

## CORRESPONDENCE

### ANTIQUATONIA MOLARUM NOM. NOV. PRO PRODUCTUS ROTUNDUS GARWOOD

SIR,—Muir-Wood and Cooper (1960, p. 271) having shown that *Productus rotundus* Garwood, 1913 (p. 569, pl. li, figs. 3a, b), a species referred by them to the genus *Antiquatonia* Miloradovich 1945, is preoccupied by *Productus rotundus* Pander, 1830 (p. 85, pl. xxi, figs. 6a–d), the name *Antiquatonia molarum* is here substituted for the former (*molae*, feminine plural, a mill, in reference to Fawcett Mill, Shap District, Westmorland, whence Garwood described his species).

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### REFERENCES

- GARWOOD, E. J., 1913. The Lower Carboniferous succession in the north-west of England. *Quart. Journ. Geol. Soc.*, lxxviii, 449–582.  
MUIR-WOOD, H., and COOPER, G. A., 1960. Morphology, classification and life habits of the Productoidea (Brachiopoda). *Geol. Soc. Amer., Mem.* no. 81.  
PANDER, C. H., 1830. *Beiträge zur Geognosie des russischen Reiches*. St. Petersburg.

### INHALANT AND EXHALANT FEEDING CURRENT SYSTEMS IN RECENT BRACHIOPODS

SIR,—In his recent article on feeding mechanisms of spire bearing brachiopods Dr. M. J. S. Rudwick (1960) divided spirolophes into two groups, one possessing an inhalant filter feeding current-system and the other characterized by an exhalant system. He noted (pp. 380, 381) that the exhalant type is unknown in living brachiopods. In subsequent correspondence Professor Alwyn Williams (1960, p. 516) considered that the absence of an exhalant system in any living species may reflect a fundamental disadvantage of the system and reiterated his views on the deuterolophous nature of the atrypaeid and spiriferoid lophophore.

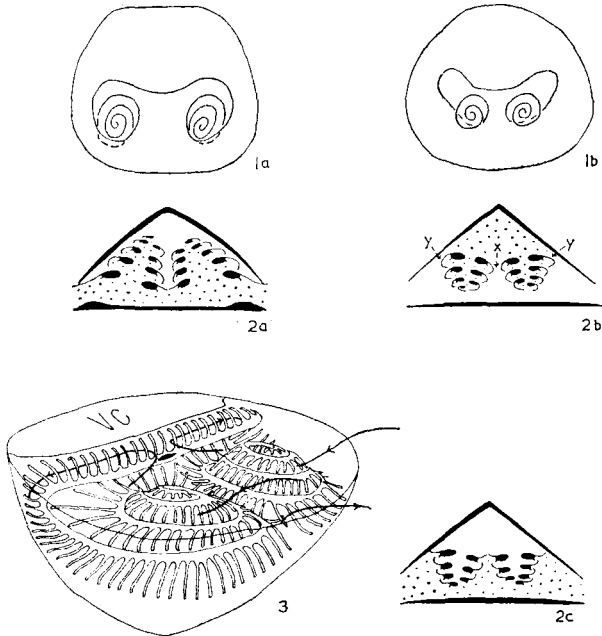
It is not the purpose of the present communication to enter into the discussion on the nature of the lophophores of fossil spire bearers or into the vexed question of the function of the jugum, but to consider the probable nature of the current system of the recent genus *Discinisca* and its implications.

As Rudwick and Williams rightly point out an exhalant system has not been noted in any recent genus and from what is known of the morphology of other recent articulate genera which have not been examined experimentally, such a system is unlikely to occur. This does not appear to be the case in the inarticulate genus *Discinisca*, which is represented in the sea to-day by several species. The gross morphology of the lophophore of this genus is known in some detail through Blochmann's studies (1900), but the lophophore has not been examined functionally.

From Blochmann's figures and description it is seen that the lophophore of *Discinisca* is spirolophous but differs from that of *Crania* in having the apices of its cones ventrally directed (cf. figs. 1a, 1b). As in the case of *Atrypa* and *Spirifer* described by Rudwick this difference is more fundamental than it might appear initially. Looking up the left spirulum from its base towards the apex, the lophophore is coiled anti-clockwise in *Crania* and clockwise in *Discinisca*. Thus *Discinisca*, in terms of its direction of coiling of the lophophore, belongs to Rudwick's "*Spirifer* group."

Rudwick (p. 373) has shown that the filaments of the left brachium, when viewed along the brachial axis towards the tip of the brachium, filter in a clockwise direction and those on the right brachium in an anti-clockwise

direction. The water always flows from the brachial lip across the groove to the filaments. He has stated (p. 376) that for an efficient filter feeding system the filtered and unfiltered water must be kept separate and that distinct exhalant and inhalant chambers must be formed. He has then assumed that fossil spire bearers had such an efficient system, an assumption which appears justifiable in view of what is known of the feeding mechanisms of recent brachiopods.



