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Family BELLEROPHONTIDÆ.

Genus *Bellerophon*, *De Montfort*, 1808.

(Conch. Systématique, I., p. 51.)

BELLEROPHON CRESSWELLI, *sp. nov.*

(Pl. xix., figs. 6–8.)

Sp. Char.—Shell globular, but little compressed at the sides, carinate, the mouth expanded, more so transversely than vertically. Whorls five or six, the inner concealed by the body whorl, which expands rapidly. Mouth rhomboidal; outer lip rather thickened above, increasing at the sides, the thickened edge rounded or bevelled slightly outwards; inner lip much reflected, forming a deep callosity; band raised and flattened, narrow, bordered by fine keels; sinus long and narrow, rendering the outer lip slightly emarginate in the middle line; umbilicus probably a little open. Sculpture of irregular, fine, transverse laminae of growth, but without spiral lines, and in consequence the surface unfenestrate.

Obs.—A *Bellerophon* without specific name is recorded by Mr. Cresswell, and I find much pleasure, therefore, in associating his name with this shell. *B. cresswelli* resembles in general form and sculpture *B. squamosus*, Lindström,* from the Wenlock rocks of Gotland, but differs from that species in the outline of the mouth, the lips less reflected, the sculpture is finer, and the surface unfenestrate.

A MUCH-THICKENED VARIETY OF *BULIMUS BIVARICOSUS*, GASKOIN, FROM LORD HOWE ISLAND.

BY R. ETHERIDGE, JUNR.,

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(Plate xx.)

IN the general Zoology of Lord Howe Island,† I applied the varietal name *solida* to a peculiar form of *Bulimus bivaricosus*, Gaskoin, one of the most characteristic species in the land molluscan fauna of the island in question. In the living state, there are already known two well marked varieties *Bulimus cunicul-insulæ*, Cox,‡ and *B. etheridgei*, Brazier,§ the former being less in size, the latter with a much thinner shell than the species in chief.

* Sil. Gastropoda and Pteropoda of Gotland, 1884, p. 78, t. 5, f. 17–24.

† Lord Howe Island, Its Zoology, Geology, and Physical Characters, *Mem. Austr. Mus.*, No. 2, 1889, p. 27.

‡ Proc. Zool. Soc., 1872, p. 19, t. 4, f. 3.

§ Lord Howe Island, *loc. cit.*, t. 5, f. 1, 2, 7, 8.

The variety now about to be described was referred to in the following words:—"This variation in the thickness is carried to the extreme condition in the sub-fossil examples of *B. bivaricosus*, in which the shell becomes thickened to an enormous extent, but in this case even gradations can be traced to the existing condition of the species. This variety I purpose calling *B. bivaricosus*, var *solida*."

Placostylus, Beck, is usually adopted by authors as a section* of *Bulimulus*, but I am quite in accord with others† who use the term in a full generic sense. The characters of the lingual ribbon, are I think sufficient grounds for this, and that this portion of *Bulimus bivaricosus*, Gaskoin, supports such a view will be amply demonstrated by Mr. Charles Hedley in his descriptions of the Lord Howe Island land shells.

Genus Placostylus, Beck.

PLACOSTYLUS BIVARICOSUS, *Gaskoin, sp.*

var. SOLIDUS, *Eth. fil.*

(Plate xx., figs. 1 - 7.)

Bulimus bivaricosus, Gaskoin, Proc. Zool. Soc., 1854, XX., p. 152, t. 29, f. 4 and 5.

Bulimus bivaricosus, var. *solida*, Eth. fil., Mem. Austr. Mus., No. 2, 1889, p. 27.

Var. Char.—Shell larger than the species proper, thick, and to some extent rugged from the roughness of the oblique semi-imbri-cating sculpture, which irregularly crenulates the edges of the sutures. Spire relatively longer, and to some extent more acute; sutures at times somewhat channeled; last whorl more inflated. Peristome enormously thickened, the callosity extending between the outer and pillar lips across the body of the whorl in a very marked manner, exposing many concentric laminae of growth, the outer edge of such thickening often projecting like a vaxex; inner edges of the lips sinuous and sometimes deeply emarginate, or channeled at the anterior and posterior ends of the peristome, the latter more or less sharply angled; callosity of the pillar lip rising into tubercles, usually well pronounced, opposite the anterior emargination and posterior angle of the aperture, the posterior tubercle being the largest.

