

## GERONTIC THICKENING IN RHYNCHONELLIDS

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ABSTRACT.—Internal characters of *Goniorhynchia boueti* have been studied by means of transverse serial sections. Two types of median septa have been observed. Microstructure of the shell wall has shown that they are not morphologically different.

**B**RACHIOPODS, like many other marine bivalved organisms, continue to secrete shell-forming material throughout life.



Williams (1956) in a recent paper has given an excellent description of the mechanism of shell secretion. In the early stages of development, shell-forming materials help to increase the body-size (conventional length, width and thickness) of the animal. In old age, which may conveniently be called *gerontic stage*, the shell-forming materials, instead of producing any overall increase in the body size, help to produce thicker shell walls. As a result, the general shape and pattern of the internal structures are grossly distorted during the ontogenetic development of an individual.

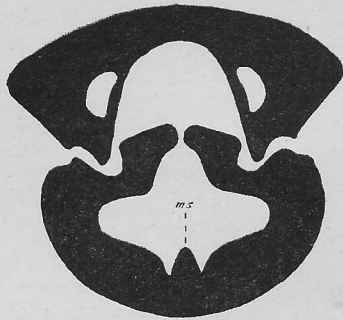
While working on a Jurassic rhynchonellid *Goniorhynchia boueti*, Davidson from the Boueti Bed, a thin calcareous clay in the Great Oolite Series in South England, the author came across two distinct types of median septa. Internal characters have been studied by means of transverse serial sections (Muir-Wood 1934, 1936).

In some individuals, the median septum appears as a triangle, which with progressive sectioning (from posterior to anterior) gra-

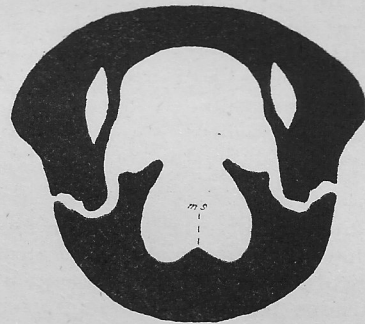
dually becomes smaller in size and ultimately disappears. In others the median septum is more rounded in section, increasing anteriorly to its maximum size and then becoming thinner and finally disappearing. These two types of septa are shown in Pl. 43. fig. 1b which shows the triangular type, while fig. 1a shows the more rounded form. (It may also be noted in fig. 1a, that other internal structures, such as hinge plates have also been distorted due to gerontic thickening). In general, these two types may appear to show different morphological features, but study of the microstructure of the shell-wall has shown that this is not so.

Micro-photograph of transverse sections of the different median septa are also shown in Plate 43. There it can be seen that the rounded condition (Plate 43 figs. 2a and 2c) is merely a further development of the triangular form (Plate 43 fig. 2b) It is clearly seen that the individual in which the septum has acquired the rounded form has preserved the ghost-structure of its younger stage. The rounded form of the septum is interpreted, therefore, as merely a gerontic thickening of an originally triangular septum.

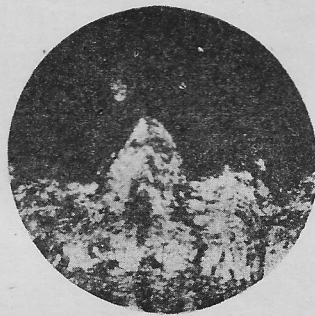
Mitra (1957) with the help of longitudinal sections along the plane of symmetry of the shell has shown that brachiopods having the same length may have very different values of thickness. Two individuals, having identical length, may be considered to belong to



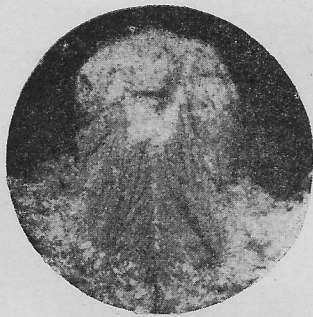
a1



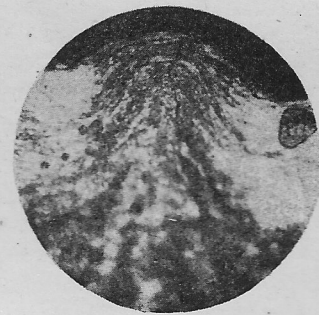
1b



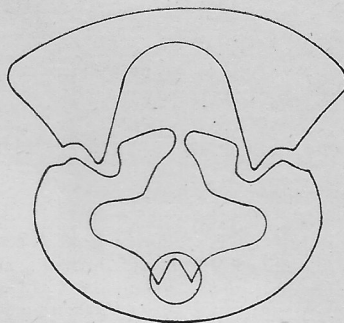
2b



2a



2c



3

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different age groups, according to the values of their thickness. The one having higher values of thickness, should be considered older than the other. This anomaly of thickness is confirmed in the present investigation, as the rounded form of median septum is frequently associated with the higher values of the thickness of the whole shell.

It is quite clear from the above investigations that gerontic thickening can distort and obscure the true picture of an internal character in transverse section, eventually giving a false impression of different morphological features. Such difficulties may be obviated by studying the microstructure of the shell-wall.

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## EXPLANATION OF PLATE 43

- Fig. 1—Transverse section of *Goniorhynchia boueti* at right angle to the plane of symmetry of the shell, showing internal characters.
- (a) Rounded form of median septum.
- (b) Triangular form of median septum.
- 2—Micro-structure of median septum. Each section is from different specimens. Mag. X20.
- (a) Section at 5.7 mm. from umbo, showing gerontic thickening around original triangular form.
- (b) Section at 5.5 mm. from umbo, showing triangular form of septum.
- (c) Section at 5.0 mm. from umbo, showing gerontic thickening around original triangular form.
- 3—Transverse section, showing general relation between the area magnified and other internal characters. Area within the circle has been magnified.