Life and Death in the Jurassic seas of South Dorset

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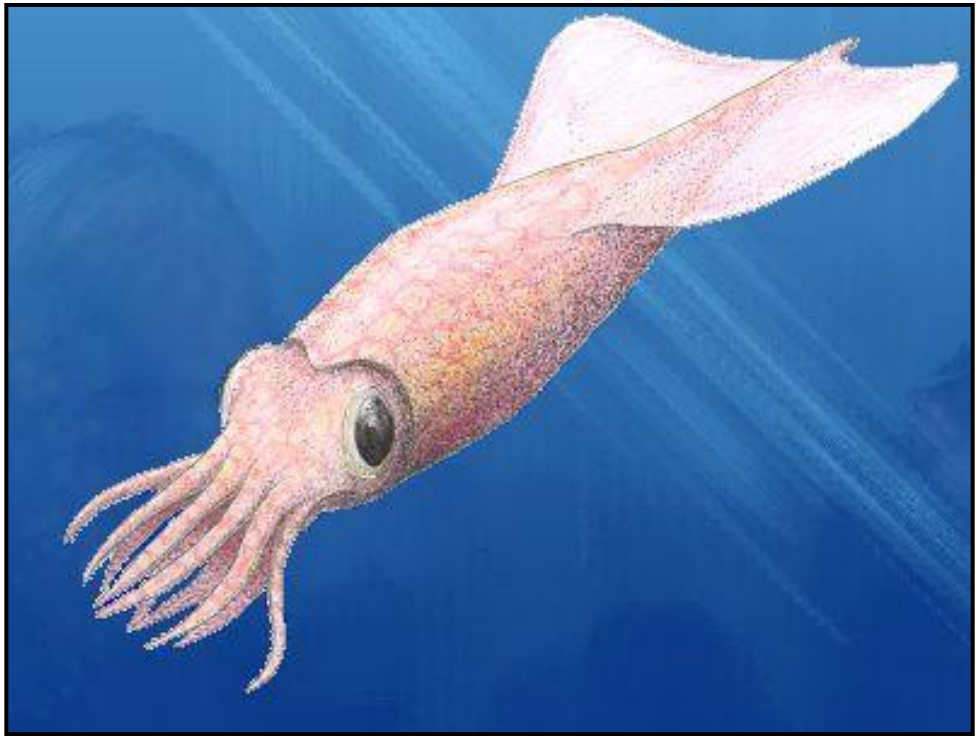
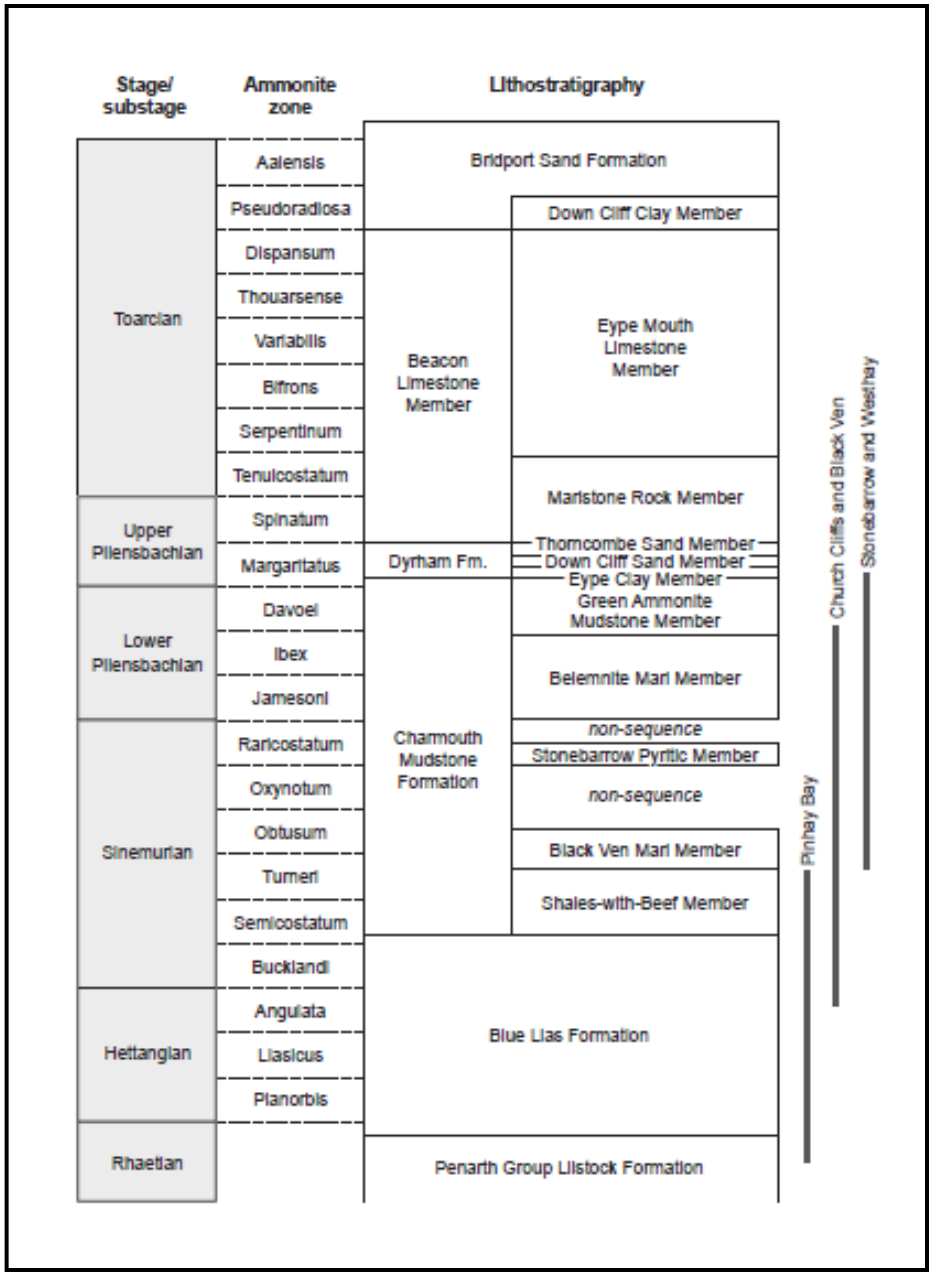