Obs.—The above characters are, to a very much less extent, visible in some one or other of a large assemblage of the species proper, but in the var. *solidus*, all are of a very pronounced nature, so much so, that had these shells been met with in an older fossiliferous formation, they would at once have been erected into a separate species. No doubt there is a tendency to occasionally

* Fischer, Man. Conchyl. et de Pal. Conchyl., 1887, p. 474.

† Hutton, Trans. N. Zealand Inst., 1881, xiv., p. 152.

thicken the shell in some living examples, in fact one such is before me; but the extent to which this extra-secretion of lime proceeds is not often met with in recent specimens of *P. bivaricosus*. The most marked differences, however, between the latter and var. *solidus* lie in the peristome, where the outer and inner lips broaden, exposing repeated laminae of growth, the callosity on the body whorl thickens greatly, supporting strong tubercles and emarginations, whilst a roughening of the surface occurs on the outer, almost amounting to an immature denticulation, and the posterior angle of the peristome becomes much more acute, and is deeply channeled. Great variability is also noticed in the state of the umbilicus, this aperture in some cases becoming completely closed and overlapped by the spreading laminae of the pillar lip.

The similarity of the var. *solidus* with some New Caledonian recent and fossil species, and a sub-fossil form from the Loyalty Islands is very marked, and demonstrates the fact that it must be regarded as a link between *P. bivaricosus*, on the one hand, and such species as *P. caledonicus*, Petit, and *P. porphyrostomus*, Pfeiffer, on the other. In both the latter the entire peristome is similarly thickened, the outer lip has a marked emargination or channel on the inner margin, more especially in *P. caledonicus*, whilst the pillar lip exhibits in both, an equally well marked, if smaller, callosity, and what is not visible in var. *solidus*, a deep emargination. Lastly, the twisting of the pillar lip seen in both the New Caledonian species is also faintly marked in some specimens of var. *solidus* from Lord Howe Island. Similar features are also traceable in the allied species *P. alexander*, Crosse, and *P. souvillei*, Morelet. There is, however, one marked difference between all these shells and *P. bivaricosus*, var. *solidus*, the much rounder anterior margin of the peristome, and absence of the channel so characteristic of the posterior.

Another ally of our species is *P. bovinus*, Brug.,* from New Zealand, more particularly in the modified presence of this anterior channel, and in the irregular inner margin of the outer lip, which it will be remembered was above dwelt on as a character as the Lord Howe Island fossil.

Mr. H. Crosse has proposed† a triple sub-division of the auriculiform mouthed *Bulimi*. The first section is *Placostylus*, as typified by *B. fibratus*, Martyn, *B. caledonicus*, *B. alexander*, *B. souvillei*, &c., in which the peristome is thick, the pillar lip (columella) twisted, and the callosity of the body whorl supporting a tubercle. The second section is *Placostyli* without a tubercle on the callosity, and a plain columella, typified by *P. bovinus* from New Zealand, and *P. bivaricosus* of Lord Howe Island, &c.

* = *P. shongii*, Lesson.

† "Étude critique sur les *Bulimus auriculiformes* de la Nouvelle Calédonie et des Terres voisines," *Journ. Conchyl.*, 1864, XII., p. 107.

The third section does not concern us, and need not be further referred to.

Now, it will be at once seen that the characters of the peristome as displayed in var. *solidus* will tend to place this shell in the first rather than the second section, which is strengthened by the fact that living examples collected by myself and Colleagues do show a tendency to a twisting of the columella.

Equally remarkable is the affinity of *P. bivaricosus* var. *solidus* with the heavy and fine fossil species *P. senilis*, Gassies,* and *P. subsenilis*, Gassies,† from New Caledonia. These are apparently a ponderous edition of the local shell *P. caledonicus*, enormously thickened in a similar manner to our var. *solidus*, only more so. The outwardly reflected peristome is very thick and laminated, the outer lip bearing a similar emargination to var. *solidus*. The tubercle on the callosity is equally proportionately larger, but there is again the difference, in the form of the anterior outline of the mouth, which is rounded and almost effuse rather than angular, and there is no anterior channel.

