

WRINKLE LAYER AND DORSAL MUSCLE SCARS IN AMAUROCERAS FERRUGINEUM FROM THE DOMERIAN OF NW-GERMANY

Weitschat, Wolfgang

Geologisch-Paläontologisches Institut und Museum der Universität Hamburg, Bundesstrasse 55, D-20146 Hamburg, Germany. E-mail: weitschat@geowiss.uni-hamburg.de

Extraordinarily well preserved ammonoids from carbonate-concretions of the Lower Jurassic, Domerian (spinatum Zone, hawskerense Subzone) of NW-Germany are presented. The material comes from glacial erratic boulders and is not known from outcrops. The fauna is composed of ammonoids (*Amauroceras ferrugineum*, *Pleuroceras hawskerense*), belemnoids (*B. elongatus*, *B. milleri*), scaphopods, gastropods, and bivalves.

The original aragonite of the ammonite shell-material is preserved and the phragmocones are usually empty and hollow which allows detailed three-dimensional investigations, especially of the early ontogenetic stages. The siphuncular tube is also present from the very beginning, including the prosiphon which consists of broad sheets attaching the caecum to the inner shell wall of the protoconch. Additional organic sheets are preserved within the first chambers where the siphuncular tube has not reached its ultimate ventral position. These sheets may have functioned not only as an attachment but also for liquid transport from the siphuncular tube to the pellicle. A similar system is also known from Recent *Nautilus*.

The most remarkable features, however, are the preserved wrinkle layer and the presence of an unpaired dorsal muscle scar. The wrinkle layer appears to be present only in early ontogenetic stages. A similar arrangement has been observed in goniatites and ceratites but up to now only very rarely within the Neoammonites of the Jurassic and Cretaceous period. The function of the wrinkle layer is discussed.

The unpaired muscle scars are situated at the dorsal side of the phragmocone just adoral of each septum, have a rounded to ovate outline, and a rugose surface structure. Its structure is usually well visible because the muscle scars penetrate the wrinkle layer. Similar muscle scars have been described from Triassic ammonoids by Weitschat & Bandel (1991). The authors supposed that these unpaired dorsal muscle functioned as the main retractor of ammonoids, but new observations support the reconstructions by Doguzhaeva & Mutvei (1992). Accordingly, as in the Recent *Nautilus*, the main retractor muscles of ammonoids are paired lateral muscles. However, the function of the unpaired dorsal muscle scars still remains an open question.