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On the fossil Cephalopoda constituting the genus Belemnoteuthis,
Pearce. By Mr. J. C. PEARCE, F.G.S.

SIR,

As you have copied from the Philosophical Transactions the figure of the Belemnite as restored by Prof. Owen, from his examination of the soft parts of Cephalopoda discovered at Christian-Malford, I beg leave to offer you a short statement of the facts which appear to me to oppose the conclusion, that these Cephalopoda are really the animals belonging to the well-known fossil bodies termed Belemnites.

A paper of mine "on the mouths of Ammonites, and on the fossils contained in laminated beds of the Oxford-clay, discovered in cutting the Great Western Railway, near Christian-Malford, in Wilts," was read before the Geological Society on the 5th of January, 1842. In the abstract of this paper, published in the Society's 'Proceedings,' the following passage will be found, having reference to the fossils since described by Professor Owen, as the soft parts of the Belemnite.—"The fossils obtained from the laminated clay, are stated to be * * * * * and an animal to which he (the author) has applied, since the paper was read, the name *Belemnoteuthis*.* In describing the last fossil, he states that the lower part is conical, blunt at the apex, and chambered internally like the alveolus of a Belemnite, with an oval siphunculus near the edge of the chambers: that it has a brown thick shelly covering, which gradually becomes thinner towards the superior part; that immediately above the chambers is an ink-bag, resting on what resembles the upper part of a sepiostaire, and composed of a yellow substance finely striated transversely, being formed of laminæ of unequal density; that in some specimens, broken longitudinally through the middle, are exposed long flat narrow processes of a different structure; that immediately beneath the superior contraction, are two long feather-like processes, and one or more which are short, indicating, the author thinks, probably the situation of the mouth."—'Proceedings of Geological Society,' 1841—2, page 592.

The specimens added to my collection since the above paper was communicated to the Geological Society, have furnished me with more ample materials for an examination of these fossils, and have confirmed me in the opinion that they are *not* Belemnites. Professor

* The generic appellation was suggested to me by Mr. J. E. Gray. I originally intended to propose that of *Belemnosepia*, but was informed that this name had been already applied to some other genus of cephalopods.

Owen was present when my paper was read, and the original specimens exhibited at the Geological Society, but in the *Philosophical Transactions* he omits any mention of this circumstance, and of the genus *Belemnoteuthis*, which I had founded upon the remains which he subsequently describes as the soft parts of *Belemnites*.

The following are the principal reasons which satisfy me that the *Cephalopoda* constituting my genus *Belemnoteuthis*, ought not to be regarded as *Belemnites* from which the guard has become detached.—

1st.—The chambered portion (phragmocone, *Owen*) in *Belemnoteuthis* is proportionately much shorter than in *Belemnites*; a crushed phragmocone associated with the guard of the species of *Belemnite*, represented at fig. 1, pl. 2, of Professor Owen's *Memoir*, measuring one inch across its widest part, will be at least one third longer than a phragmocone, of the same diameter, of *Belemnoteuthis*.*

2ndly.—The capsule of the phragmocone in *Belemnoteuthis* is thickest at the lower extremity or apex, and extends, in some of the larger specimens, an eighth of an inch below the chambers, becoming thinner as it approaches the *upper* portion of the phragmocone. The reverse of this is the case with phragmocones that are associated with *Belemnite*-guards, and in these the chambers extend to within a line of the apex, and the cone is terminated by a small oval body; the investing capsule is very thin, and between the phragmocone and sheath of the guard, there is nothing analogous to the thick covering which surrounds the apex of the cone of *Belemnoteuthis*, nor is there any cavity corresponding to the space which such a capsule must have occupied.

3rdly.—The *Belemnite*-guards which occur in the laminated clay, when broken, are invariably found to contain the apical chambers of the phragmocone, though the upper ones may be lost.

How is this fact to be reconciled with the generally complete state of the phragmocone in *Belemnoteuthis*, if we assume with Professor Owen, that *Belemnoteuthis* is a *Belemnite*, detached from its guard?

Lastly, although only negative evidence, still, in connexion with the evidence of a positive character that I have brought forward, the fact that so many specimens of the so-called soft parts of the *Belemnite*, with its phragmocone, have been found, and yet in every instance

* My collection contains a crushed phragmocone of *Belemnoteuthis* in its capsule, twelve inches long, indicating a length of 3 ft. 6 in. for the entire animal, judging from a comparison with the relative proportions of the cone and soft parts in perfect specimens.

without a guard, ought not to be lost sight of in weighing the balance of probabilities for and against the establishment of the genus *Belemnoteuthis*.

Since my communication on the subject to the Geological Society, I have added to my collection two specimens of greater interest than any which I was able to exhibit on that occasion. One of these (Pl. 15) has the external surface and all the parts quite perfect. The other (Pl. 16) displays a character not shown by any other specimen yet discovered that I am aware of, namely, the acetabula or suckers of the arms. It is strange that no trace of these organs should have been detected in other examples of *Belemnoteuthis*; for they are too large to be accidentally removed in the process of developing the arms from their matrix.