Fossil squid are largely soft-bodied and unlikely fossils – but we still have many records from the Jurassic (200 – 145 Ma) of the Wessex Basin.

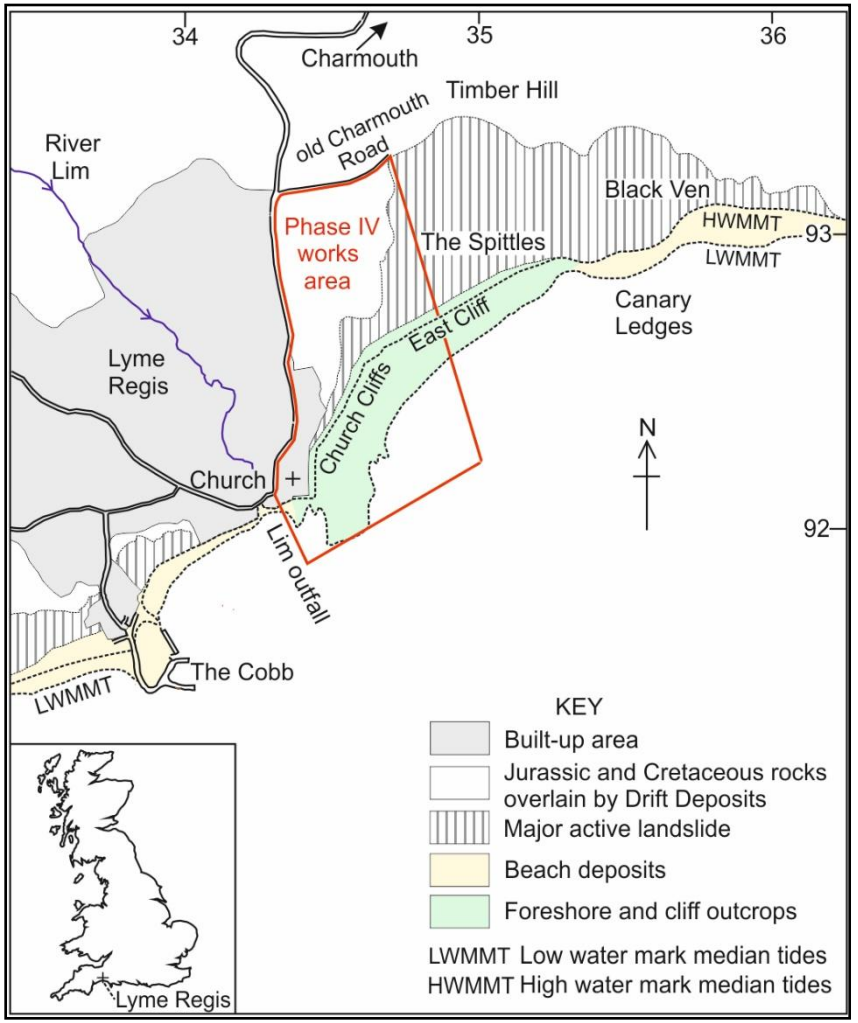
The parts that can be preserved are:

