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A ?DIAPSID (REPTILIA) PARIETAL FROM THE LOWER PERMIAN OF OKLAHOMA

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ABSTRACT

A single isolated parietal bone from the Fort Sill deposit of Oklahoma is described. It has a well-developed upper temporal opening, resembling that of the primitive South African diapsids. The parietal is compared with that of *Araeoscelis* and *Youngopsis*. Based on comparison with this parietal and the configuration of the rear skull table of millerosaurs and romeriids, the bone usually identified as tabular in younginids is designated the supratemporal. The Fort Sill parietal may belong to a form structurally, if not phylogenetically, intermediate between primitive captorhinomorphs and eosuchians.

INTRODUCTION

It is generally recognized that the primitive millerosaurs and eosuchians from the Middle and Upper Permian of South Africa evolved from forms related to the romeriid captorhinomorphs of the Upper Pennsylvanian and Lower Permian of North America

(Romer 1956 and 1966). There remains a considerable morphological gap between these groups, however, and none of the known North American genera appear to have developed the specific features which characterize the African forms. The discovery of a single isolated right parietal from the Lower Permian of Fort Sill, Oklahoma, suggests that ancestral eosuchians may occur in the North American fauna.

The fossil vertebrates from Fort Sill occur in fissure fillings in Ordovician limestone. No direct stratigraphic correlation with the extensive deltaic deposits of Oklahoma and Texas is possible, but on faunal grounds this locality appears comparable to the Arroyo Formation of Texas (Gregory, Peabody, and Price 1956; Fox and Bowman 1966). Numerous papers have been written describing particular taxa from the Fort Sill locality (e.g., Gregory, Peabody, and Price 1956; Fox 1962; Fox and Bowman 1966; Vaughn 1958), but no study of the entire fauna has been published. Many isolated bones are present in this deposit which cannot be attributed to recognized genera, indicating a large and varied fauna.

Description and Comparison

The parietal (Peabody Museum, Yale University, YPM no. 4926, Figures 1-3) was found during a search for additional material of the microsaurs *Cardiocephalus* and *Euryodus* which are being restudied as part of a general review of this order. During this study, collections from Fort Sill at the Museum of Comparative Zoology, Harvard University; American Museum of Natural History; University of Kansas; University of Michigan; and Field Museum, Chicago, were examined, but without finding additional remains which could be associated with this parietal. Despite the isolated nature of this bone, its possible taxonomic significance is sufficient to justify description. It is perfectly preserved, showing no evidence of crushing, breakage or wear. As with other isolated bones from this locality, it shows no evidence of deformation, indicating retention of the original curvature.

This parietal shows a deep embayment for an upper temporal opening and well developed surfaces for articulation with the surrounding bones. The only genus from the North American Lower Permian which has a comparable parietal is *Araeoscelis*

(Vaughn 1955) known from the Admiral, Belle Plains, and Arroyo formations of northern Texas. *Araeoscelis* has a well develloped dorsal temporal opening, but no ventral fenestra. This isolated parietal differs from that of *Araeoscelis* in having a larger and more posteriorly placed pineal opening, and in the greater

