II.—*BALTOCERAS*, A NEW GENUS OF THE FAMILY ORTHOCERATIDÆ.

By GERHARD HOLM.

A NEW Cephalopodan species, *Endoceras Burchardii*, was described in 1880 by Dewitz,¹ who considered this species as a very typical *Endoceras*. A description and diagram of its ectosiphon is given in the introductory description of the siphon of *Endoceras* as an example of a typical *Endoceras*-siphon. In *Endoceras Burchardii* each septum, according to Dewitz,² forms a septal tube (funnel), extending backwards to the next septum, into the septal tube (funnel) of which a small part of it enters.

Rüdiger³ has also described this species as an *Endoceras*, and I have myself, on the authority of Dewitz, occasionally mentioned it under this name. Having had, however, many opportunities of seeing it in the island of Öland, where it is pretty common in the grey *Lituities* Limestone, I have long since been surprised to find that detached siphons of it—without reference to its size or its marginal position—far more resemble the siphon of an *Orthoceras* than that of an *Endoceras*, not only as to shape but also as regards substance and colour. Like a siphon of an *Orthoceras*, detached by weathering, it never shows any septal fractures,⁴ but immediately behind each septum there is a narrow, deep, groove-like contraction, sharply defined in front as well as behind. In figures 2 and 2a, taf. xvi, Dewitz, this can be seen very distinctly. Rüdiger, too, has noticed this siphonal form, so exceptional in an *Endoceras*, and describes it thus: “Die Erweiterung der Düten erstreckt sich über den ganzen Zwischenraum zweier Kammerscheidewände, so dass der Siphon nur an der Durchbruchsstelle der letzteren eingeschnürt erscheint und, isolirt, einer Reihe Semmeln ähnelt.” Nor does the weathered siphon consist of a firm shell-substance, but always presents itself more or less decomposed, the surface being of an earthy appearance, like that of an *Orthoceras*. Having commenced some time ago to prepare thin sections of a series of species in order to study microscopically the siphons of the Lower Silurian Cephalopods, I was deeply interested as I looked forward to the first section of *Endoceras Burchardii*, and I was not astonished to find its siphonal structure entirely different from that of *Endoceras*; instead, it was quite similar to the siphon of a species belonging to the group *Elliphoanoida*, Hyatt.

The following illustrations, Figs. 1 and 2, drawn from sections, show the structure of the ectosiphon. The septa, together with the short septal tube (funnel), consist of two layers; one thicker in the middle, of water-clear, colourless calc-spar, on both sides of which

¹ Dewitz, H., “Ueber einige ostpreussische Silurcephalopoden”: Zeitschr. d. Deutschen geolog. Gesellschaft, vol. xxxii (1880), p. 391, taf. xvi, figs. 2, 2a.

² Ibid., p. 371, fig. 1, “Schematischer Längsschnitt in der Mittelebene.”

³ Rüdiger, H., “Ueber die Silur-Cephalopoden aus den mecklenburgischen Diluvialgeschieben,” p. 29: Separatdr. aus Arch. der Freunde d. Naturg. Meckl. 1891.

⁴ Holm, G., “Om de endosifonala bildningarna hos familjen Endoceratidæ”: Geol. Fören. Förh., Bd. xvii (1895), p. 607.

there is a thin opaque layer of a light greyish-yellow colour. The septa, therefore, corresponding to the different layers, are white in the figures, with black boundary-lines. The wall connecting the

Endoceras Burchardii, Dew. The island of Öland, Grey *Lituities* Limestone.

FIG. 1.—Tangential section through the middle of the siphon. The plane of the section is not exactly at right angles to the middle plane of the conch, nor is it exactly parallel to the longitudinal axis of the siphon. The latter circumstance is the reason why the siphon appears to taper towards the distal end. Drawing after a photograph. Enlarged three diameters.

