

MORPHOLOGY OF THE EARLY WHORLS OF GONIATITES FROM THE CARBONIFEROUS BUCKHORN ASPHALT (OKLAHOMA) WITH ARAGONITIC PRESERVATION

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We investigated the morphology of the early whorls of goniatites from the Upper Carboniferous Buckhorn Asphalt (Oklahoma). The specimens show aragonitic preservation. They probably all belong to a single species or several closely related species. The ammonitella is approximately 0.8 mm in diameter. The initial chamber is wide and is covered by the first whorl of the ammonitella. The outer surface of the ammonitella is smooth without any trace of ornamentation or growth lines. In contrast, growth lines occur on the postembryonic shell. The initial chamber terminates in a thickened flange. There is an elongate muscle scar on the inner surface of the initial chamber just behind the flange. The wall of the initial chamber consists of three layers, the outermost of which is the dorsal wall of the next whorl. The wall of the ammonitella also consists of three layers: an inner prismatic layer representing the mural part of the proseptum and subsequent septa, a middle granular layer representing the wall proper of the ammonitella, and a very thin outer prismatic layer. The ammonitella wall is covered by the dorsal wall of the next (postembryonic) whorl. The wrinkles on the dorsal wall first appear near the apertural margin of the ammonitella. The wrinkles do not extend to the umbilical seam. The proseptum and second septum are closely spaced in median cross-section. The proseptum is prismatic and the second septum is nacreous. The morphology of these ammonitellas is similar to that of the ammonitellas of Mesozoic ammonoids with the exception that there is no ornamentation on the ammonitella in goniatites. This similarity in morphology implies a consistent mode of formation of the ammonitella.