- **The lens from the eye;**
- **The phragmacone (preserved as aragonite);**
- **The ink sack (often formed of the original cells);**
- **The jaw or 'beak' (preserved as hardened chitin);**
- **The hooks (or onychites) from the arms (preserved as chitin); and**
- **The statoliths (2) which are the balancing organs (preserved as aragonite).**

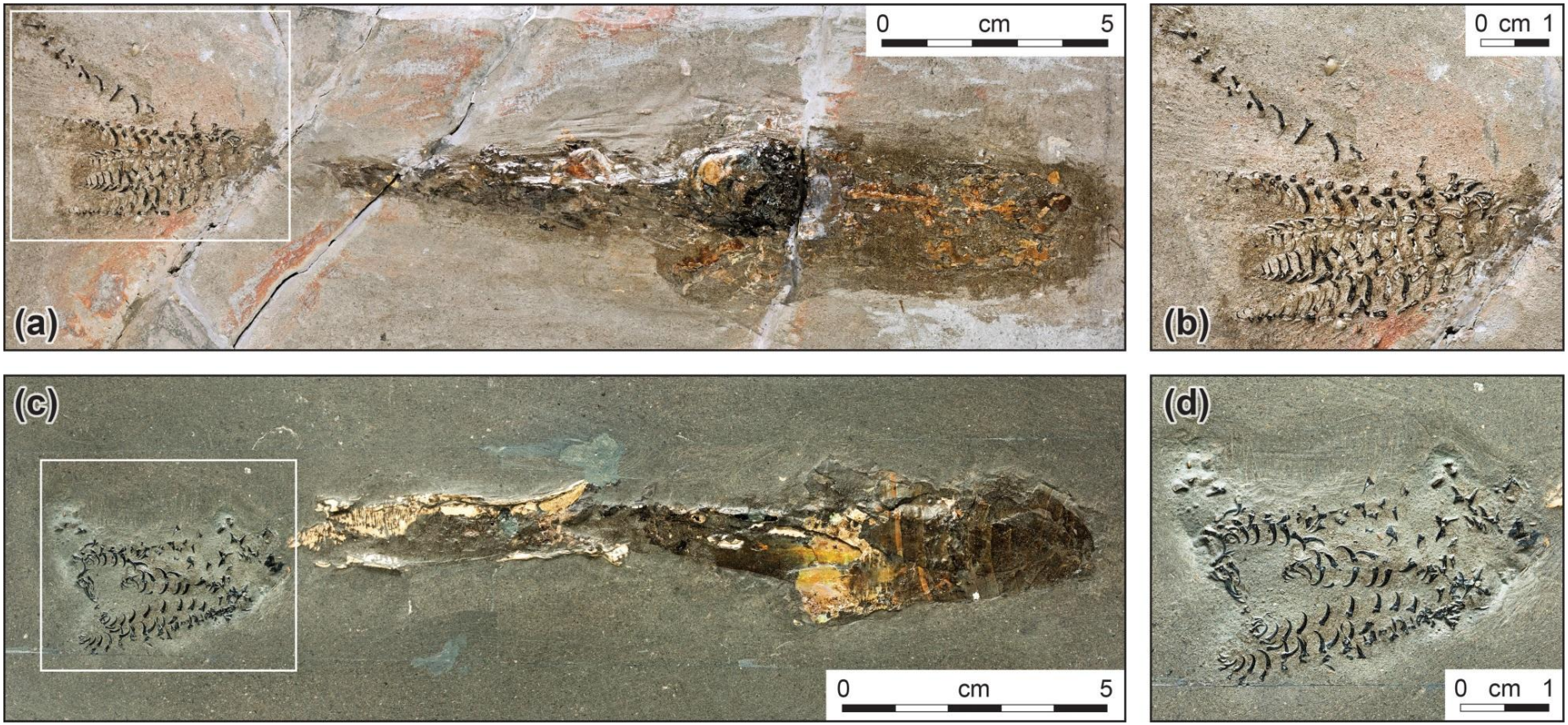


Lithostratigraphy for the Liassic succession near Lyme Regis.

