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A CRANIUM OF SYMBOS CAVIFRONS (MAMMALIA) FROM THE MISSISSIPPI RIVER BETWEEN SOUTHERN ILLINOIS AND MISSOURI

Edwin C. Galbreath
Department of Zoology
Southern Illinois University, Carbondale

ABSTRACT. -- Description and discussion of the cranium and the endocranial cast are presented with speculation that the remains came from Wisconsinan deposits in Illinois. The cranial cast has a distinctive shape, possibly associated with structural support for the horns, that may be of taxonomic value or of use in identifying male and female individuals.

Remains of Symbos cavifrons (Leidy) are not rare but each ;covery of a specimen adds to our fund of knowledge concerning : species. In the fall of 1973 Randall Morgan, of Cape Girar- ıu, Missouri, presented a cranium to the Earth Science Depart- ıt of Southeast State Missouri University.

Provenance and Age of Specimen

The specimen was recovered during dredging operations a few .es south of Grand Tower, Illinois. Examination of the ante- ›r end of the cranium suggests that a more complete skull had :n buried and that little abrasive action had taken place after ;turbance and before recovery. I regard this as evidence that : cranium was not moved far from the place of preservation.

Some of the indurated matrix from a diploic sinus was sent to : Illinois State Geological Survey for evaluation. The mate- :l proved to be principally siderite with some quartz and traces other substances. No clay was found. Sedimentary siderites : precipitated by the action, in the absence of oxygen, of 'anic matter upon a bicarbonate solution of ferrous iron. This a process similar to the formation of bog iron ore; therefore, hink it is possible that the skull had been buried in a marsh bog. The nature of the Mississippi valley in this area, with : main channel next to the bluffs of Missouri and a broad flood :in to the east, suggests burial on the Illinois side of the 'er.

With our knowledge of the geological age of other discoveries Symbos cavifrons and the circumstances of the discovery ›orted here, it is probable that the age is Wisconsinan.

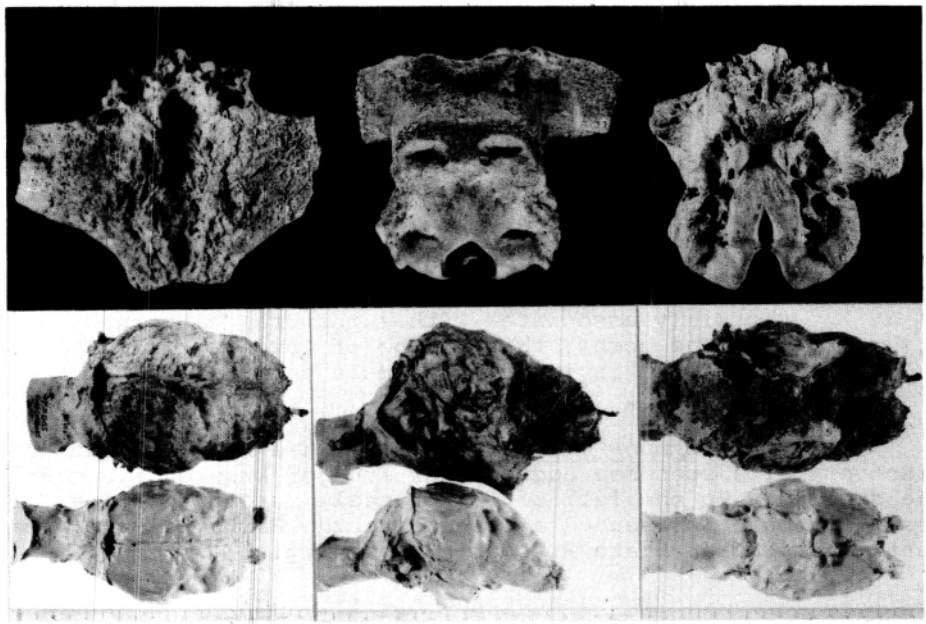

Figure 1. Top: dorsal, posterior and ventral views of the cranium of Symbos cavifrons dredged from the Mississippi River south of Grand Tower, Illinois. Middle: dorsal, lateral and ventral views of the endocranial cast of the specimen figured above. Bottom: dorsal, lateral and ventral views of the endocranial cast of Ovibos moschatus (female) No. 49314, Field Museum of Natural History, Chicago.

Description of Specimen

This specimen consists of the rear part of an adult skull (Fig. 1) broken from the front part at a point anterior to the horn cores and posterior to the orbits. Dimensions least affected by abrasion are:

Depth of skull from bottom of occipital condyles to top of exostosis, 228 mm.
Breadth from lateral surface of right mastoid to midline of skull, 102 mm.
Breadth of occipital condyles, 120 mm.
Breadth of basioccipital at posterior margin, 68 mm.
Width at ventral tips of post-glenoid processes, 110 mm.
Width of left horn core at a point 20 mm lateral to the protruding ledge of the parietal overhanging the fossa for the temporal muscle and perpendicular to axis of the horn at this point, 112 mm.
Depth of horn core in the plane described for the width, 77 mm.

Endocranial Cast

The cast bears a certain similarity to that of a female Ovibos moschatus (Zimmerman), the living musk ox. On the other hand, the cerebrum is relatively higher and wider in Symbos and the dorsal surface is more acutely curved in the tranverse plane. The cerebellum of Symbos is relatively shorter than the cerebrum when compared to the lengths of these parts in Ovibos. Furthermore the almost flat dorsal surface of the cerebellum in Symbos is strikingly different from the cerebellum of Ovibos (female) which has the dorsal surface arched in a manner that can be described as a median ridge. The resulting "peaked" shape of the endocranial cast of Symbos is unlike the shape of any artiodactyl brain figured in Brauer and Schober (1970) or endocranial casts of other artiodactyls seen by me. Some features are not readily displayed in Figure 2. The pons in Symbos is more rounded and swollen ventrally than in Ovibos (female). Equally undetectable is the indication that the facial nerves of Symbos arose from a point posterior to a transverse line marking the rear margin of the pons.

Discussion

I am not aware of any other endocranial cast of Symbos cavifrons, so I shall regard this cast to represent a normal condition worthy of attention.

I think it is a reasonable assumption that the unusual shape of the brain case reflects a relationship between the deep and relatively narrow cranium, the presence of the extensive exostosis on top of the skull, and the large horns but I realize that the relationship must be consistent with the evidence found in other specimens of S. cavifrons and in other species of musk oxen.

Enthusiasm causes me to wonder if the gross shape of the brain case could be a character of taxonomic value or, possibly, a feature that could be correlated with individual age and/or differences due to the sex of the individuals assigned to Symbos and Bootherium. See Semken, et al. (1964) for comments on some of these questions. For example, the specimens of Symbos tyrrelli (Osgood) from Alaska and the specimen from Nebraska assigned to S. tyrelli by Cook (1931, p. 278) would be a fit subject for investigation -- particularly since Hay (1914, p. 304) thought the type specimen to be a female S. cavifrons. The enigmatic Bootherium sargenti Gidley, even if a victim of hormonal imbalance, would yield some evidence on the shape of the brain case. The problem of recognizing the females of S. cavifrons is aggravating and, by any standard, can be described as a case of too many bulls and too few cows; I do not know if the shape of the brain case will resolve this problem but it might eliminate some species from further consideration.

Regardless of the merits of my speculations, the brain case

of Symbos cavifrons reveals an interesting field for research. Such a program is beyond my facilities but I urge its pursuit.

Acknowledgements

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