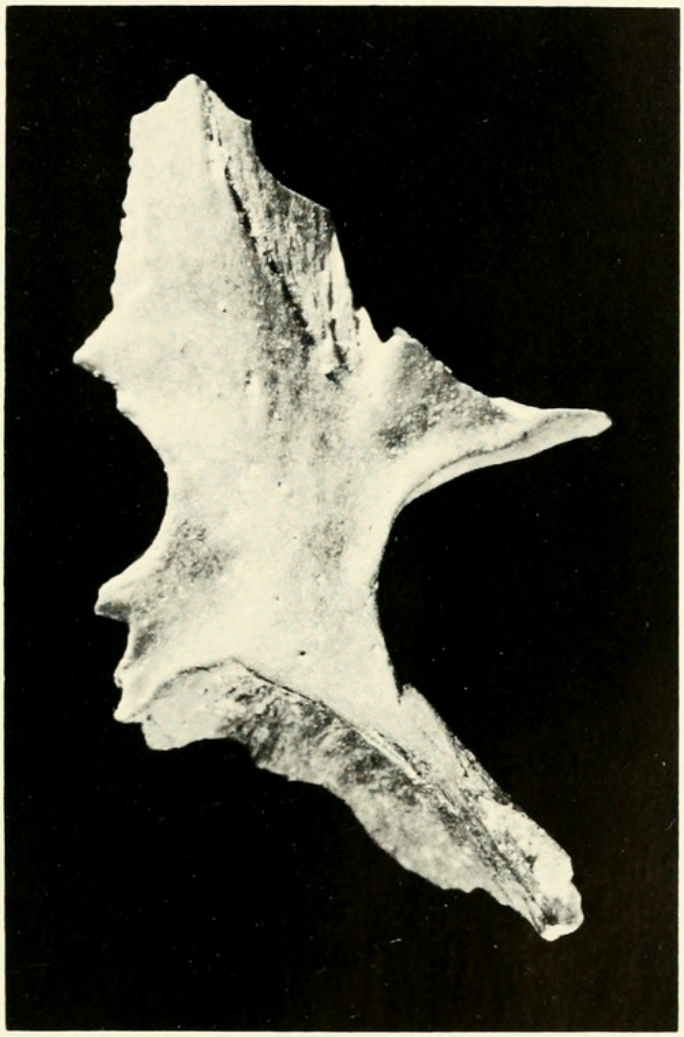


FIG. 1. Photograph of right parietal, Peabody Museum, Yale University, YPM no. 4926, in dorsal view, × 6.

medial extent of the temporal opening. The parietal is only very slightly curved transversely, indicating that the temporal opening faced almost directly dorsally as in *Youngina* and *Prolacerta,* rather than dorsolaterally as in *Araeoscelis.