Many of the diplobelid fossils come from the Obtusum Zone in the Sinemurian, Black Ven Marl Member of the Charmouth Mudstone Formation.

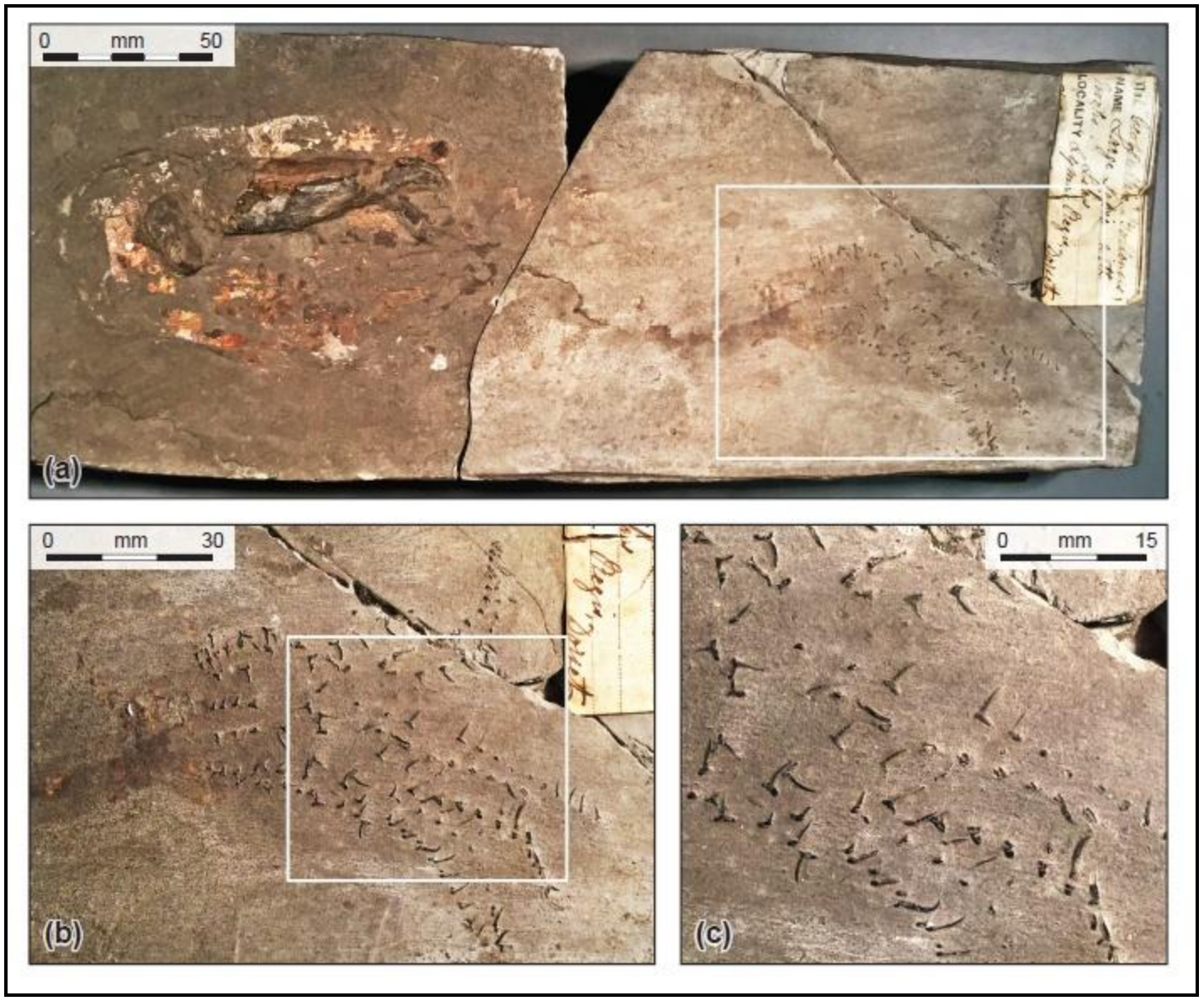


Mary Anning (1799–1847) depicted on Church Cliffs, Lyme Regis. With her is the little dog that famously accompanied her every time she went out. The area quarried out below Church Cliffs has recently had to be stabilized.

