AN ICHTHYOSAUR BONE FROM THE JURASSIC OF SOUTH DAKOTA

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ABSTRACT

The first Jurassic ichthyosaur to be reported from South Dakota is a right angular, cf. *Baptanodon*. It is from the Sundance Formation in Rapid City, and found during 1962, but was only recently correctly identified.

Keywords

Ichthyosaur, Jurassic

INTRODUCTION

Although ichthyosaurs are well known from the Jurassic of Wyoming (Marsh, 1879, 1880A,1880B) none have previously been reported from the Jurassic of South Dakota, nor the Black Hills region. While some may exist in collections, the lack of recorded specimens and comparative materials from South Dakota has no doubt hindered their recognition. Some ichthyosaur fragments may indeed have been misidentified, as was the one described here. It is to be hoped that this reported occurrence will result in the recognition or discovery of others.

DISCOVERY

In 1962, excavations for a commercial development began on the east side of Jackson Boulevard (2100 block) in Rapid City, Pennington County, South Dakota. Mrs. Elsie Biegler, an enthusiastic amateur collector, was among those who inspected the site. Shelly fossils were numerous, and clearly indicated that the rock unit was the Sundance Formation, notably by the presence of belemnites. Mrs. Biegler also found a bone, which she generously donated to the Museum of Geology at the South Dakota School of Mines and Technology (SDSM). Although recorded and catalogued it remained unidentified until 1967, when one of us (D.C.P.) suggested that it might be a fish spine. This suggestion was generally accepted and the specimen long reposed under this name. Re-examined after a chance encounter in the collections during 1998, it proved to be of reptilian affinities instead, and is the only South Dakota specimen of a Jurassic ichthyosaur known to us.

SYSTEMATIC PALEONTOLOGY
Order Ichthyosauria Blainville 1835
Family Ichthyosauridae Baur 1887
Genus *Baptanodon* Marsh 1880
cf. *Baptanodon* sp. (Figure 1)

Referred Material: SDSM 62277, a right angular bone.

Provenience: Sundance Formation (Jurassic) in Rapid City, Pennington County, South Dakota, from an excavation in the Northeast Quarter of the Northeast Quarter of the Southeast Quarter of Section Three, Township One North, Range Seven East (Cattermole, 1969). Glauconitic sandstone adhering to the specimen, as well as its probable position low in the section, indicate that it came from the Stockade Beaver Shale Member of the Sundance Formation. The member has a thickness of up to twenty-five meters in the area and is correlated to the Bathonian and Callovian stages (Gries and Martin, 1985). Remaining exposures of rocks at the site, revisited during 1999, confirmed the provenience of the specimen; identical matrix was collected from the outcrop. Description: The specimen, SDSM 62277, is a mandibular element, the right angular bone. Situated in the ventral edge of the posterior part of the mandible, the angular generally has dorsal grooves for articulation with the surangular and dentary. Presence of these dorsal grooves led to recognition of the bone as reptilian, and its comparison with Jurassic ichthyosaur taxa.

The angular bone in ichthyosaurs is elongate and relatively straight compared to the angular bones of other reptilian groups and bears a distinctive lateral flange on the labial posterior side as well as the previously mentioned dorsal grooves. The descriptions of McGowan (1973) and Romer (1968) are particularly instructive in this regard. The specimen is a virtually complete angular of actual length 265 mm. Comparison to Yale University specimen YPM 1979, an isolated angular of *Ophthalmosaurus* (from the Oxford Clay of England), was essential to identification of the bone. The specimens compare closely even in size and surface texture and in the position and proportions of the posterior/lateral flange. Both specimens bear two dorsal grooves for articulation with the surangular and dentary bones but differ in the proportions of the grooves. They are subequal in SDSM 62277, while in YPM 1979 the medial one is considerably larger in size and more extensive in length. The lateral groove runs nearly the entire length in SDSM 62277. In YPM 1979 it is well-developed only in the vicinity of the posterior lateral flange, extending only slightly anterior to it and existing only as a slight depression rostrally. The two specimens may be presumed to be from different taxa. The differing groove proportions presumably indicate a surangular and dentary of subequal size (caudoventral thickness) in SDSM 62277, while in YPM 1979 the surangular was of dominant size in this region of the mandible.