The acetabula exhibit their greatest development in the centre of each series, becoming smaller as they approach the basal and terminal extremities of the arms. Prof. Owen remarks that the hooks of the Christian-Malford cephalopods were doubtless developed from the horny hoops which encircled the caruncles of the acetabula, as in the modern *Onychoteuthis*, but in his restoration of the animal he represents it *without* acetabula, and with hooks disposed in pairs, though their arrangement is described by him as forming a "double alternate series."*

Examined under Mr. Bowerbank's powerful microscope, the capsule presented in its structure a great analogy with the structure of the *Belemnite-guard*, being composed of minute, radiating fibres. The economy of its greater thickness where it covers the apex of the cone, the reverse of what we observe in the capsule of the cone of *Belemnites*, will be understood when we bear in mind that the apex of the cone in the *Belemnite* is protected by the alveolus of the guard, while in *Belemnoteuthis* the absence of a guard necessitates a greater development of the material of the capsule. From the disposition of the muscular mantle, as shown in plate 15, over the upper part of the capsule of the cone, and from the invariable thinning of this portion of the capsule, it appears probable that in *Belemnoteuthis* the mantle did not envelope the entire shell, but only the upper portion, where it rendered a development of the substance of the capsule less necessary than in the exposed apex.

Should these few observations be thought worthy of insertion in the 'London Geological Journal,' I shall feel gratified at their admission

* Philosophical Transactions, pp. 73 & 77.

into a periodical which fearlessly throws open its pages to the demonstration of a most important though perhaps unpalatable truth, namely, that the progress of geological knowledge may be seriously retarded by relying too much upon the certainty of palæontological determinations that are given to us upon 'authority.'

With the warmest wishes for the success of your undertaking,
I am, &c.

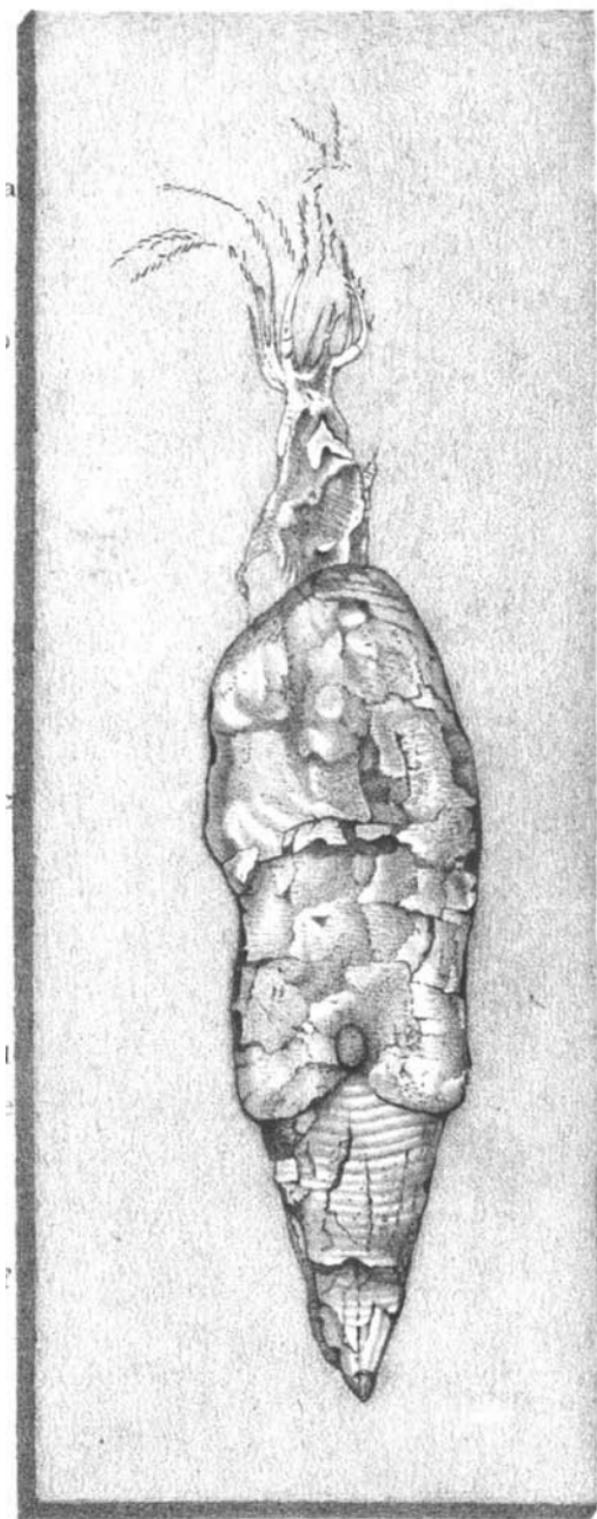
J. C. PEARCE.

Montague House, Lambidge, Bath,
January 13th, 1847.

To the Editor of the 'London Geological Journal.'

REFERENCES TO THE PLATES.

- Pl. 15, *a*. The hooks beautifully preserved in their natural position.
- b*. The arms, all of which are distinctly shown in this unique specimen. An attempt to develop the arms still farther from the matrix would remove the hooks.
- c*. External surface of muscular mantle, entire, showing the transverse fibrous structure.
- d*. Ink-bag covered with the mantle, but very prominent, and in its natural position, immediately above the first chamber of the shell.
- e*. Muscular mantle forming two festoons, and covering part of the capsule which contains the chambered shell.
- f*. Conical chambered portion, quite perfect, exhibiting the brown, external surface of the capsule, which has transverse, indented lines, showing the point of attachment of the thin edges of the plates forming the chambers.
- Pl. 16, *a*, *b*. The arms thrown out of their natural position, but displaying the acetabula and hooks in a very complete and beautiful manner.
- c*. Circular, fibrous bodies, probably belonging to the eyes.
- d*. Muscular mantle. The surface being removed, shows the central cavity stained with ink.
- e*. Muscular mantle extending over the surface of the chambered cone, on its under side, as shown in Pl. 15.
- f*. Chambered cone, exhibiting at the lower extremity the external surface of the thick, brown covering or capsule with which it is invested.
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Belemniteuthis antiquus, Pearce.

From the Oxford-Clay of Christchurch-Maliard, Wilts