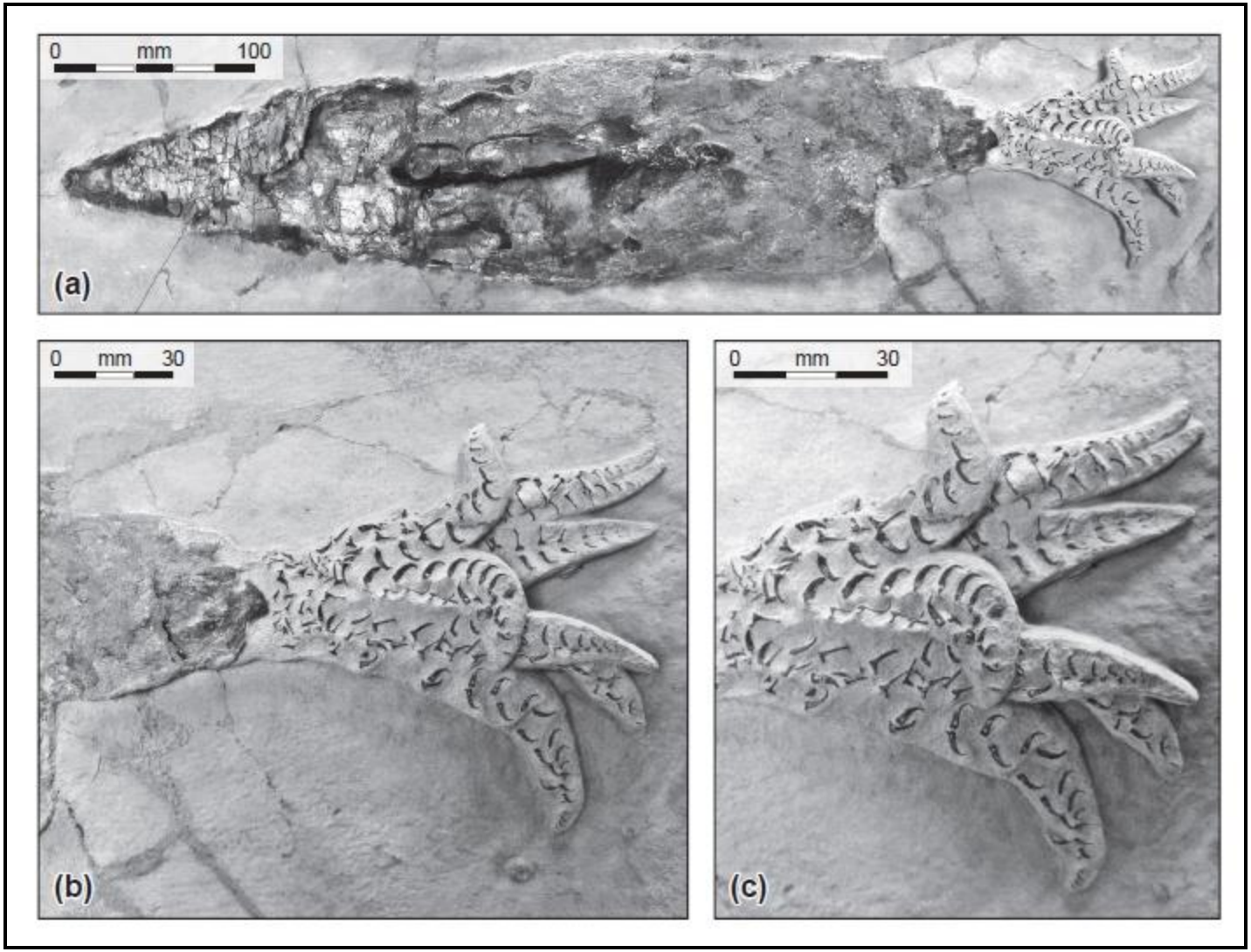


(a, b) *Clarkeiteuthis montefiorei* (Buckman), holotype (NHMUK C5026) from the Sinemurian (Lias Group) of Lyme Regis showing long slender bi-lobed hooks paired with smaller more triangular hooks.