My colleague, Mr. J. Brazier, to whom I am indebted for the loan of specimens of *P. senilis*, has also communicated two fossil *Placostyli* from Mare Island, Loyalty Group, collected by himself. These show precisely the same thickening of the shell, and in particular of the peristome. To me they appear to have a closer relation to *P. caledonicus*, than to either *P. senilis*, or the local species known at the Loyalty Group, *P. edwardsianus*,‡ although they have the posterior portion of the peristome inflated as in the last named, rather than contracted to some extent as in *P. caledonicus*. Mr. Brazier met with this shell in the sand beds accompanying the coral-rock of the island at the time this was being quarried by Missionary Jones for use in the building of his Church.

In the "Geological and Physical Structure of Lord Howe Island,"§ I drew attention to facts tending on the one hand to prove a former union of that island with New Zealand, and on the other an extension northwards, and perhaps also in a north-easterly direction, of this same old land, chiefly deduced from soundings. Our knowledge of the conformation and physical features of land formerly existing in the South Pacific is but in its infancy, and it will be particularly interesting to ascertain in the future, if other portions of the fauna of either New Caledonia or the Loyalty Islands, confirm the indication of this land extension and continuity in their direction also. It must not be forgotten

* Faune Conchyl. Terr. et Fluvio-lac. Nouv.-Calédonie, 1871, Pt. ii., p. 63, t. 4, f. 2.

† *Ibid.*, 1880, Pt. iii., p. 39, t. 2, f. 1.

‡ Gassies, *loc. cit.*, 1871, Pt. ii., p. 63, t. 4, f. 2.

§ Mem. Austr. Mus., No. 2, 1889, p. 122.

that *P. bivaricosus*, and the other species, herein touched on, do not resemble any of the *Bulimi* of New Guinea so far as known.

Placostylus is not known to occur on Norfolk Island; and considering the position of the latter between New Zealand, Lord Howe Island, and New Caledonia, with the numerical preponderance of *Placostylus* where it is found, we are afforded further food for reflection on this important subject.

It is interesting to note that the geological occurrence of *P. senilis*, Gassies, in the Isle of Pines and Koutoumo Island, New Caledonia, is very similar to that of var. *senilis* at Lord Howe Island, in a sand-rock overlying an upheaved coral reef, and inferior to the present surface soil of the islands.*

In the course of these investigations I have been assisted with several important suggestions by Messrs. J. Brazier and C. Hedley, which have led up to the views enunciated.

THE LAND AND FRESH-WATER SHELLS OF LORD HOWE ISLAND.

By C. HEDLEY, F.L.S.

(Plates xxi. - xxii.)

IN the Memoirs of the Australian Museum, No. 2, "Lord Howe Island," a sketch will be found on pp. 22 - 30 of the molluscan fauna of the island, illustrated by plates 4 and 5, which were, by an unfortunate accident, reversed. Stress of professional duties has prevented Mr. Brazier from completing this outline by detailed descriptions of the species there enumerated, and, greatly to the disadvantage of conchological science, that portion of the work dealing with fluviatile and terrestrial shells is now undertaken by the present writer.

On glancing over the species inhabiting the island, the most noticeable feature is that they are all endemic, while the absence of ubiquitous species like the *Truncatellæ* indicate that further search would augment the roll. To the eye of an Australian student the types are unfamiliar, and old acquaintances are conspicuous by their absence. Here, the operculates are largely represented, in Australia they are a foreign intrusive element confined to the north-east border, where they increase with every degree of latitude as Torres Straits are approached. Neither are

* Gassies, *loc. cit.*, Pt. ii., p. 67.

EXPLANATION OF PLATE XX.

Placostylus bivaricosus, Gaskoin, sp., var. *solidus*, Eth. fil.