* This suggests that, as in the former genera, this form may have had a lower temporal opening as well. In contrast with all of these genera, a large wing of the parietal extends anterior to the temporal opening.

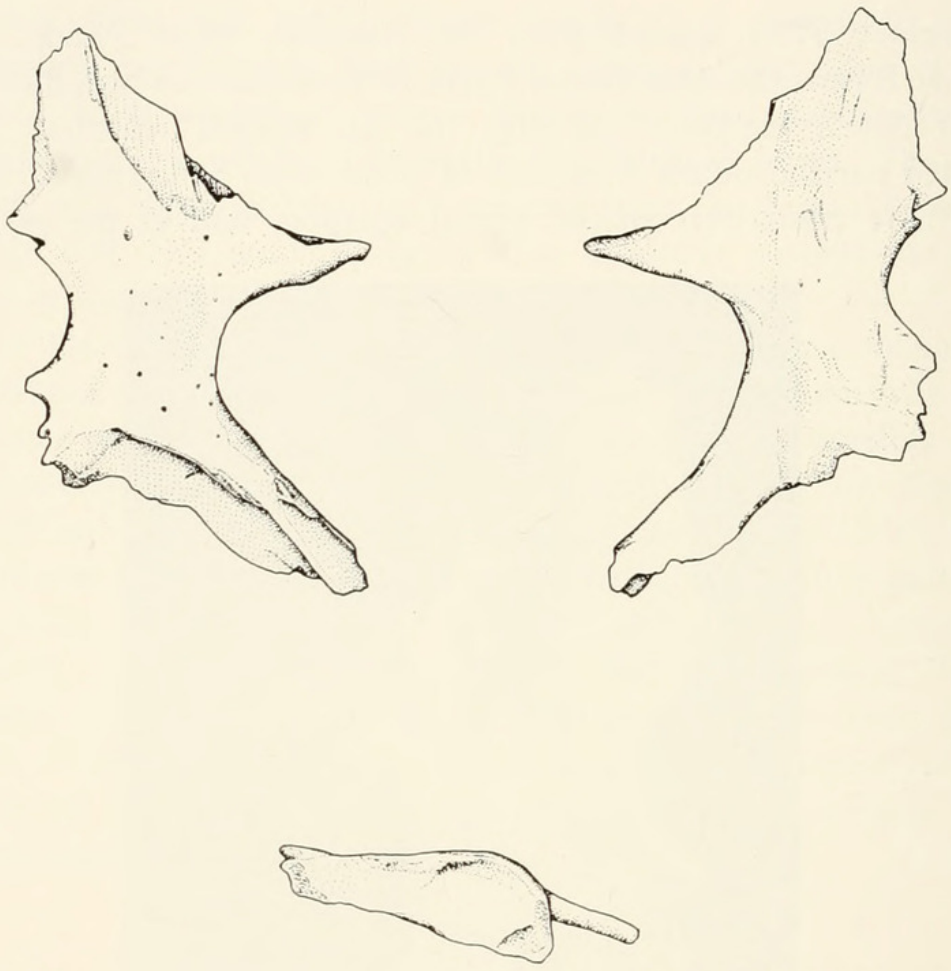
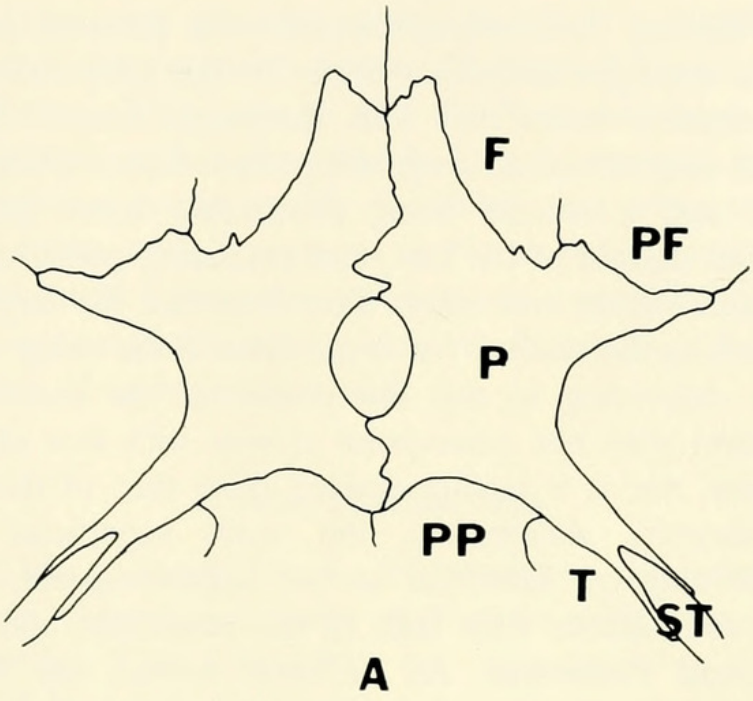


