience of Dr. J. Cox, and the excellent drawings in his possession, I find that shells which I certainly regarded as no more than varieties are really quite different in the animals. It must, therefore, be only after a careful examination of the shells and animals here named that any alteration of the list should be determined upon by future observers.

Since the publication of my paper in the proceedings of this Society I have described a very small one in the proceedings of the Royal Society of Victoria, which was read August 9, 1877. It is a small species from Lake Connewarre,

* *Philosophical Transactions*, 1835, part 2, p. 303.

Geelong, named then by me, *Bythinia Victoriæ*. It will now stand as *Bythinella Victoriæ*. Its minute size, silky appearance, fine longitudinal striæ, and turbinately conical form, distinguish it from all its Australian congeners. The list of the genus for Tasmania will stand thus for the future :—

Genus.	
BYTHINELLA	Moquin-Tandon, 1855.
,, EXIGUA. = Paludestrina legrandiana (Brazier). = Bythinia legrandi nobis.	The name *Legrandi* is pre-occupied by restoring Brazier's name to my *Bythinia unicarinata*. It is the smallest Tasmanian species—hence the name *exigua*.
BYTHINELLA SIMSONIANA. = Bythinia pontvillensis nobis. = Amnicola simsoniana	Brazier.
BYTHINELLA DULVERTONENSIS. = Bythinia dulv. nob.	
BYTHINELLA LEGRANDIANA.* = Paludestrina legrandiana. = Bythinia unicarinata nobis.	Brazier.
BYTHINELLA DUNROBINENSIS. = Bythinia dunrob. nob.	
BYTHINELLA WISEMANIANA. = Paludestrina wisemaniana. = Bythinia tasmanica nobis.	Brazier.

It seems to me also not altogether improbable that this may turn out to be Gould's *Amnicola egena*, of New Zealand, or *Hydrobia preissii* (Phil.).

Thus far the shells are all of one type, and may possibly be varieties—a matter to which local naturalists are earnestly invited to give their attention, as well as to the animal, about which too little is known. The operculum is yellowish horny, with certain dark, black, and opaque spots, which I considered to be calcareous. There is another species to which I have not referred, because it is of such a different type :—

BYTHINIA HUONENSIS, *nobis*.

This shell, Professor Tate considers, should be made the type of a new genus. The animal was carefully observed by the Professor, who kindly placed his notes at my disposal. The foot is broadly ovate, truncate under the head. The muzzle is reddish brown, with a colorless lip. Tentacles long, subulate, eyes enclosed with brown near tip. Operculum calcareous, with a vertical submarginal claw. This peculiarity, combined with the turretted pyramidal form of the shell, makes it the type of a new genus, which I have

* This is, according to Mr. R. M. Johnston, only a variety of *B. wisemaniana*.

great pleasure in dedicating to the learned Professor. It is characterised thus :—

TATEA. *Gen. nov.*

Freshwater shells of elongate pyramidal form ; animal with a truncate foot, long tentacles, calcareous operculum, with a vertical submarginal claw.

TATEA HUONENSIS.=*Bythinia huonensis nobis.*

PLANORBIS MERIDIONALIS. (Brazier. *Proc. Lin. Soc. N.S.W.*, vol. 1, p. 20.)=*P. tasmanicus nobis.*

Since my monograph has been written, Mr. R. M. Johnston has carried on the subject with that zeal, industry, and accuracy which are characteristic of him. I believe he has discovered several new species. In reconsidering the whole subject, some new place will probably have to be found for the species which I described as *Ampullaria tasmanica.* (*Proceedings, for* 1876, p. 117.)

The *Limnea Hobartonensis* of my monograph, I find on comparison, to be quite undistinguishable from *L. peregra*, of Muller (*Vermium terrest. et Fluv. Leipsic*, 1773), one of the most wide-spread forms. An Australian habitat is, however, quite a novelty. We must suppose that it has been introduced from ships' water-casks.

I note further, that in my monograph the genus *Pomatiopsis* is by mistake printed *Pomiatopsis.*