TEXT-FIG. 1.—Diagram of dorsal valve of (a) *Crania anomala* to show dorsally directed lophophore spires. (b) *Discinisca lamellosa* to show ventrally directed lophophore spires.

TEXT-FIG. 2.—Transverse sections to show filter feeding systems (a) *Crania anomala* (Rudwick, 1960), (b) *Discinisca lamellosa* reconstructed with inhalant system (c) *Discinisca lamellosa* reconstructed with exhalant system. Unfiltered water stippled.

TEXT-FIG. 3.—Diagrammatic view into dorsal valve of *Discinisca lamellosa* to show disposition of filaments when reconstructed with an exhalant filter feeding system. Only one row of filaments shown. Arrows indicate direction of currents. VC—visceral cavity.

Applying Rudwick's assumption to the lophophore of the recent *Discinisca* it is seen that two possible reconstructions can be made. The filter feeding current-system could be inhalant (Fig. 2b) with the filaments of the proximal whorl extending onto those of the whorl beneath, or it could be exhalant (Fig. 2c) with the filaments of the proximal whorl extending to the dorsal mantle and the space between the proximal whorl and the whorl beneath closed by filaments from the latter whorl. Reconstruction 2b does not produce an efficient inhalant system since the separation of inhalant and exhalant chambers is incomplete at X and Y. In *Crania* (Fig. 2a), these spaces are closed by

filaments as the lophophore is coiled into dorsally instead of ventrally directed spirals. Thus on the grounds of functional necessity for an efficient filter feeding current-system the recent inarticulate *Discinisca* should possess an exhalant system. The filaments in such a system could be arranged as in fig. 3. The filaments of the proximal part of the lophophore flexed ventrally to touch the anterior body wall, forming a tunnel to conduct that part of the exhalant water, which has passed through these filaments to the main exhalant chamber in the spirals.

Cases when scientific method can be applied rigorously in palaeontology are perhaps rather rare, but this would appear to be one such case. The theoretical conclusion that *Discinisca* possesses an exhalant system is capable of being verified by direct observation on the living animal when material becomes available. If it does possess an exhalant system it will strengthen the value of Rudwick's hypothesis for fossil spire bearers with spirolophous lophophores. It will not of course prove that fossil spire bearers had spirolophes rather than deuterolophes.

## REFERENCES

- BLOCHMANN, F., 1900. Untersuchung über den Bau der Brachiopoden. Zweiter Teil. Die Anatomie von *Discinisca lamellosa* (Broderip) und *Lingula anatina* Brugière. 69-124. Taf. vii-xix. Jena.
- RUDWICK, M. J. S., 1960. The feeding Mechanisms of Spire-bearing Fossil Brachiopods. *Geol. Mag.*, xcvii, 369-383.
- WILLIAMS, A., 1960. Feeding Mechanisms of Spire-bearing Brachiopods. *Geol. Mag.* xcvii, 514-516.

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## ORIGIN OF ALBITE PORPHYROBLASTS

SIR,—In his paper on the "Origin of Albite Porphyroblasts in Rocks of the Ben More-Am-Binnein Area", in the January-February issue (*Geol. Mag.*, 98, 41-55), Dr. Jones has misrepresented, to an extent worth correction, the conclusions which I drew from work on albite gneisses in this area and elsewhere in the Dalradian some time ago (Trendall, 1953).

First, a minor point on page 43: Dr. Jones is confusing my views with Reynolds' in the sentence "The origin of the porphyroblasts was considered by Trendall to be due to a soda metasomatism, possibly from a trondhjemitic magmatic source." I thought the most likely source of soda to be a migmatite, similar to those of Belmullet and Foxford in Ireland and Cromar and Glen Shee in Scotland, underlying the crestral area of the Cowal anticline.

On page 51 I am quoted as an authority for the assertion that the albite schists are confined "to the Ben Ledi Grit Group, both in the present area and in the rest of the South West Highlands and Co. Mayo". On the contrary, I wrote: "In the Dalradian of North Mayo albite schists occur throughout a great thickness of Dalradian rocks whose correlation with the Standard Perthshire Succession is uncertain, but which are likely to lie below the Loch Tay Limestone, and possibly extend downwards as far as the Schiehallion Boulder Bed. There is no suggestion that in Mayo the albite schists are confined either to (i) Ben Ledi Grits or their equivalents, or (ii) rocks which may have contained abundant felspathic grits."

Dr. Jones fails to make clear where his views differ from mine, and does not in fact suggest any origin for the albite porphyroblasts, except to agree with Reynolds and myself that "sodium was introduced from an extraneous source by a large scale metasomatism". He proposes, it is true, that "the formation of albite schists is an integral part of the regional metamorphism" but suggests that most of the soda "arose as the result of a late regional