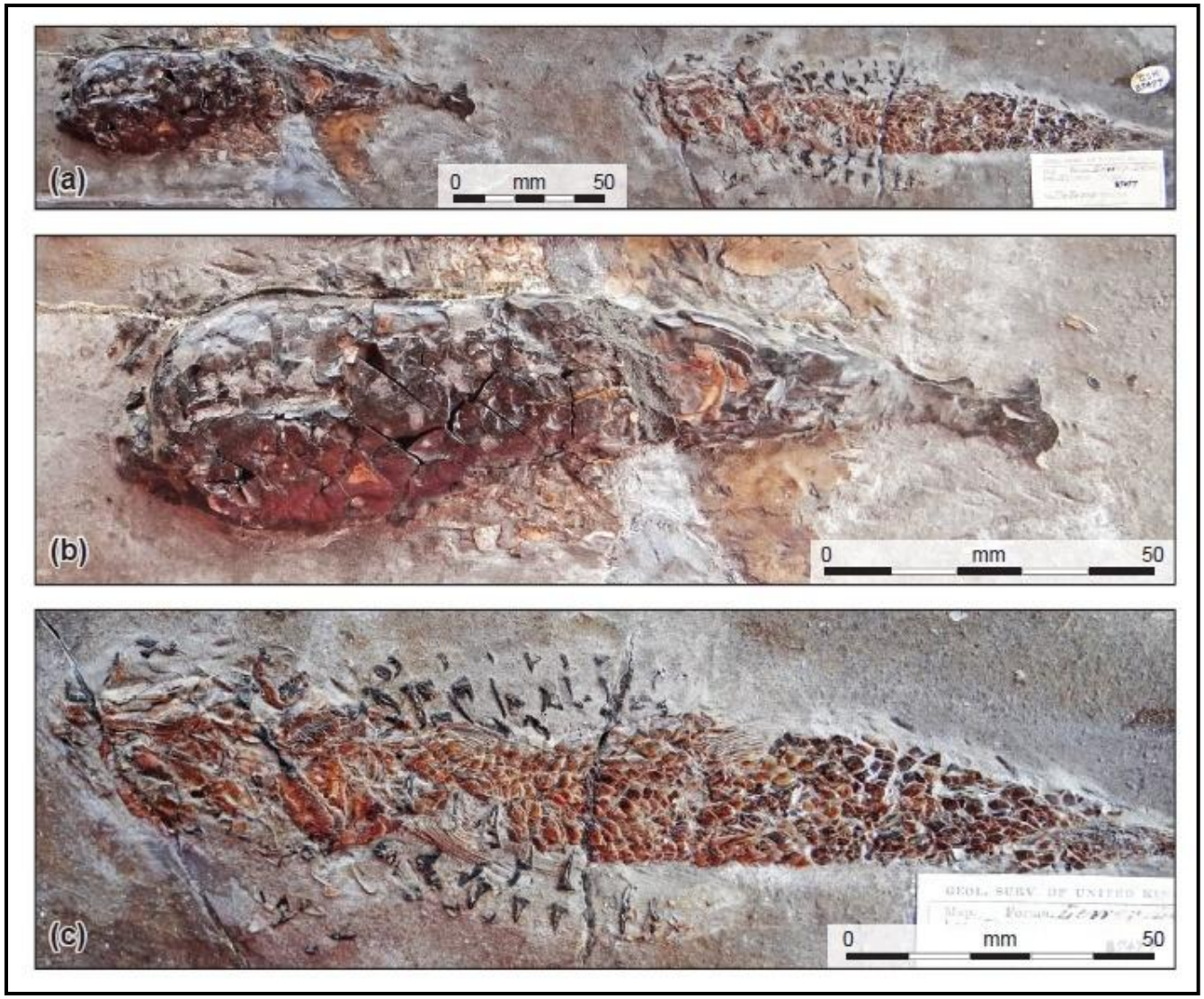
(c, d) *Clarkeiteuthis conocauda* (Quenstedt) This is (NHMUK CC652) from the Toarcian of Holzmaden, Germany. In this case the paired hooks appear identical in shape.



