

nevertheless have been present, for in the living *Sepia officinalis* "the tentacular arms remain contracted within the others when in repose."¹ The two dorsal arms are about 70 mm. long and 6 mm. wide at their base; for a short distance they taper rather rapidly, then much more gradually to their extremities. The next pair is a little longer and a little more robust. The third pair is about the same as the first, and the fourth or ventral pair a little shorter and less robust than the first. A marked irregularity in the outline of the inner surface of the arms is doubtless due to the presence of small acetabula or "suckers," but there are no indications of hooks. The first and second arms on either side seem to have been united for some short extent (perhaps one-third of their length) by a web-like membrane, which probably also connected some of the other arms, but this appears not to have united the bases of the two dorsal arms.

Dr. A. Wagner, in his memoir already alluded to, groups all the examples of *Coccoteuthis* which have been described from the Lithographic Stone into one species, viz. *C. hastiformis*, recognizing amongst them three varieties—(i) var. *minor*, (ii) var. *media*, and (iii) var. *maxima*. Fortunately in the specimen described above, the shell is preserved so that it can be readily compared with the species which have already been described. It is referable to Wagner's var. *minor*.

EXPLANATION OF PLATE XIV.

- sa. The first (dorsal) and second arms of the right side, showing acetabula or "suckers" on their inner surfaces.
- u. Membrane uniting the bases of the first (dorsal) and second arms on either side.
- b. Impression of beak or mandible.
- e. Probable position of eye.
- s. Anterior extremity of shell.
- m. Portion of mantle, exhibiting wrinkles and traces of colour.
- f. Anterior boundary of lateral fin on either side.
- f'. Posterior boundary of same.

Slightly reduced from the original.

IV.—THE SEARCH FOR *UINTACRINUS* IN ENGLAND AND WESTPHALIA.

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IT is just a score of years since the unstalked crinoid *Uintacrinus* was discovered, almost simultaneously, in the Niobrara Chalk of Kansas and the Lower Senonian of Westphalia. The American specimens were described by Grinnell and Meek, while the single European specimen was exhaustively discussed by Schlueter. Of recent years further specimens, in a better state of preservation, have been found in Kansas, and a slab purchased by the British Museum enabled me to make a more detailed study, the results of which were published in the Proceedings of the Zoological Society (vol. 1893, pp. 974–1004, pls. liv–lvi, April, 1896). But as to

¹ Tryon, "Manual of Conchology," vol. i, 1879, p. 58.

the occurrence of *Uintacrinus* in Europe, our knowledge at the beginning of 1896 remained as in 1876; not even from Recklinghausen, the original Westphalian locality, had another fragment been obtained. It may therefore be a surprise to many to learn that *Uintacrinus* is one of the commonest fossils of the *Marsupites* zone, not only in the Marlstone of Westphalia, but in the Chalk of our own island, and probably at the same horizon in a good many other countries.

It was in March last that Mr. C. D. Sherborn brought to me from Dr. A. W. Rowe, of Margate, a few scattered plates, supposed to belong to a small *Marsupites*. I saw at once that they belonged to *Uintacrinus*, though the species was uncertain; and having obtained two days' leave for the purpose, I set off for Margate, on Dr. Rowe's invitation, to examine his collection and to search the cliffs. Dr. Rowe has several fragments showing the plates in juxtaposition, and these fully confirmed my opinion. Moreover, a search, with the help of Mr. Sherborn, Dr. Rowe, and my wife, showed that along the cliffs east of Margate, next to columnals of *Bourgueticrinus*, cup-plates and brachials of *Uintacrinus* were the commonest fossils. We did not find it in the same places as *Marsupites* and *Echinocorys scutatus*, although Dr. Rowe says that he has found it in various localities west of Margate, associated with *Marsupites*. In any case it occurs at the horizon of *Actinocamax verus*.