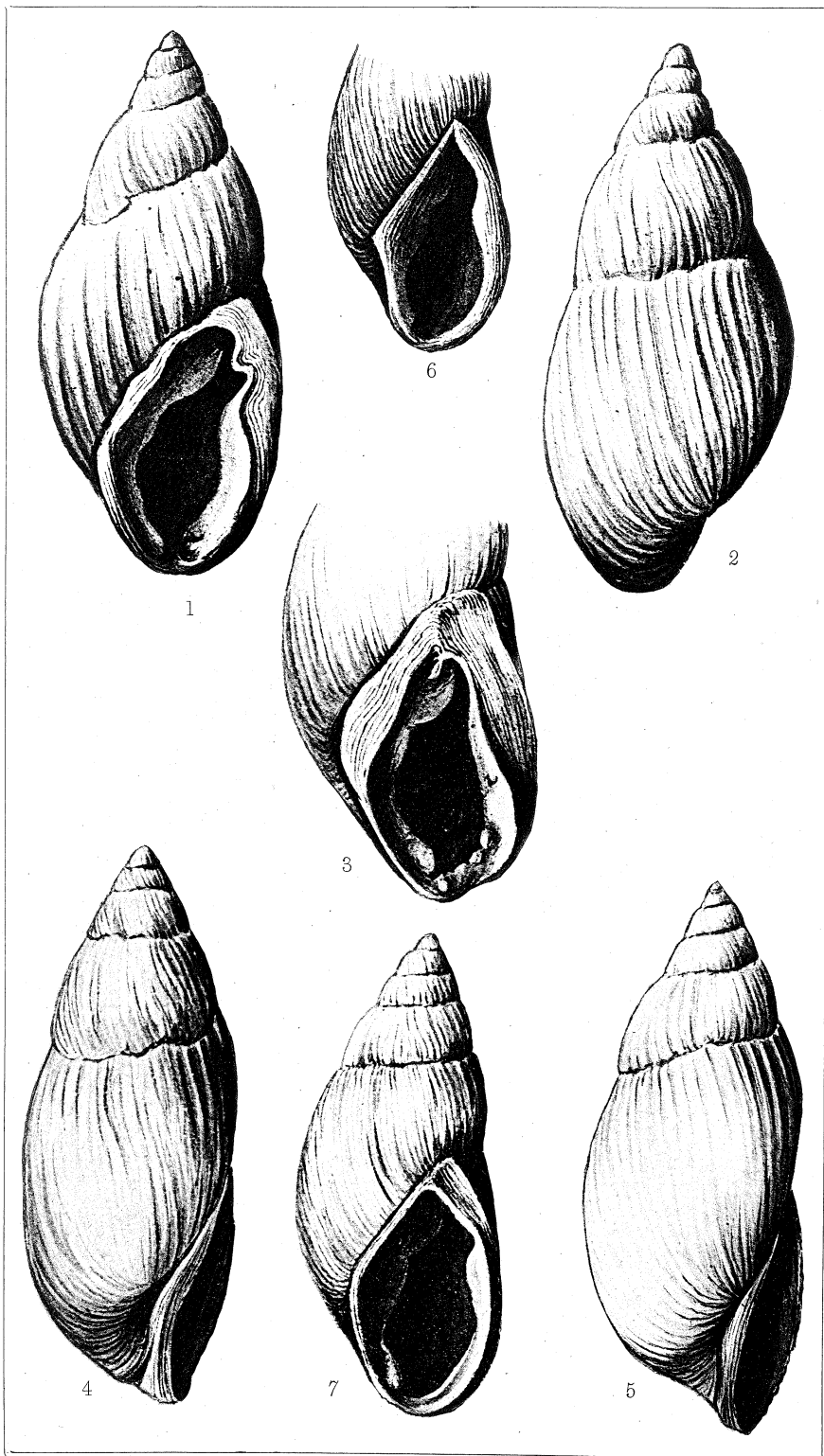
- Fig. 1. Front view of a much thickened individual, with the emargination on the inner edge of the outer lip acute, the posterior channel well marked, and the tubercle of the callosity obtusely rounded.
- „ 2. Back view of the same specimen, showing the coarse sculpture and irregularly crenulated sutures.
- „ 3. Peristome and portion of the last whorl of a thicker-shelled individual, the emargination of the outer lip is shallow, but the tubercle very prominent, the false denticulation on the posterior margin very apparent, and the thickened margins with concentric laminae equally so.
- „ 4. Side view of the entire specimen Fig. 3, with the umbilicus partially disclosed.
- „ 5. Side view of a somewhat less thickened example with the umbilicus practically closed.
- „ 6. Peristome and portion of last whorl of a much smaller specimen from the Sand-dunes, with the general varietal characters marked in less degree, but showing a tendency towards a twisted columella.

Placostylus bivaricosus, Gaskoin, sp.

- Fig. 7. A recent example showing a transition towards the var. *solidus*, and the twist in the pillar or columellar lip more marked than in Fig. 6.

Figs. 1 - 5 from the Coral-sand Rock ; Fig. 6 from the Sand-dunes
Fig. 7 Recent.

[From drawings by Mr. G. H. Barrow, Australian Museum.]



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CORRIGENDA.

Records, I., No. 7, Explanation of Plate xx.

Fig. 1, Line 2, for *posterior* read *anterior*.

,, 3, Lines 3 and 4, for *posterior* read *anterior*.