

NUMBER 62

DECEMBER 14, 1918

OCCASIONAL PAPERS OF THE MUSEUM OF  
ZOOLOGY

---

UNIVERSITY OF MICHIGAN

ANN ARBOR, MICHIGAN

PUBLISHED BY THE UNIVERSITY

---

A MOUNTED SKELETON OF *EDAPHOSAURUS*  
*CRUCIGER* COPE, IN THE GEOLOGICAL COL-  
LECTION OF THE UNIVERSITY OF  
MICHIGAN

BY E. C. CASE

In 1913 an expedition from the University of Michigan excavated the Brier Creek Bone Bed in Archer County, Texas, discovered the previous year. From this bone bed over fifteen hundred specimens, mostly of isolated bones, were recovered. From this large amount of material two skeletons have so far been restored showing the complete skeletal anatomy of the great lizard-like Permo-Carboniferous reptiles *Dimetrodon* (completed in 1915 and now in the Museum of Zoology of the University) and *Edaphosaurus*, just completed.

The genus *Edaphosaurus* has been one of the most puzzling forms of reptilian life of the late Paleozoic and the completion of a mount showing its characters is the final result of many collecting trips and trial mounts. The striking peculiarity of

this form is the development of greatly elongated neural spines with prominent lateral projections on all the pre-sacral vertebrae. This peculiarity led to the identification of the first fragments of the spines as bits of petrified branches; later when their true nature was made out Cope described the animal as Naosaurus, the Ship-lizard, from the fancied resemblance of the cross-bars on the spines to the yard-arms of a ship. For a long time, when the skeleton was only imperfectly known, it was supposed that the animal was carnivorous in habit because of the general resemblance of the known bones to those of the carnivorous genus *Dimetrodon* with elongated, but smooth, spines. It was finally shown that the skull of a herbivorous or molluscivorous form previously described as *Edaphosaurus* really belonged with the cross-barred spines and the long used name *Naosaurus* was necessarily abandoned.

The skeleton as now mounted shows an animal with a relatively small skull provided with sharp conical teeth on the edges of the jaws and strong plates filled with blunt, crushing teeth on the dentary bones and the palate. The dorsal spines rise abruptly from just back of the skull to a considerable height and then curve back over the pelvic region. The sacral spines are abruptly shortened. The spines of all the pre-caudal vertebrae are provided with cross-bars. The lower pair are prominent and probably marked the upper limit of dorsal muscles; above this pair the cross-bars are rapidly reduced in size until above the center of the length of the spine they are reduced to knobs and lose the paired arrangement. The spines in the species *E. cruciger* terminate in blunt points. In other species of the same genus the shape of the spines and the size and arrangement of the cross-bars are notably different.

The animal possessed a broad scapula quite different in form from that of *Dimetrodon*. There is a small splint-like cleithrum, the clavicle is shorter and heavier than in *Dimetrodon*, the interclavicle has a stouter anterior end but a similar, elongate posterior projection. The humerus is quite like that of *Dimetrodon* in general form but possesses an ectepicondylar as well as an entepicondylar foramen. The lower arm bones are decidedly shorter and heavier than in *Dimetrodon*. The pelvis lacks the strong posterior prolongation of the ilium; instead, this bone is flared out into a broad, flat surface with a deeply grooved inner surface for cartilaginous attachment to the two sacral ribs. The femur has the bicipital groove extending further down the anterior face, bounded by strong ridges. The lower leg bones are short and heavy. No specimen has been found in which the feet are preserved and in the mount the feet are modeled after those of *Dimetrodon*. There is some reason to think that this is not correct and the arrangement is regarded as provisional. Certain very large and heavy claws found in the bone bed and in all probability not belonging to *Dimetrodon* may belong to *Edaphosaurus*. The ribs show that the animal had a fairly heavy body which was probably increased by the large size of the visceral cavity. That the tail was fairly long and provided with a distinct dorsal crest is shown by the neural spines, but the chevron bones were small and there is no indication of natatorial power.

The remains of this reptile are not uncommon in the Permian-Carboniferous deposits but the bones are mostly isolated and frequently water worn. It is believed that it lived upon higher land some distance from the lagoons and pools in the deposits of which the bones are found, and that the partially destroyed cadavers or isolated bones were transported to the place of

burial and preservation by streams. The character of the teeth shows that the animal lived upon vegetation or hard-shelled molluscs which were crushed by the blunt teeth upon the palatal and dentary plates. The shortness of the lower limbs shows that the movements were slow, while the stoutness of the limb bones and girdles indicates great strength. The animal probably lived upon the upland eating hard vegetation or roots which it excavated with its powerful claws or haunted the banks of upland streams devouring vegetation and hard-shelled molluscs.

