## 10. *On a* Fossil Octopus (Calaïs Newboldi, J. De C. Sby. MS.) *from the* Cretaceous *of the* Lebanon.

By Henry Woodward, LL.D., F.R.S., F.G.S. (Read January 22nd, 1896.)

[Plate VI.]

I am indebted to Mr. C. Davies Sherborn, F.G.S., for drawing my attention to a very remarkable and beautiful fossil from the Cretaceous formation of the Lebanon, Syria, obtained about 1846 by Lieut. T. J. Newbold, and presented by him to the Museum of the Geological Society, where it has since remained. In 1846 it attracted the attention of Mr. J. De Carle Sowerby, who evidently intended to describe it, 'at a more convenient season,' which never arrived; for he wrote upon it:—

'*Calaïs Newbouldii*' (read *Newboldi*). 'Ceph. Octopoda. *Genus ineditum. Abdomen alis triangularibus instructum.*

'*E strato calcareo tertiario Montis Libani a D.* (T. J.) *Newbo(u)ld effossum* 1846. J. De C. Sowerby.'

The only criticisms that I would venture to make upon this label are (1) that the stratum of limestone from the Lebanon, whence the fossil was derived, is not of 'Tertiary' but Cretaceous age; (2) that the specimen is marked in pencil on the back 'Major Newbold, Mt. Lebanon' (whose initials were 'T. J.'='Thomas John') not *D.*, and there should be no *u* in Newbold. He is spoken of in 1842 as 'Lieut. Newbold' (Proc. Geol. Soc. 1842, pp. 782–792), and by Murchison in his Presidential Address, Feb. 17th, 1843, as 'Lieut. Newbold, of the East India Company's service' (Proc. Geol. Soc. vol. iv. 1846, p. 137).

[In the 'National Biography,' 1894, pp. 314–315, Newbold is spoken of as one of the most accomplished officers in the East India Company's service. He was made a Lieutenant in 1834; and, while serving in Malacca, was Aide-de-camp to Brigadier-General E. W. Wilson, C.B. In 1840 he obtained leave and visited Egypt, Sinai, and Palestine, when he no doubt secured the fossil now under consideration. He was made a Captain, April 12th, 1842; but his later rank of Major is not mentioned by his biographer. He died at Mahabuleshwar on May 29th, 1850, at the age of 43 years. He wrote several important works on Indian Geology, on Egypt, the Sinaitic Peninsula, and Palestine, and he contributed 46 papers to various learned Societies.]

Prof. Lewis says, 'There are two principal localities for Cretaceous fossils known and recorded in the Lebanon, namely, Hâkel and Sahel-el-Alma, and a third of minor importance, called Hazhûla (Djoula on the French military chart), about 2 hours and a half south of Hâkel.

'Hâkel is the oldest known locality, though it has been but rarely visited. It is a long day's journey from Beirût, and is situated at about 800 to 1000 feet of elevation above the sea, and distant from the sea in a straight line about 6 miles.

'Sahel-el-Alma is nearer to Beirût, and may be visited from the

latter place in one day, with an allowance of two or three hours at the locality.

'The rock at Hâkel is somewhat harder than from Sahel-el-Alma, very fissile, and can be readily trimmed with the hammer.

'The section at Sahel-el-Alma is under the very walls of the old Convent, which gives its name to the spot; here, in a fig-orchard, outcrops the stratum of white chalky limestone where so many beautiful fossils have been obtained, and whence comes also the *Calaïs Newboldii*.'

The following is a brief summary of the bibliography of this classical locality:—

The existence of fossil fishes in the Lebanon is referred to in Joinville's 'Histoire de St. Louis'—edited by M. Natalis de Wailly. During the sojourn of the king at Sidon in 1253, just before his return home from the Crusades, a stone was brought him, says Joinville, 'which was the most marvellous in the world, for when a layer of it was lifted, there was found between the two pieces the form of a fish. The fish was of stone, but lacked nothing in form, eyes, bones, colour, or anything necessary to a living fish. The king demanded a stone and found a tench within.'

M. de Blainville described *Clupea brevissima* and *Clupea Beaurardi*, from Hâkel, in the Lebanon, in 1818.

Mr. Chas. Koenig, 1820, in his 'Icones Fossilium sectiles,' figured *Ophiura libanotica* and *Euryale Bajeri*, pl. ii. figs. 26 and 27, from the Cretaceous of the Lebanon.

Prof. L. Agassiz, in 1833–43 ('Poissons fossiles'), described two species of *Clupea* from Hâkel, and a *Sphyræna* and *Rhinellus* from Sahel-el-Alma.

Sir Philip Egerton added an account of *Cyclobatis* from Hâkel (Quart. Journ. Geol. Soc. vol. i. p. 225) in 1845.

