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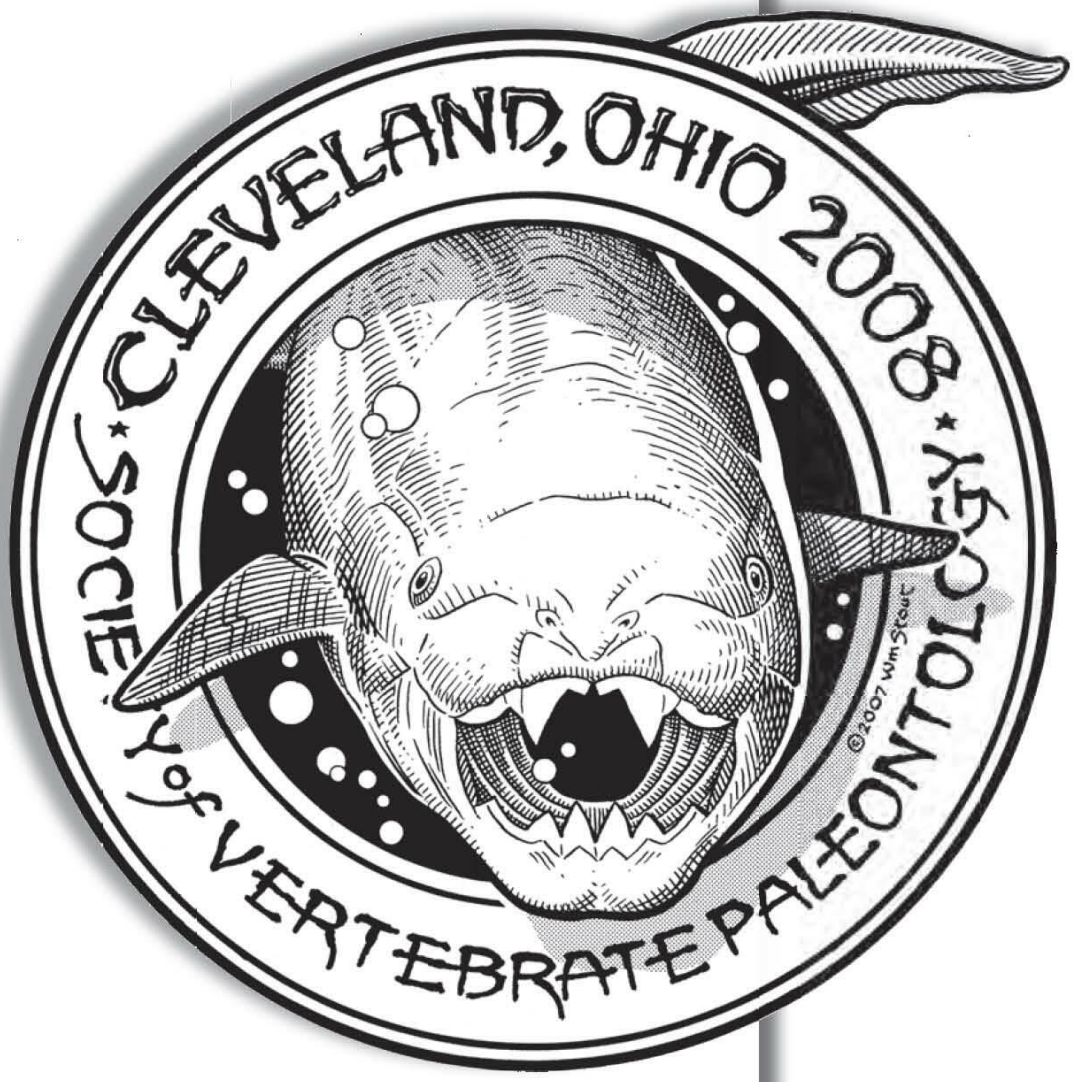
Program and Abstracts



68th Annual Meeting
Society of Vertebrate Paleontology

Cleveland Museum of Natural History
Case Western Reserve University
Renaissance Cleveland Hotel
Cleveland, Ohio USA
October 15-18, 2008

Technical Session IV, Wednesday 3:15

WHAT CAN SEDIMENT PATTERNS TELL US ABOUT SOFT TISSUE?: AN ACTUALISTIC TAPHONOMIC STUDY OF OSTRICH HEADS DURING AND POST-BURIAL

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CT scans of fossil skulls often show radiological density variations within the encasing rock. These variations may correspond to differential sediment sorting by soft tissue during burial. To test this hypothesis, we built two flumes to model deposition in (1) deep, slow-moving water (pools) and (2) shallow, fast-moving water (sand bars). Ostrich heads were buried in each flume under varying decompositional states (fresh, desiccated, rotten, clean skulls), then CT scanned and sectioned to obtain sediment samples for comparison with sediment maps created from the CT scans. Marked contrasts were seen between flow regimes and among decompositional states. Sediment drapes covered the heads retaining feathers in the shallow flume. No drapes appeared on the clean skulls nor on any head buried in the deep flume except after extensive decomposition dispersed organics into the surrounding water. Drapes may be a useful indicator of integumental coverings such as feathers or hair as well as water flow indicators. Only heads in the shallow flume showed any sediment sorting, as corroborated by grain-size analysis, filling the oral cavity and pharynx. The nasal cavity and large paranasal sinuses were extensively filled only in rotten specimens buried in the shallow flume. Nevertheless, in all cases the rostralmost nasal conchae were sufficiently covered, suggesting that evidence of conchae may be preserved in the sediment, even when not in the fossil itself. Over 30% of the initial air remained in all heads with soft tissue in the deep flume, whereas over 65% remained in fresh heads in the shallow flume, but decomposition rapidly let most air escape. Even in clean skulls, some air remained, suggesting that some fossil void spaces may be primary and were never sediment-filled. Continued decay after burial affects these patterns depending on the post-burial environment, most notably in the fresh heads, less so in the clean skulls. Such sediment patterns may provide additional anatomical information from CT scans of matrix-filled fossils, as well as identifying optimal preservational environments, allowing field workers to target promising rock units.