

TRIGONIA ACUTICOSTATA.

This, the earliest discovered of the Tertiary species of the genus, was described by McCoy from specimens obtained from the Muddy Creek beds in Victoria, probably on the same geological horizon as those at Table Cape in which it has not yet been found. It has, however, in latter years, been reported by McCoy as living on the south-eastern coast of Australia, and it also occurs in Newer Tertiary strata at Mordialloc; Hobson's Bay; River Murray Cliffs, at the Nor'-West Bend; and at Aldinga Bay, St. Vincent's Gulf.

RHYNCHONELLA SQUAMOSA.

This palliobranch, common to the Older Tertiary of South Australia, Victoria, Tasmania and New Zealand, must now be catalogued among recent species, as I have no doubt that *R. nigricans*, var. *pixydata*, Davidson, in "Brachiopoda of the Challenger Expedition, t. 4, f. 14, p. 59, 1880," is its living representative.

The differential characters of the so-called variety *pixydata* are the more numerous scaly ribs (40 to 46), and the less transverse and comparatively more convex shell, characters upon which Hutton founded the species *R. squamosa*. As the differences are not mere individual variations, they must be regarded as of specific value, so largely supported by the facts of the present and past distribution of the two species.

R. squamosa, as an existing species, is known only in deep water off south of Kerguelen Island, and as a fossil in the Older Tertiary of South Australia, Victoria, Tasmania and New Zealand. *R. nigricans* extends in time from the oldest Tertiary formation to the recent epoch in New Zealand, and has not been found in association with *R. squamosa*, except in the Oamaru formation in New Zealand.

ON THE COMMUNITY OF SPECIES OF AQUATIC
PULMONATE SNAILS BETWEEN AUSTRALIA
AND TASMANIA.

BY PROFESSOR RALPH TATE, F.E.S., F.L.S., CORR. MEMB., ETC.

[Read June 9, 1884.]

LIMNAEA HUONENSIS (*Tenison-Woods*).

Tenison-Woods, in his paper on the freshwater shells of Tasmania (Proc. Roy. Soc., Tasmania, for 1875), describes four species of the genus *Limnaea*; but, subsequently (loc. cit., 1878, p. 72), he writes that "*L. Hobartensis* of my monograph, I find, on comparison, to be quite undistinguishable

from *L. peregra*;" and in the same volume, at p. 27, Mr. Johnston expresses the opinion that *L. Hobartensis* and *L. Launcestonensis* are merely varieties of the same species, while finally Mr. Petterd has stated that *L. Huonensis* is identical with *H. Launcestonensis* and that *L. Tasmanica* is the European *L. stagnalis*. Thus the four species of Tenison-Woods are reduced to two, considered to be identical to European forms, and at the same time the genus is erased from the Tasmanian fauna.

So far as regards one of the species, I protest against its absorption in *L. peregra*. Without a comparison with specimens named from the types, I am not sure of my identification, but the species, which I claim to be indigenous, is probably *L. Huonensis*.

Some years since I received from Mr. R. M. Johnston a few examples of a *Limnaea*, which fairly agree with the diagnosis of *L. Huonensis*, but when the validity of the species came to be challenged, I compared them with actual specimens of *L. peregra*, and though I could not concur with the opinion that they were identical, yet as my examples of *L. Huonensis* were few and imperfect, I could not assert with confidence an opinion to the contrary, and thus in my catalogue of Australian freshwater shells (Proc. Linn. Soc., N.S.W., vol. v., p. 552), *L. Huonensis* and the three other Tasmanian species are expunged from the list of endemic species. Since then, the question has been reopened by the discovery of the same species on our Continent in a locality that precludes the possibility of accidental introduction; to the better identification of the continental shell, Mr. R. M. Johnston has lately forwarded a sufficient number of examples of what is doubtlessly *L. Huonensis*, and the result of my comparison is that they are identical with that species and specifically distinct from *L. peregra*.

The new locality for *L. Huonensis* is on marshy ground, produced by the issue of freshwater from beneath the sand-dunes which line the margins of the backwaters of the estuary of the River Glenelg.

At this station, *L. Huonensis* has much the habit of *L. truncatula* of Europe, living at the water's edge or amidst the damp herbage; it is profusely abundant.