Prof. Haeckel described two species of *Pycnosterinx* from Sahel-el-Alma, and a new species of *Clupea* from Hâkel, in 1849.

Mr. O. G. Costa described *Imogaster*, *Omosoma*, and *Beryx* in 1855.

In 1866 MM. Pictet and Humbert ('Nouvelles Recherches sur les Poissons fossiles du Mont Liban') described 26 species of fishes from Sahel-el-Alma and 21 from Hâkel.

(*Leptosomus macrurus*, described by Pictet and Humbert, Upper Cretaceous, Sahel-el-Alma, Mount Lebanon, is one of the fishes associated on the same slab with *Calaïs Newboldi*, the subject of this paper.)

Dr. Louis Lartet, in his fine memoir, 'Exploration géologique de la Mer Morte, de la Palestine et de l'Idumée' (1877), recorded, at p. 112, Class Cephalopoda. 1. Octopoda, '*Calaïs Newboldtii*,[1] Sow. Empreinte de Céphalopode dans les Calcaires à Poissons du Liban (Collection de la Société géologique de Londres).'

Lartet also mentions the remains of cephalopods of the family Sepiadæ from the same Cretaceous Limestone of the Lebanon (preserved in the Paris Museum).

[1] (The *t* in the specific name should be omitted.) 'Cette empreinte curieuse, très-bien conservée, a été recueillie par M. Newbold*t*.'

Prof. Dr. Oscar Fraas, in his work, 'Aus dem Orient,' 1878, pt. ii. (Stuttgart), figures and describes 28 species of invertebrata, echinodermata, mollusca, crustacea, etc., and 1 fish (*Gyrodus*) from the Cretaceous of Syria. He figures one dibranchiate cephalopod (*Geoteuthis libanoticus*) and 1 ammonite.

Dr. Fraas mentions that he saw in the collection of the Rev. Prof. E. R. Lewis, at the Syrian Protestant College, Beirût, a specimen of *Sepialites* with eight arms, of which he secured a photograph; and that Sowerby had long ago obtained from the Lebanon an *Octopus* collected by Mr. Newbold, to which he had given the name of *Calaïs Newboldi* ('Aus dem Orient,' ii. p. 90).

In the same year (1878) the Rev. Prof. Lewis, F.G.S., gave an interesting description of the Fossil Fish Localities of the Lebanon in the Geological Magazine (pp. 214–220).

In 1879 I described before this Society *Squilla Lewisii* and *Limulus syriacus* from the Lebanon Cretaceous (see Quart. Journ. Geol. Soc. vol. xxxv. pp. 552–556, pl. xxvi.).

In 1883 I described a new genus of fossil 'Calamary,' *Orateuthis syriacus*, from the Cretaceous of Sahel-el-Alma (see Geol. Mag. 1883, pp. 1–5, pl. i.).

In 1882 Mr. W. H. Hudleston, F.R.S., gave in his Presidential Address to the Geologists' Association an admirable account of the 'Geology of Palestine,' in which the geological horizon of the Hâkel and Sahel-el-Alma deposits is discussed, with a coloured map and a plate (Proc. Geologists' Association, vol. viii. 1883–84, pp. 1–53) (see also 'Further Notes,' Proc. Geol. Assoc. vol. ix. 1885, pp. 77–104).

In 1886 Prof. Dr. W. Dames published an account of ten genera and twelve species of crustacea from the Cretaceous of the Lebanon. Among them is one figured and described as *Protozoëa Hilgendorfi*, Dames, which is represented by three specimens on the slab which contains *Calaïs Newboldi* (Zeitschr. d. deutsch. geol. Gesellsch. vol. xxxviii. 1886, p. 577, pl. xv. figs. 5–7).

The fossil remains of *Calaïs Newboldi* are preserved as a delicate ferruginous impression upon the biscuit-coloured surface of one of the fissile slabs of Cretaceous Limestone from Sahel-el-Alma, Mount Lebanon.

The slab is $9\frac{1}{2}$ inches long by 8 in breadth and 1 in thickness, displaying remains of fossil organisms upon both its surfaces.

These consist of several small well-preserved fishes, *Leptosomus macrurus*, Pictet & Humbert, and a small crustacean carapace (believed to be a zoea-form) and named *Protozoëa Hilgendorfi* by Dames.

The *Octopus*, which occupies the centre of the slab, exhibits its eight arms (or more properly feet or 'podites'), each furnished with a row of suckers, which diminish in size gradually from their base to the very slender extremities of the podites. Near the union of the podites with the head, there is a faint trace of what

may have represented the umbrella, or 'web,' which once united the arms or podites together.