IDENTIFICATION

The best-known genus of ichthyosaur from the Sundance Formation is *Baptanodon* Marsh (1879, 1880A, 1880B), of which several species have been

described. Although we have no angular bone of *Baptanodon* for comparison, the expectation that it would be similar to that of *Opthalmosaurus* (as compared here) is reasonable. The two genera have been considered synonyms by some authors, for example Dechaseaux (1955), and McGowan (1991), but discussion of the validity of that synonymy is beyond the scope of this report. We have, of course, noted how the angular of SDSM 62277 differs from that of the specimen of *Opthalmosaurus* at Yale. We refer the South Dakota specimen to cf. *Baptanodon* sp. and note that the long expected occurrence of ichthyosaurs in the Jurassic of South Dakota is now documented.

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REFERENCES CITED

Baur, G. 1887. On the morphology and origin of the Icthyopterygia. American Naturalist 21;837-840.

Blainville, H.M.D. de. 1835. Description de quelques especies de reptiles de la Californie. Nouvelles Annales du Museum díHistoire Naturelle 4:233-296.

Cattermole, J.M. 1969. Geologic map of the Rapid City West Quadrangle, Pennington County, South Dakota, United States Geological Survey, Geologic Quadrangle GQ - 828, Scale 1:24,000.

Dechaseaux, C. 1955. Ichthyopterygia. IN J. Piveteau (Ed.), Traite de Paleontologie, pp 376-408. Paris.

Gries, J.P. and Martin, J.E. 1985. Composite Outcrop Section of the Paleozoic and Mesozoic strata in the Black Hills and surrounding areas. IN Rich, F.J. ed. Geology of the Black Hills, South Dakota and Wyoming, American Geological Institute, 2nd edition p. 261-292.

Marsh, O.C. 1879 A new order of extinct reptiles (Sauranodonta) from the Jurassic formation of the Rocky Mountains. American Journal of Science (3), xvii, pp. 85-86

Marsh, O.C. 1880A. The limbs of *Sauranodon,* with notice of a new species. American Journal of Science (3), xix, pp. 169-171.

Marsh, O.C. 1880B. Note on *Sauranodon*. American Journal of Science (3), xix, pp. 160-171.

McGowan, C. 1973. The cranial morphology of the Lower Liassic latipinnate ichthyosaurs of England. Bulletin of the British Museum (Natural History), Geology 24:1 - 109.

McGowan, C. 1978. Further evidence for the wide geographical distribution of ichthyosaur taxa (Reptilia, Ichthyosauria). Journal of Paleontology 52:1155-1162.

McGowan, C. 1991 Dinosaur, Spitfires, and Sea Dragons. Harvard University Press, Cambridge, Massachusetts, 365 pp.

Romer, A.S. 1968. An ichthyosaur skull from the Cretaceous of Wyoming. Contributions to Geology, University of Wyoming 7:27-41.

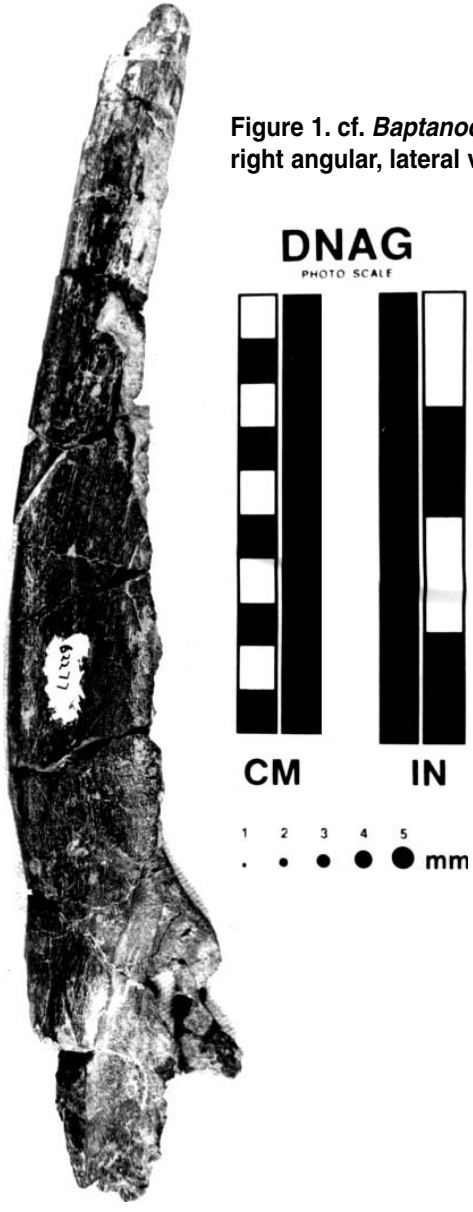

Figure 1. cf. *Baptanodon* sp. right angular, lateral view.