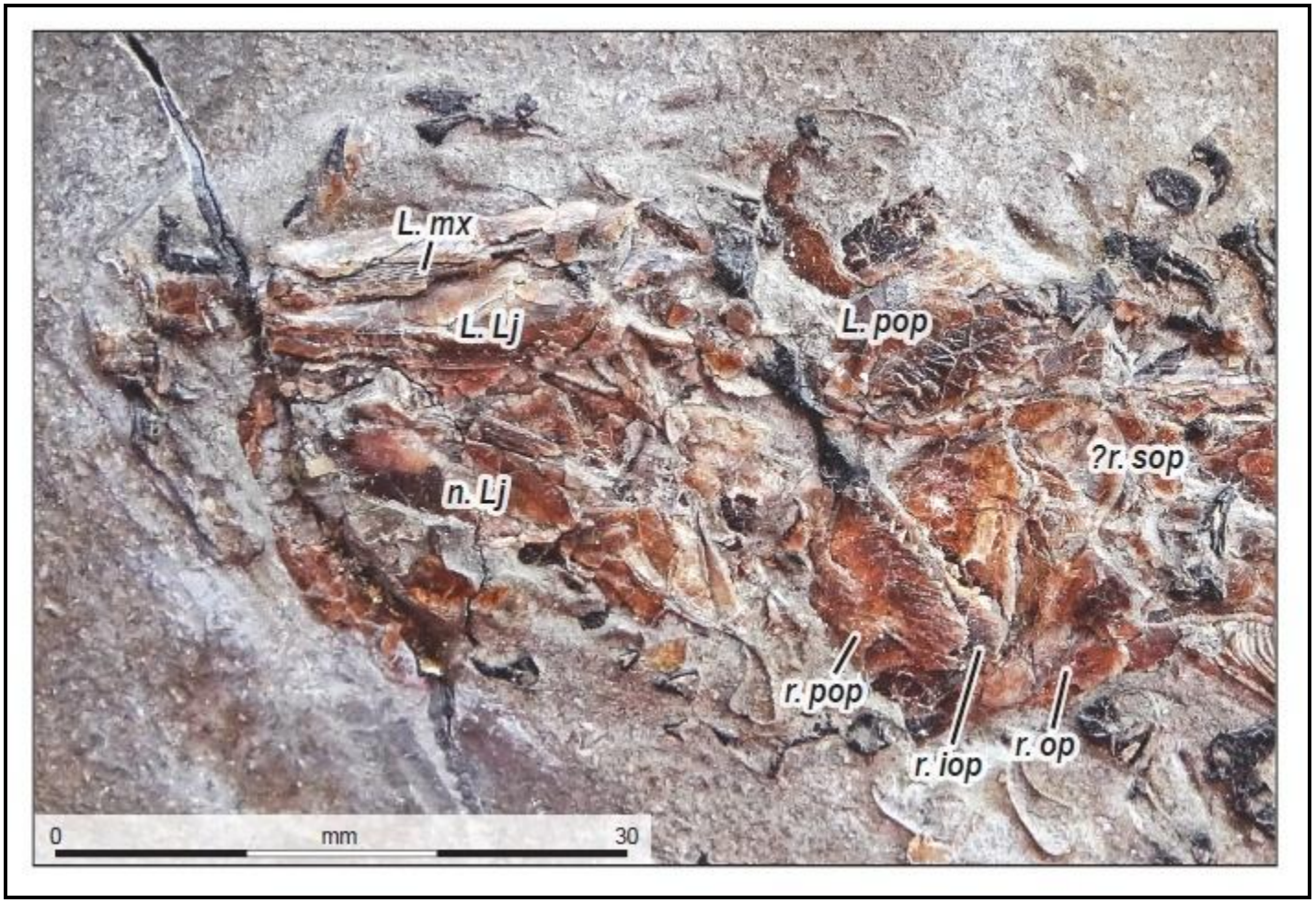
Clarkeiteuthis montefiorei **from the (?)Sinemurian of Lyme Regis in the collections of Leeds Museum. This is typical of material collected in 19th Century and attributed to the area, but lacking stratigraphical precision.**