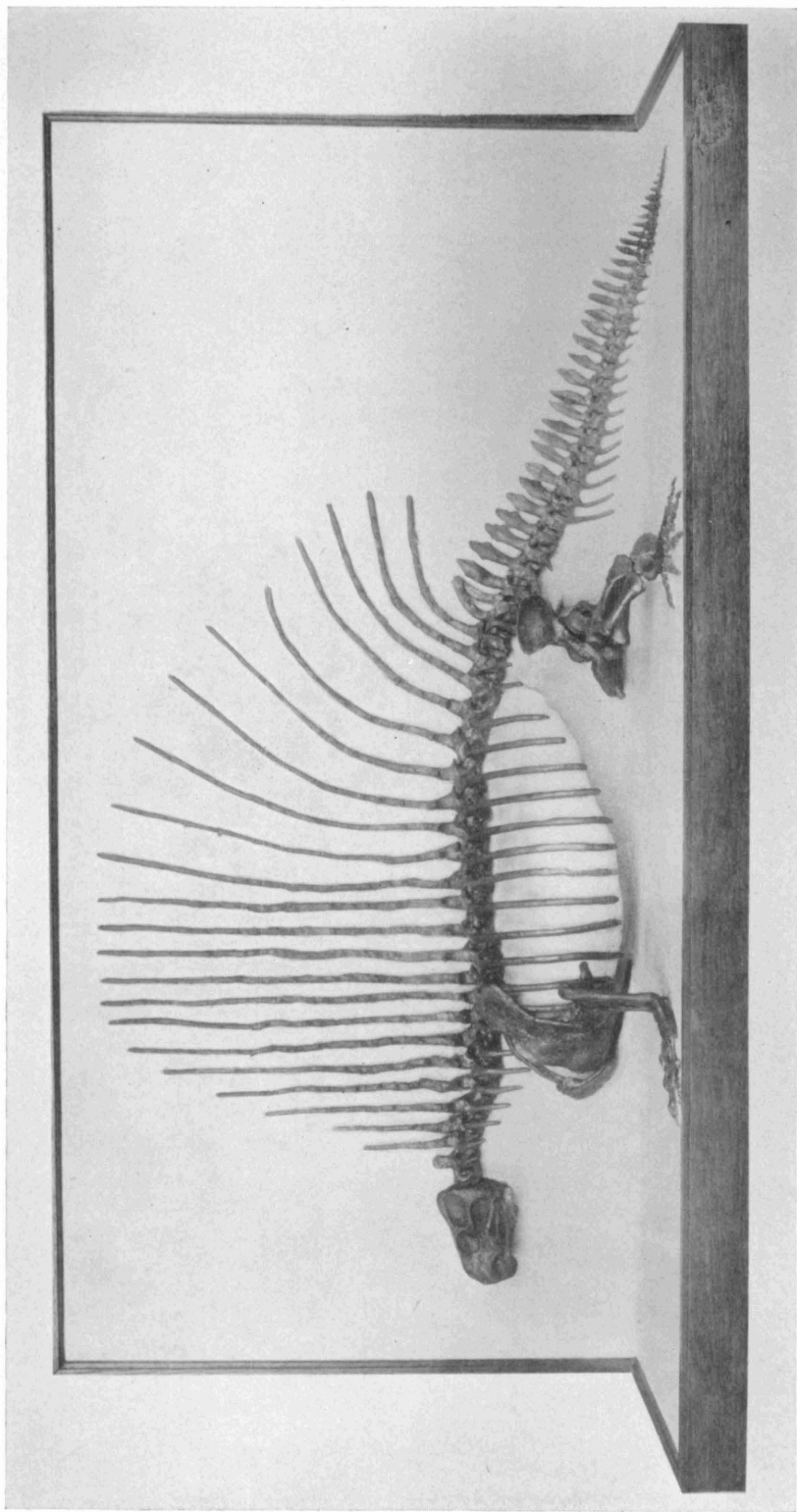
No rational explanation has been given for the enormous development of the neural spines upon a functional basis. It is the opinion of the author, elsewhere expressed, that the spines are a case of physiological overgrowth starting from smaller spines in some ancestral form in which they were of advantage. Living apart from the fierce carnivores of the time, *Edaphosaurus* had probably found some degree of isolation which permitted the spines once started to increase beyond any size which would have been useful to the individual. Despite the physiological burden of the exaggerated spines, the animals were for a time successful for not only do the remains occur in considerable quantity but they are found as widely distributed as Oklahoma, Texas, Pennsylvania, and Ohio.

In the reconstructed skeleton and in the restoration the animal is shown in a normal resting posture with the head only slightly raised, this seems more natural than in a previous reconstruction of the skeleton made at another institution where the animal is shown raised upon the limbs in an attitude which could only have been assumed by an unusual effort and maintained for only a very brief period.



## PLATE I

Reconstruction of the skeleton of *Edaphosaurus cruciger* Cope. The skull is a plaster cast of the only known skull, the terminal caudal vertebrae and some of the ribs are restored in plaster. One-twelfth natural size.









## PLATE II

Restoration of *Edaphosaurus cruciger* Cope. One-twelfth natural size.

