

PRESERVATION OF CEPHALOPODS IN THE UPPER JURASSIC NUSPLINGEN LITHOGRAPHIC LIMESTONE (LATE KIMMERIDGIAN, SW GERMANY)

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Ammonite and nautilid preservation

The laminated Late Kimmeridgian Nusplingen Lithographic Limestone occurs in a small area (less than 1.5 km²) on the western part of the Swabian Alb. The limestone accumulated in deep, probably anoxic basins surrounded by sponge-microbial reefs, shallow areas with calcareous oolites and small islands. It is well-known because of its findings of marine vertebrates. Ammonites and isolated aptychi are the most common invertebrate fossils. With few exceptions, ammonites are preserved as extremely compressed casts with the aragonitic shell dissolved during early diagenesis, while the siphuncle is still present. Among the larger ammonites only few are completely preserved. Often the body chamber or the anterior part of the body chamber is missing, probably eaten away from predators. In complete specimens the aptychi, which are assumed to represent the lower jaws, are still found in situ or in the nearest surroundings of the ammonite shell. In several bituminous beds, also isolated wing-like upper jaws are quite abundant. In some specimens of the aspidoceratid *Physodoceras nattheimense* SCHWEIGERT both the aptychi and the corresponding upper jaws have been found still in the body chamber or in near context to the shell. The upper jaws originally consisted of chitin, which is preserved as carbonised organic matter. There is hardly any analogue in shape and assumed function of the jaw apparatus with that of nautilids or coleoids. We could not detect a "rostral tip" at the upper jaws so that a scraping function is more likely than a biting. Within the same beds, also the content of the stomach is sometimes preserved, consisting either of small broken aptychi (*Neochetoceras*), *Saccocoma* skeleton elements (*Physodoceras*), phosphatic material (*Lithacoceras fasciferum*) or foraminiferas (*Lithacoceras ulmense*), thus indicating different diets in different ammonite groups.

Besides ammonites, nautilids are extremely rare. In contrast to ammonites, the siphuncle in the nautilids is not preserved, whereas the embedding and diagenesis of the shell is identical to that in ammonites. One specimen (*Pseudaganides* sp.) has been found with a *Conchorhynchus* and a corresponding *Rhyncholites* in the body chamber. This is the first fossil record of a nautilid with both parts of the jaw apparatus in situ.

Belemnite and coleoid preservation

Most belemnites of the Nusplingen Lithographic Limestone are preserved by their guard only. While specimens which are bitten at the alveolar end of the guard, mostly lie horizontally on the bedding planes of the laminated limestone, specimens with the phragmocone being stuck obliquely or even vertically in the sediment. This gives evidence for a rapid sedimentation rate and a stiff-plastic consistency of the lime mud. In few cases agglomerates of belemnite tentacle hooks (*Onychites*) and smaller arm hook-lets (*Paraglycerites*) besides fragments of the guard were detected. These rests represent bitten and/or disgorged indigestible parts of belemnites. Coleoids are far less common, like *Trachyteuthis*, *Plesioteuthis*, while the giant *Leptoteuthis* is extremely rare. Also these specimens must be interpreted as bitten by predators.

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