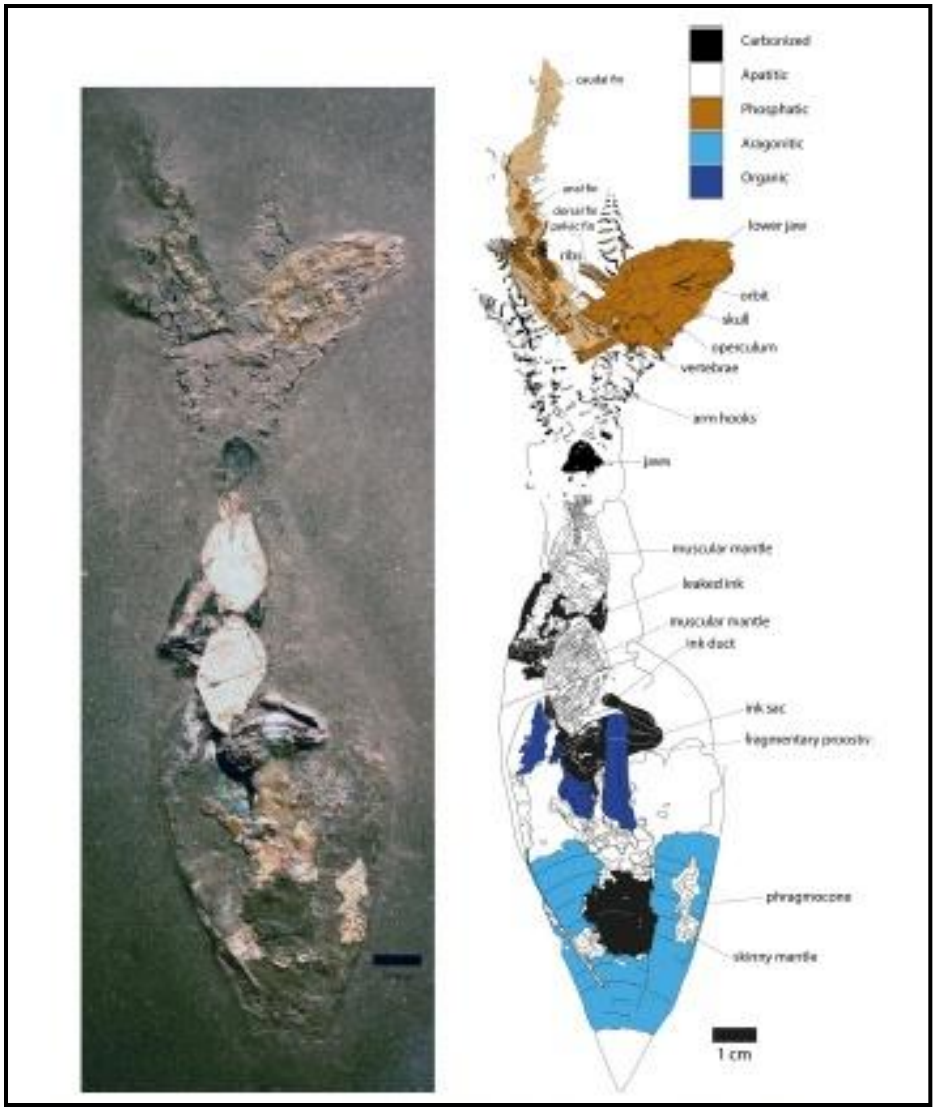
A new specimen of *Clarkeiteuthis montefiorei* collected and prepared by Chris Moore. This is from the Lower Sinemurian of Lyme Regis and shows part of the phragmocone, ink sack, jaw, 7/8 arms with lines of paired hooks.



Specimen GSM 87477 from the collections of the British Geological Survey showing the ink sack, jaw area and a number of arms (with hooks) holding a fish identified as *Dorsetichthyes bechei*. This is the earliest record of predation within the Diplobelida; though not precisely located it is Early Sinemurian in age.



Head of *Dorsetichthyes bechei*, showing sharp edges of broken bones that are probably the result of a violent attack by the diplobelid. This seems to be a different style of 'attack' to the other fossil records in the Toarcian and Callovian.



Clarkeiteuthis conocauda **catching a fish (*Leptolepis bronni*). Specimen from the Toarcian of Southern Germany [after Jenny *et al*., 2019]. Painting by Christian Klug, and used in the same publication.**

Belemnotheutis antiquus **from the Upper Callovian (Middle Jurassic) of Christian Malford (Wiltshire) in the process of capturing a fish.**

This clearly shows predation occurring in the Middle Jurassic.

The fish appears to have had its spine broken, as shown by Jenny *et al*. (2019).

Specimen GSM 87477 from Lyme Regis is identified as *Clarkeiteuthis montefiorei* and the fish it has caught is identified as *Dorsetichthyes bechei*. There are only a few known specimens of coleoids feeding and, in all cases, the prey are small fishes. This is the oldest known specimen as the others are from the Toarcian of Southern Germany or the Oxford Clay Formation of Wiltshire.

Summary

More generally, using the evidence of arm hooks and statoliths found associated with body fossils, isolated hooks in microfossil residues are now being investigated in order to construct the ranges of known taxa, especially where they are only known from a very few locations.

There is evidence of fish predation in the Sinemurian (described here), the Toarcian (Jenny *et al*., 2019) and the Upper callovian, but these are still rare occurrences in the geological record.