



## **Exceptional preservation of Jurassic coleoid fossils in Southern England: taphonomy, movable geoheritage, collection and loss**

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The Jurassic strata of Southern England (Wessex and Severn basins), over the last 200 years, have yielded exceptionally preserved coleoid fossils. Many specimens show soft-bodied preservation of arm crowns (with hooks), ink sacks, phragmocones and muscle fibres. The locality at Christian Malford (Wiltshire) is a true lagerstätte with numerous records of belemnitids and teuthids (*Belemnotheutis antiquus* Pearce, 1847). In the clays of the Oxford Clay Formation (Phaenium Subzone, Callovian) processed microfossil residues contain foraminifera, ostracods and significant numbers of arm hooks, statoliths and otoliths.

Within the Lias Group mudstones of the Lyme Regis–Seatown area (Devon–Dorset) and the Kimmeridge Clay Formation (Upper Jurassic) of the Purbeck coastline (Dorset) there have also been significant finds of exceptionally preserved coleoids with arm crowns, traces of the body and internal structures. However, it is clear that intense and essential uncontrolled, contemporary fossil collecting at a number of sites is leading to the destruction of many taxonomically important specimens as conspicuous parts of the fossil, such as the ink sack are preferentially selected. In some cases, these ink sacks are being destroyed to make a sepia-style ink for drawing pictures for sale and other specimens are being sold on the internet.

Remarkably, however, the majority of these specimens come from nationally protected Sites of Special Scientific Interest (SSSIs) and/or Geological Conservation Review (GCR) sites which, in theory, are protected for their geological features by national laws, and require consents and collection permissions from both the landowners and the state agency, Natural England. In West Dorset, where many important specimens of ichthyosaurs and plesiosaurs have been collected, a Fossil Collecting Code has been developed in the hope that collecting in-situ material does not take place and that, if collected under ‘rescue’ conditions (e.g., prior to marine erosion or loss by landsliding, etc.), there is a voluntary system to record finds and make such material available to the scientific community for research. Even a cursory inspection of the on-line database shows that few coleoid fossils are being recorded and, where features like ink sacks are being collected, the additional palaeontological and taphonomic information is being missed or, in some cases, ignored. In addition, even a record in this database can be scientifically problematic, as many of the specimens recorded will be offered for commercial sale, as simply recording a find in the database is treated as a transfer of legal ownership to the finder (irrespective in fact as to whether such transfer actually has any legal status in English Law in many cases). The problem is compounded by the absence of legislation to protect ‘movable’ geological heritage meaning that, once collected, it can be virtually impossible to recover fossils, even if they are technically ‘stolen’. On the Dorset Coast the situation is made more serious by the failure of local and national management to ensure that its listing as a natural World Heritage Site by UNESCO provides a genuine level of protection “for all peoples of the world”, as required by the 1972 Convention.