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).

Premising that the evidence is very incomplete, I may say that the coal measures of the South and East of Tasmania may probably be roughly classed with the upper coal measures; the marine beds of the Mersey with the upper marine; the Mersey coal with the lower coal measures; and the sandy and calcareous rocks with marine fossils, which occur near Hobart and in numerous localities on the South and East, as well as in the interior, with the lower marine beds of New South Wales.

In a paper read before the Royal Society, on the 8th July, 1873, I mentioned some of the circumstances which made it improbable that any lower seams would be found in the Mersey coalfield. Nothing, however, had been disclosed by mining operations which could be taken as conclusive evidence on this point, and, to set the question at rest, it was necessary to have recourse to other than private enterprise. The boring at Tarleton has not yet, so far as I can judge from casual reports, yielded any encouraging results; but this is no more than might have been expected, and the object for which the work was undertaken by the Government will not have been attained until a greater depth than 200 or 300ft. has been reached.

The first suggestion in reference to exploration for coal near the Cascades Brewery came from abroad. At a meeting of the Royal Society of New South Wales, Mr. C. S. Wilkinson, the Government Geologist, drew attention to a collection of fossils from the above locality, and remarked that as seams of bituminous coal and kerosene shale occur in formations containing these fossils in New South Wales, it was probable that coal might be found associated with them in Tasmania. An opinion from so eminent an authority necessarily carries great weight, but it is right to say that Mr. Wilkinson spoke from an examination of the fossils alone, and had nothing before him to show whether they came from rocks corresponding with the upper marine, or with the lower marine beds of New South Wales.

The Government having been urged to test the question of the existence of seams of coal near Hobart, at a greater depth than had been reached in the workings at New Town, Mr. F. M. Krausè, F.G.S., of Ballarat, was engaged to report on the subject. After carefully examining the New Town coalfield, and ascertaining that the lower part of the series was already exposed in natural sections, Mr. Krausè selected two spots in the underlying marine formation, at one of which the diamond drill has been at work for some months. Supposing that Mr. Krausè's theory as to the age of the New Town coal measures, and that of the marine beds, which latter he classes as *dyas*, is correct, there are reasonable

grounds for expecting that true coal measures may be met with below, though at an unknown depth. If, on the other hand, I am right in classing our Southern marine formations with the lower marine beds of New South Wales, the probability is that no coal will be found underneath them, and I am inclined to think that their thickness is to be measured by thousands rather than hundreds of feet.

The Minister of Lands (the Hon. N. J. Brown) has kindly promised to present to the Museum a complete series of specimens obtained from the borings at Tarleton, and the Cascades, when the whole question can be more fully discussed.

DESCRIPTION OF A NEW SPECIES OF VITRINA FROM THE TRAVERTIN BEDS, GEILSTON.

By Robt. M. Johnston, F.L.S., Etc.

[*Read June* 9, 1884.]

Vitrina Barnardii (*n. s.*).

Shell minute, depressed, auriform; whorls $2\frac{1}{4}$, rapidly increasing; surface irregularly rugosely striate towards peristome; peristome simple, right margin slightly dilated forward; columella concealed, but, evidently, resembles the living *V. Verreauxi* in this as in other general characteristics. Greatest dia., 8mil.; least, $5\frac{1}{2}$mil.; depth, 3mil. Travertin Beds, Geilston (one specimen).

The above fossil shell differs from *V. Verreauxi* in being much smaller and in being more depressed. The whorls, relatively, increase more rapidly, and the surface markings are more rugose. It is associated with *Helix Tasmaniensis*, *H. Huxleyana*, *H. Geilstonensis*, *H. Sinclairi*, and *Bulimus Gunnii* in the lower beds of the Travertin.

I have named this shell in honour of our worthy vice-president, Mr. Barnard, who, for many long years, has taken a most active interest in all matters relating to the progress of the natural history of this island.

It is somewhat singular that remains of freshwater shells should not have been discovered hitherto in these freshwater deposits. It would seem that the waters, during the time the lower Travertin beds were being formed, were unfavourable to animal life*; and that the remains of land animals, found hitherto in such abundance, were carried to their present position by a stream draining the land slopes in the immediate neighbourhood.

*See "Discovery of Entomostraca in the upper members," in following paper, as proof that the upper members of the deposit were at least favourable to the life of a species of cypris. R. M. J.