Another diligent collector, Mr. C. Griffith, of Winchester College, showed me, last July, plates from the railway-cutting west of Grately station, near Andover, and from a pit one mile north-east of Wherwell railway station, which undoubtedly belonged to *Uintacrinus*. Among the associated fossils were said to be *Bourgueticrinus*, *Actinocamax verus*, *Micraster cor-anguinum*, and *Echinocorys*.

Clearly, then, *Uintacrinus* was common enough in England; but the fragments had, for the most part, been disdained by collectors, or relegated to "Marsupites?" Thus, in the Wetherell Collection at the British Museum there are *Uintacrinus* plates from the north of Kent, which had been labelled *Marsupites*, and which, when rapidly sorting the collection some eight years ago, I had set aside as belonging to an undetermined genus.

These discoveries suggested that *Uintacrinus* could not be so rare at Recklinghausen; so when the holidays came, off we went thither, visiting Bonn, Professor Schlueter, and the type-specimen on the way.

It is not easy to collect fossils at Recklinghausen. The rock is a glauconiferous sandstone, the grains of which are cemented by carbonate of lime, and coloured a greenish-gray by carbonate of iron. When freshly quarried it is a hard, massive stone; but exposure to the atmosphere rapidly dissolves the lime and decomposes the iron carbonate, leaving eventually a loose sand, coloured reddish-brown or yellow by iron peroxide. The rock is therefore useless for building purposes and for road-metal, and is not quarried in a regular manner, although there are a few pits in some unfossiliferous sand that seems to have arisen from the decomposition and perhaps

partial erosion of the hard rock. Fortunately the soil requires occasional replenishing with lime, and this is supplied by scattering over the fields lumps of the fresh rock, such as may be obtainable from any casual openings. Such lumps and openings are the collector's only hope.

I reserve a statement of the various localities searched by us, and the fossils there found, for a future detailed description of the European specimens of *Uintacrinus*. The main result is that at Recklinghausen, as at Margate, *Uintacrinus* is, next to *Bourgueticrinus*, the commonest fossil. It occurs, associated with *Actinocamax verus* and *A. quadratus*; but, as at Margate, we found no *Marsupites*. The greater number of the remains consist of scattered cup-plates and brachials, differing only in colour from those so common in the Margate Chalk. This was all that I expected to find, so that I was all the more delighted when my wife discovered at the junction of the humus and the sand, in a small roadside cutting east of the railway station, a complete cup of *Uintacrinus*, less perfect than the type-specimen as regards the arms, but more perfect in its base and the important interbrachial areas. The specimen was extracted with great care, delicately laid in a round tin box, and packed in with fine dry sand. Thus it travelled safely until its loose substance could be hardened with water-glass.

The object of this note is to draw the attention of those who collect Upper Cretaceous fossils to this abundant species, which has been so strangely overlooked. If they have not already in their collections, they will doubtless find in the Lower Senonian of their neighbourhood, flattish, thin plates, usually of pentagonal or tetragonal outline, and marked on the inner surface with wide grooves radiating from the centre to the sides, not to the angles. Associated with these they will find brachials, often characterized by a diagonal fulcral ridge, as figured in the paper above referred to. I shall have pleasure in sending a copy of that paper to anyone who will look out for *Uintacrinus*, and will lend me the specimens he finds.

Possibly with this assistance many important questions may be solved. We want to know, first, if there are really two species of *Uintacrinus*, as has been supposed; and if both are represented in Europe; or if the European specimens belong to the American species: this can only be decided by the comparison of many specimens. Secondly, we have to determine the geological and geographical range of *Uintacrinus* in Europe: for this, details of its occurrence, and especially of the associated fossils, are desired. Does it really belong to the *Marsupites* zone? Thirdly, when this knowledge is obtained, we may be able to throw light on the correlation of the Cretaceous rocks in America and Europe, and to distinguish further between synchronism and homotaxis. Other questions there are of morphological and bionomic interest; but I hope enough has already been said to kindle in the breasts of geologists some enthusiasm for *Uintacrinus*.