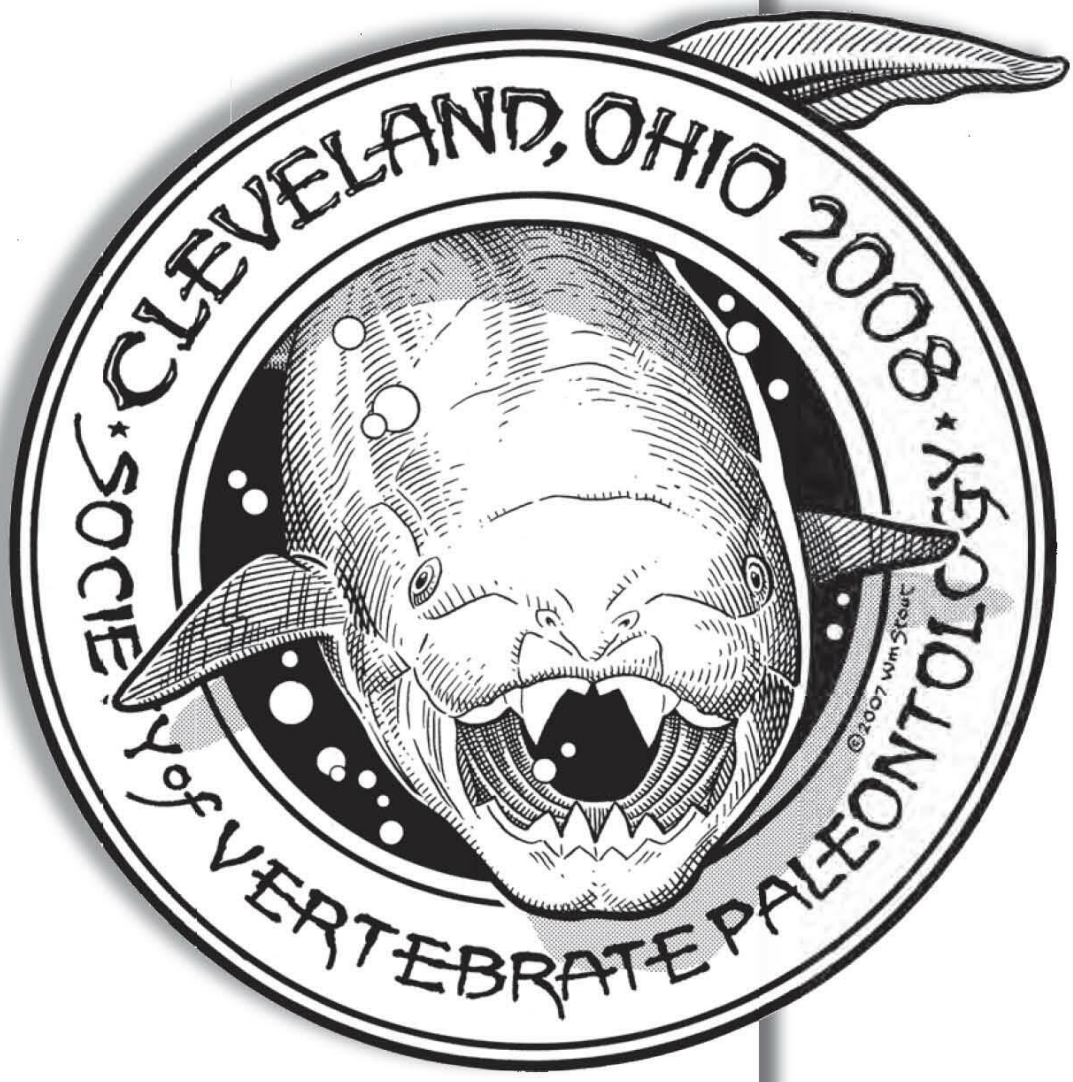
Volume 28, Supplement to Number 3
September 2008

JVP

Journal of Vertebrate Paleontology
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

New Directions in the Study of Fossil Endocasts: a Symposium in Honor of Harry J. Jerison, Thursday 8:30

ENDOCRANIAL ANATOMY OF LAMBEOSAURINE DINOSAURS: IMPLICATIONS FOR CRANIAL CREST FUNCTION AND EVOLUTION

EVANS, David, Royal Ontario Museum, Toronto, ON, Canada; WITMER, Lawrence, Ohio University, Athens, OH, USA; RIDGELY, Ryan, Ohio University, Athens, OH, USA; HORNER, John, Museum of the Rockies, Bozeman, MT, USA

Interpreted in a phylogenetic context, brain endocast and nasal cavity morphology and ontogeny represent powerful tools to test functional hypotheses in extinct vertebrates. In order to test hypotheses of cranial crest function, endocasts of six corythosaurin lambeosaurines were generated through computed tomography and three-dimensional rendering and visualization software. The specimens represent a range of ontogenetic stages from the taxa *Lambeosaurus*, *Corythosaurus*, and *Hypacrosaurus*. The morphology of brain cavity endocasts in lambeosaurines differs little from that of hadrosaurines. The undivided olfactory region confirms that the olfactory bulbs were small and proximally situated with respect to the hemispheres. The hemispheres form a relatively large proportion of the overall size of the endocast, accounting for approximately 43% of the total endocranial volume at all ontogenetic stages. Relative to total endocast volume, the cerebrum is larger than that of many ornithischians and large theropods, but compares favorably to the maniraptoran theropod *Conchoraptor* (43%) and *Archaeopteryx* (45%) of considerably smaller body size. The nasal cavity reconstructions of juvenile *Lambeosaurus*, *Corythosaurus*, and *Hypacrosaurus stebingeri* are very similar, and appear relatively consistent with their reconstructed adult conditions. The vestibule forms the largest part of the nasal cavity, and the main olfactory region is closely associated with the olfactory bulbs and outside of the main airway. In *Hypacrosuarus altispinus*, the nasal vestibule is strikingly elongated and convoluted compared to all other corythosaurs. When interpreted in the context of lambeosaurine phylogeny, this suggests a strong selective pressure for nasal cavity function that operated independently from changes in the external shape of the crest. The vestibular apparatus reveals for the first time that the detailed structure of the lambeosaurine inner ear closely resembles that of hadrosaurines, and therefore confirms key assumptions of previous estimates of auditory sensitivity in the group as it relates to the resonation model of crest function.