In the centre of the head (between the bases of the arms or podites) is a darker and denser spot of brown showing evidence of the beaks,—marking the position of the mouth; below this again is a small slightly-raised orifice, which probably marks the opening of the funnel. Two remains of fishes lie across the neck and separate the head and arms above from the round wrinkled body beneath, with its triangular fins, a feature which at once distinctly characterizes this genus.

An injudicious attempt to develop the two mutilated fishes, lying across the Octopod, has resulted in the unfortunate removal of a part of the thin and delicate layer on which the Nature-painting of *Calaïs* was preserved. In the centre of the body is an oval depression or cavity 8 mm. long and 4 mm. broad, once occupied by the ink-bag. The breadth of the body is 40 mm., and to the extremity of the lateral fins 64 mm.; height of fin 14 mm. Length of arms rather over 100 mm. Breadth of arm near the head about 5 mm., but diminishing rapidly to 4 and 3 mm., and terminating in a slender whip-like extremity.

There appears to be only a single row of suckers upon each arm, as in the genus *Eledone*, and about 30 suckers in each row. The suckers vary in size from 2 mm. in diameter to less than 1 mm. Some of the suckers seen in profile stand up as much as 2 mm. from the surface of the arm.

There is a faint trace of the presence of an umbrella, or web, uniting the bases of the arms around the mouth to a distance of about 15 mm. The arms were evidently very flexible, judging by the graceful curves which they have assumed even in death. They are also seen to be of nearly equal size and length, so far as can be ascertained.

As I have already stated, the triangular 'alæ,' or more properly 'fins,' are characteristic of *Calaïs*. S. P. Woodward ('Manual of the Mollusca,' p. 64) says of the Octopods, 'their bodies are round, and they seldom have fins.'

In *Pinnoctopus* the body has lateral fins united behind (ex. *P. cordiformis*). In *Cirroteuthis* the body has two transverse fins. In *Calaïs*, as we have seen, the body is round, but it is provided with triangular lateral fins (not united behind).

In the decapoda—cephalopods with eight arms and two tentacles, or, as they are often called, 'tentacular arms'—the body is oblong or elongated, and is always provided with a pair of lateral or nearly terminal fins.

*Sepiola* has rounded dorsal fins, but in very many genera the fins are terminal and often rhombic or angular.

The question of the position of the arms, whether uniform in size and freely-moving, or differing in size and position in relation to the dorsal and ventral aspect of the body, is of some importance even in studying these fossil remains.

Thus, for example, in his work, 'Aus dem Orient,' vol. ii. p. 90,

Dr. Fraas refers to a specimen which he had seen at Beirût in the collection of the Rev. Prof. Lewis; this showed the head of a sepialite with its eight arms close together, and, as he says, reminded him of the fossil forms from the Lias, figured and described by Quenstedt.

Dr. Fraas obtained a photograph of this 'sepialite' from Prof. Lewis, which was afterwards lent to Mr. G. C. Crick, F.G.S., who compared it with specimens obtained by the British Museum from the late Prof. Lewis, and was happily able to identify by its aid the original of Dr. Fraas's remarks.[1]

The specimen proves to be the head and arms of a decapod cephalopod allied probably to *Onychoteuthis*, showing the eight ordinary arms, but with only a faint trace preserved of one of the long tentacular arms.

The arms are close together and nearly straight, and are arranged in pairs. First there is a pair of slender and short dorsal arms, then two pairs of very stout and longer lateral arms, and, lastly, another pair of somewhat shorter and more slender ventral arms.

Plesioteuthis Fraasii, *sp. nov.*, *from the Cretaceous of the Lebanon.*

No suckers are visible on the arms, but there are traces of what appear to be hooklets and serrations in two or three places, so that, taken in connexion with the more rigid carriage of the arms and their arrangement in pairs, we may feel assured that this is not an octopod, like *Calaïs*, but a true Teuthid[2] and probably related to *Dorateuthis* (see Geol. Mag. 1883, pl. i. p. 1).

[1] The photograph was marked in pencil *Calaïs Newboldi*.

[2] If a name be desired, I would suggest for this sepialite the name of *Plesioteuthis Fraasii*, after the author of 'Aus dem Orient.'

Length of the largest arms 7 inches, of the shortest pair of dorsal arms 4 inches; the second or ventral pair of slender arms are 5 inches long. The head with the arms is nearly 10 inches in length. The beak is $\frac{3}{4}$ inch in length and $\frac{4}{12}$ inch broad at its base.

At present, so far as my information serves, *Calaïs Newboldi* remains the oldest and only known fossil octopod.

I have retained Mr. J. de Carle Sowerby's original name, it having been already recorded in print by Dr. Oscar Fraas and by Dr. Louis Lartet in their respective works already referred to.