FIG. 2. Drawing of right parietal, YPM 4926, in dorsal, ventral and posterior views, × 4.

The anterior margin of this extension shows areas for articulation with the frontal and postfrontal, but no separate area for the postorbital. The postorbital is excluded from contact with the parietal in *Youngina* and *Prolacerta* but retains contact in *Araeoscelis*. The areas for articulation with the postparietal, tabular and supratemporal resemble those of *Araeoscelis* and romeriid captorhinomorphs. The postparietals appear to have a greater lateral extent than those of the South African genera. It is difficult to compare the position of the supratemporal (clearly shown on this specimen) with that of *Youngina* due to the conflicting interpretations of that genus by recent workers (Watson 1956 and Romer 1966).

A.W. Crompton, of the Peabody Museum, Yale University, has very generously allowed me to reproduce a drawing (Fig. 3B) of the type of the closely related genus *Youngopsis,* which he is



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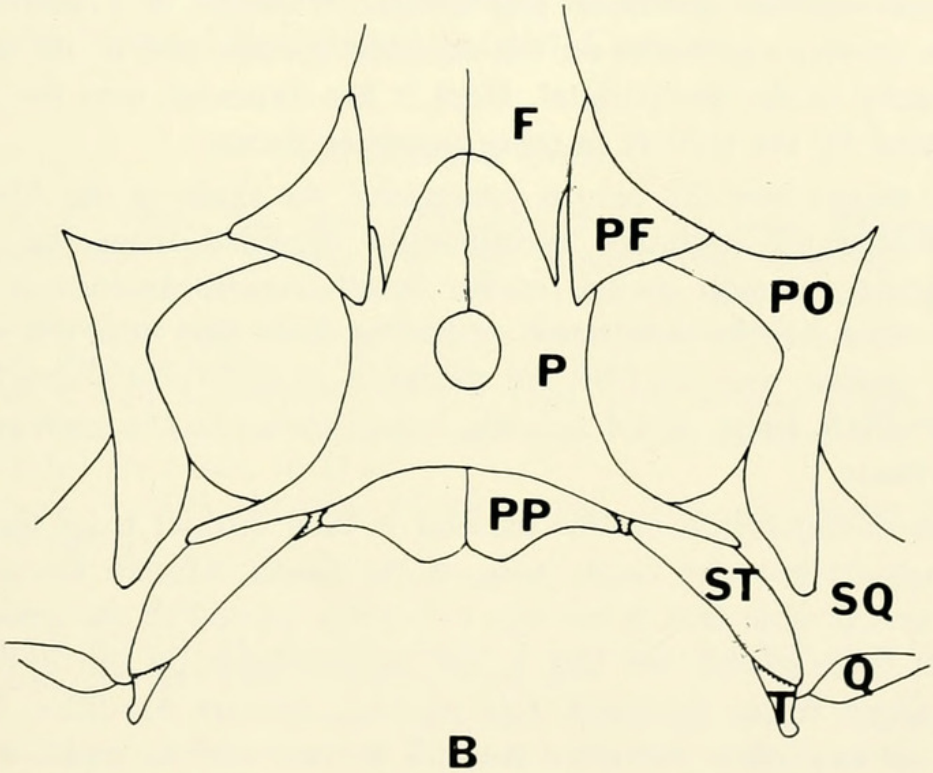

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FIG. 3A. Reconstruction based on YPM 4926 indicating the area of articulation of the adjacent bones. Left parietal restored as a mirror image of the right, × 4.

FIG. 3B. Posterior portion of the skull roof of *Youngopsis,* simplified from a drawing by Dr. Crompton, for comparison with the Fort Sill specimen. F = frontal; P = parietal; PF = postfrontal; PO = postorbital; PP = postparietal; Q = quadrate; SQ = squamosal; ST = supratemporal; T = tabular.

currently studying, for comparison with this parietal. In *Youngopsis,* there are apparently two bones in the temporal series, an extensive element articulated with the posterolateral margin of the parietal and extending over the posterodorsal margin of the squamosal, and a second bone, protruding from beneath the posterolateral margin of the first, and extending posteriorly above the quadrate. Watson and others have identified the larger, superficial element as the tabular (with the other bone being the supratemporal). According to this interpretation, the position of the supratemporal does not correspond closely with that of the Fort Sill specimen, nor is it readily derived from that of the romeriid captorhinomorphs. Alternately, the more superficial bone in *Youngopsis* may be identified as the supratemporal, in which case it is comparable with that of the romeriids, the Fort Sill specimen, and *Prolacerta.* As in these forms, the bone now designated supratemporal inserts in a notch in the parietal lappet, and overlaps the squamosal and tabular. It differs, in *Youngopsis,* in the greater expansion on the occipital surface and in its closer proximity to the postparietal. Here it has extended into the area occupied by the tabular in more primitive forms.

No matter how this area is interpreted, the skulls of the African eosuchians are certainly considerably modified from the configuration common to the earlier North American forms. Yet, the former may be interpreted as having developed from the same basic pattern, with the Fort Sill specimen exemplifying a structural intermediate stage, if not actually being related to the ancestry of eosuchians.

The configuration of this parietal is thus distinct from that of *Araeoscelis* but also from those of the South African Eosuchia. It is conceivable that it belongs to a form related to the ancestry of the latter group, but this is not determinable on the basis of this single bone. Although this parietal appears to differ from those of any other described form, I do not wish to make it the basis of a new taxon. Despite its almost perfect preservation, it might be difficult to compare it with subsequently discovered specimens, particularly since several species might have essentially indistinguishable parietals.

Although other isolated material from Fort Sill may be found to belong to the same species as this parietal, it appears that this

form is a very rare element in this fauna. It is apparently not represented in the extensive deltaic deposits of Texas, Oklahoma or New Mexico. This suggests that the form may have lived in a different habitat, such as the uplands, little represented in this area.

This specimen opens up the possibility that other elements of an upland fauna may be present in North America at this time. Such forms might bridge the gap between captorhinomorphs and the millerosaurs and eosuchians of South Africa, and could include the ancestors of archosaurs as well.

Acknowledgments

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