

## EARLY TAPHONOMIC HISTORY OF THE LOWER CAMBRIAN EMU BAY SHALE FOSSIL LAGERSÄTTE

NEDIN, Christopher. Dept. of Geology and Geophysics, University of Adelaide, South Australia 5004. Australia.

Whilst the preservation of non-, or poorly mineralized tissues is now known from an increasing number of sites world-wide, the early taphonomic processes involved are only now becoming understood. Recent laboratory work at the University of Bristol has provided a sound experimental basis for the early diagenetic precipitation of carbonate and phosphate in and around soft tissues, by highlighting the importance of oxygen availability and pH. The information gained from these experiments can be applied to deposits where carbonate and phosphate mineralization occurs, such as the Emu Bay Shale fossil Lagerstätte.

The Emu Bay Shale outcrops at two localities on the northern coast of Kangaroo Island, South Australia. One locality contains a restricted fossil Lagerstätte, dominated by arthropods. Common elements of the assemblage are the trilobites *Redlichia takoensis* and *Hsuaspis bilobata*, the phyllocarids *Isoxys communis* and *Tuzoia australis* and the possible opabinid, *Myoscolex ateles*. Rarer elements include *Anomalocaris briggsi*, *Anomalocaris* sp., *Naraoia* sp., *Xandarella* sp. and the presumed worm *Palaeoscolex antiquus*.

The usual mode of preservation is by the precipitation of red stained, calcium carbonate fibres, which preserves coarse detail only. The notable exception to this is *Myoscolex*, where preservation of muscle tissues via phosphatization has occurred, representing the oldest occurrence of this phenomenon yet found. According to laboratory studies, phosphate mineralization occurs at sites of significant and sustained low pH within labile tissues, whilst carbonate mineralization occurs when the pH rises at the termination of labile tissue decay. The carbonate and phosphate preservation within the Emu Bay Shale Lagerstätte allows the knowledge gained from laboratory studies to be applied to the early taphonomic history of the deposit in terms of oxygen availability and pH levels.