The genus *Călăis* is derived from Călăis, the brother of Zetes (sons of Boreas and Orithyia), frequently called the Borĕădæ (mentioned among the Argonauts), and described as winged beings. [Smith's Classical Dictionary, 1883.]

## Postscript.

The genus *Dorateuthis*, proposed by myself in 1883, is by Zittel included in the genus *Plesioteuthis* of A. Wagner (1860), which has also a tricarinate internal pen with a spatulate distal expansion.

There are now in the British Museum (Natural History) as many as ten Teuthidæ,[1] the largest of which is 20 inches in length, and exhibits the body, head, and arms in union. The smallest is not so large as *D. syriacus*, H. W. (1883). They all possess tricarinate shells.

I hope to offer some further notes upon these very well-preserved decapod cephalopoda from the Lebanon later on, with the promised kind co-operation of Mr. G. C. Crick, F.G.S., who has devoted so much attention to the cephalopoda generally, and to whom I am indebted for information and assistance in preparing this paper.

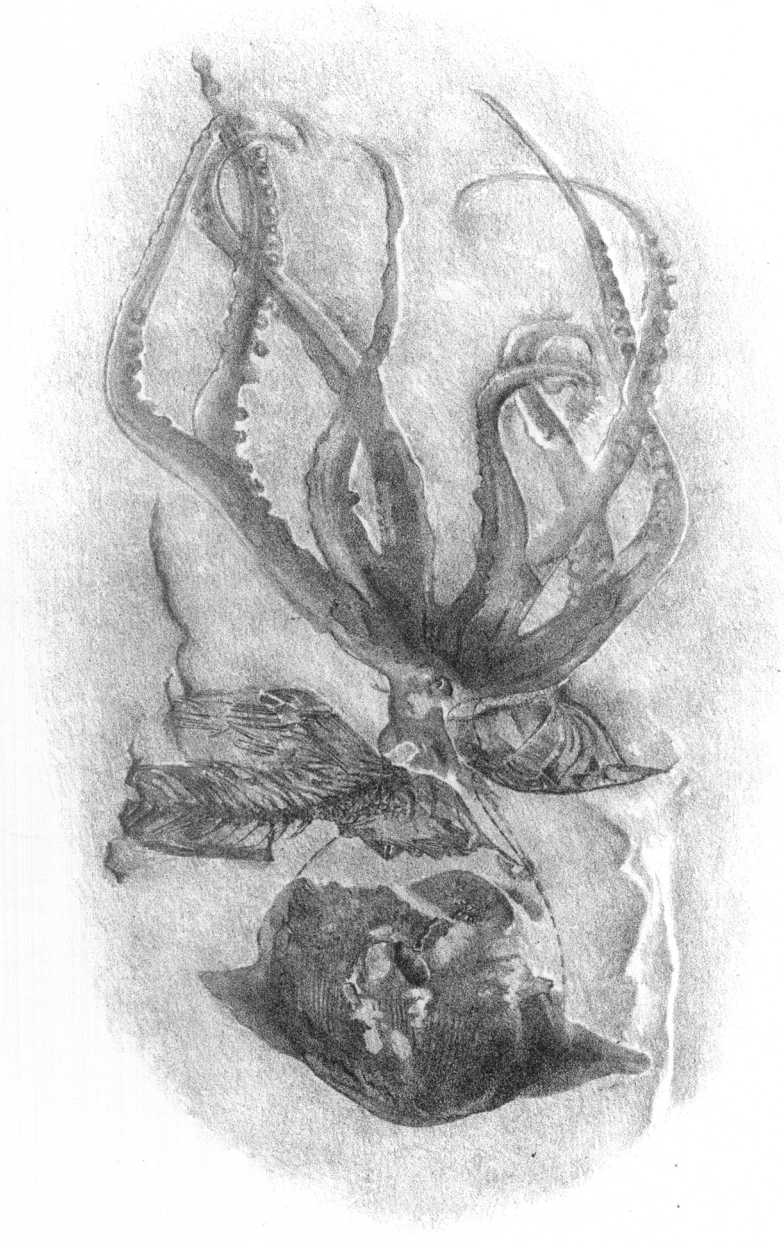
## PLATE VI.

*Calaïs Newboldi* from the Cretaceous of the Lebanon.

## Discussion.

Mr. Crick stated that, as the occurrence of this fossil had been already at least twice recorded, and as neither a description nor a figure had been given hitherto, it was most important that the specimen should be described and figured, and it was very fortunate that the fossil had come into the hands of the President for description. He believed the specimen to be a true octopod; it was therefore the oldest known representative of this division of the cephalopoda.

[1] All from Prof. Lewis's collection of Lebanon Cretaceous fossils.



G.M. Woodward del. et lith. Mintern Bros. imp.

CALAIS NEWBOLDI.