FIG. 2.—Section in the middle plane. Enlarged two diameters.

septal tubes (funnels) is of about the same colour and appearance as the outer layers of the septa (like them black in the figures). The loculi are filled with coarse-grained calc-spar; the siphon with the rocky substance. The septal tubes (funnels) are short, and extend only the fifth of the distance to the next septum, ending in a sharp edge. The intervening connective wall is thicker than the septa, opaque, sharply defined inwards, while the outside, even where the specimens are not weathered, is decomposed, having no even or clear-cut surface. At the posterior part it attaches itself to the inner side of the posterior septal tube (funnel); in the anterior part it encloses the outer side of the anterior septal tube (funnel). The strictures and the peculiar appearance of loose siphons is thus easily explained, as the siphon between the septal tubes (funnels) is easily removed from the enclosing stone and from the short septal tubes (funnels). The strictures are therefore impressions from the septal tubes (funnels).

In spite of its apparent resemblance to *Endoceras*—through the comparatively large and marginal siphon (diam. $\frac{2}{3}$ – $\frac{2}{5}$ of that of the conch)—it appears that the species above described, considering the structure of the ectosiphon, does not even belong to the same subdivision (*Holochaonoida*, Hyatt) of Nautiloidea as *Endoceras*, but has its nearest relations in the family Orthoceratidæ of the subdivision *Ellipochaonoida*, Hyatt. It follows that even within the latter family there must occur species with a large marginal siphon, although they have been overlooked on account of their apparent

resemblance to *Endoceras*-forms. It being impossible to refer these species to any genus hitherto described, *Endoceras Burchardii* may be considered as the type of a new genus. As a suitable name I propose *Baltoceras*, as the species of this genus appear in the Baltic Silurian. *Baltoceras Burchardii* (Dew.) is found in the Lituite Limestone in the island of Öland and in Dalarne, as well as in the corresponding horizon (Schicht C₁) of Esthonia, where I have discovered it at Kandel, and at Hirro, near Reval.

In the grey *vaginatum* Limestone in the island of Öland, and in Dalarne, I have found a closely connected form with perfectly identical structure of the ectosiphon, but with shallower loculi.

In this connection it may be mentioned that there is reason to suspect that *Endoceras*, nov. sp., and *Endoceras angustisiphonatum* of Rüdiger,¹ far from belonging to the genus *Endoceras*, in reality are some forms of *Orthoceras*, with marginal or submarginal siphon.

III.—ON A NEW SECTION IN THE MIDDLE LIAS OF LINCOLN.

By JOHN H. COOKE, F.G.S.

THE quarrying operations that have been carried out during the last five years at Handley's Pit, Lincoln, have led to the exposure of some very complete and instructive sections in the Middle Lias.

Handley's Pit is situate on the North Cliff, at a distance of about a furlong from the now disused pit of Glaisiers, and immediately below that of the Lincoln Brick Company (late Swan's). When compared with the sequence exposed in Swan's Pit, it affords some interesting details that assist materially in clearing up some of the doubtful points to which Mr. Dalton referred in the Geological Survey Memoir on Lincoln Geology² regarding the limitation of the range of *A. margaritatus*, and the occurrence of the Marlstone Rock-bed in the Lincoln District.

The general facies of the rocks exposed is a series of layers of arenaceous shales, clays, limestones, and ferruginous nodules, following one another rapidly and conformably, and having a dip of 5° E. and 30° N. The line of dip as shown in the fall of the section is, however, much distorted, a fact which is due partly to the presence of a number of small faults, and partly to the unequal shrinkage which the shales and clays probably underwent during the processes of lithification. The following is the sequence that the strata in this pit at present exhibit, the total thickness of which is 35 feet 3½ inches. (See p. 254.)

Many of these layers, however, are not persistent even over short horizontal distances, and hence it is that no two pits in the district offer the same sequence in their sections, and even in the same pit they vary as the work of excavation proceeds. Mr. W. D. Carr³ remarks that at Lincoln the "Marlstone Rock-bed is entirely absent," and

¹ Loc. cit., pp. 36-7, taf. i, figs. 5a-b; taf. ii, figs. 10a-b.

² Memoir of the Geological Survey, sheet 83, pp. 24 and 25.

³ W. D. Carr, "The Lincoln Lias": GEOLOGICAL MAGAZINE, April, 1883.