The very large number of examples examined permits to say that *L. Huonensis* is constant in its characters, which do not fall within the limits of variability of *L. peregra*. The European analogue of *L. Huonensis* is *L. peregra*, from which it may be distinguished by the almost obsolete fold of the columella, concealed by one thin and broad expansion; in the less oblique revolution of the whorls and in the more regularly pointed spire; also by the simple margin of its

aperture in front of the columella, which in *L. peregra* is slightly expanded and reflected.

AMPHIPEPLEA PAPYRACEA.

Reference.—*Limnæa papyracea*—Tate, Trans. Roy. Soc., S. Aust., vol. iii., p. 103, t. 4, f. 5, 1880. *Amphipeplea papyracea*—Tate, id., vol. iv., p. 140, 1881.

Among examples of *Limnæa Huonensis*, recently received from Mr. R. M. Johnston, I find three specimens of *Amphipeplea papyracea*. The association of the two species may serve to fix the station and locality of this addition to the fauna of Tasmania.

A. papyracea was originally described from dead shells obtained from a dried pool at Penola, S. Australia, but a year later it was taken alive in the Reedbeds, near Adelaide, and a study of the animal brought about the new generic appellation.

The species is now known to me, from samples sent by Mr. J. F. Bailey, to inhabit at Merrigum, Victoria.

GUNDLACHIA PETTERDI (*Johnston*).

This freshwater limpet, originally described from Tasmanian specimens, inhabits the hill-streams of the Mount Lofty Range, near Adelaide.

These are the first records of continental species of aquatic pulmonate snails living in Tasmania, and it is surprising that no other specific points of contact have been recognised. As regards the land snails, whose means of dispersal are limited, the distribution of whose species is so restricted, and correlatively presenting constant characters so much so that they are valuable factors in defining zoological provinces, there are seven or nine species in common between Tasmania and Australia. (See Tate, Trans. Roy. Soc., S. Aust., vol. iv., p. 73, 1881.) On the other hand, the aquatic pulmonate snails are in comparison easily dispersed, and their species exhibit great morphological variability, so much so that, as regards the commoner sorts, each hydrographic basin has its own *races*. There is, therefore, much reason to anticipate a larger community of aquatic species between Australia and Tasmania than we have, at present, knowledge of.

My personal experience of the limits of the continental species is most perplexing, and the difficulty of elaborating species increases as the area of observation is extended and the number of specimens is multiplied. Many so-called species, which have been defined on a few examples taken from local colonies, break down when the work of collecting and comparison has been carried out with due regard to

those embarrassing facts touching the mutability of species which have been gained by a wider experience.

A revision of the nomenclature of the freshwater shells of Australia is urgent, and I venture to offer my help in instituting a critical comparison of the Tasmanian species, *inter se* and with continental forms. For this purpose it is absolutely necessary that the collections submitted for examination be large and varied.

NOTES ON BORING OPERATIONS IN SEARCH OF COAL IN TASMANIA.

BY T. STEPHENS, F.G.S., ETC.

[*Read June 9, 1884.*]

The attempt which is being made, by means of the diamond drill, to test the question of the existence of deep lying seams of coal at Tarleton, on the Mersey, and near the Cascades Brewery, at Hobart, calls for some notice. The work is not yet so far advanced as to demand more than a brief statement of the circumstances under which it has been undertaken. It is probably pretty generally known now that the seam of coal which has been worked for many years past, in the Mersey district invariably underlies certain marine calcareous beds, the presence of which was formerly supposed to indicate that the base of the coal measures had been reached. This feature is absent from the coal measures of the Eastern and Southern districts, and all such evidence as is forthcoming leads one to suppose that the latter belong to a later epoch than those of the Mersey and other districts bordering on the North Coast.

To go fully into this question would require more time than I can command, and no definite conclusion can be arrived at until a reasonably complete series of specimens of the plant remains of the several formations is available for comparison and examination. For the basis of a provisional classification I will take the succession of rocks composing or associated with the coal measures of New South Wales, with which Tasmania has more in common than with any of the other Australian Colonies. The following is a rough outline of the order in which they occur:—

Triassic (?)	{	Wianamatta shales.	
	{	Hawkesbury rocks.	
Permian (?).....		Upper coal measures (Newcastle coal).	
Carboniferous	{	Upper marine beds.	
		Lower coal measures (Anvil Creek, Greta, and Stony Creek coals).	
		Lower marine beds.	
		Lower carboniferous, Port Stephens, etc. Plant and marine beds (without coal).	Plant