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A MOUNTED SKELETON OF THE MAMMAL-LIKE REPTILE *DICYNODON TIGRICEPS*

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ABSTRACT

A skeleton of *Dicynodon tigriceps* from the Upper Permian of the Murraysburg District, Cape Province, South Africa, has been mounted in the Walker Museum of the University of Chicago. The specimen is briefly described in the present paper. The large dicynodonts, which were prey of contemporary large carnivores, appear to have lived in a region of moderately warm, moist climate.

An almost complete skeleton of *Dicynodon tigriceps* was discovered by Dr. A. S. Romer during a trip to South Africa undertaken for the University of Chicago by him and Mr. P. C. Miller in 1929. This specimen has since been mounted by Mr. Miller and placed on exhibition in the Walker Museum of the University of Chicago. It is the first skeleton of a large dicynodont to be mounted in any museum, although mounts of certain smaller species are to be found in other institutions.

This fine skeleton was found about 20 miles northwest of Murraysburg, in the Murraysburg district of Cape Province, a region which proved to be the richest visited during the trip. The horizon in which the specimen occurred is the Murraysburg division of the Upper Permian. In the same beds fragmentary remains of other dicynodonts, a gorganopsian, and the skull of the rare diapsid reptile *Youngina* were found.

The matrix in which the specimen was embedded is an extremely hard, compact, dark-gray shale. The tail of the animal was weathered out and partially destroyed; a small part of the base of the pelvic girdle was exposed so that the bone on either side of the puboischio symphysis was lost. The rest of the skeleton is almost complete except for the feet which were only partially preserved.

The skull of the animal, although slightly flattened, is very nearly complete. It is marked by a very large, lateral temporal fenestra which is separated from the orbit only by a narrow bar composed of

the postorbital bone. The small pineal opening is completely surrounded by the preparietal bone which forms a slightly raised elliptical area on the dorsal surface of the skull between the temporal openings. The nasal bones are broad and heavy and overhang the nostrils. No teeth were ever developed in the jaws, although in the type specimen of the species two tusk-like canines are present. Broom has cited evidence which indicates that the presence or absence of canine teeth in otherwise identical forms is probably a

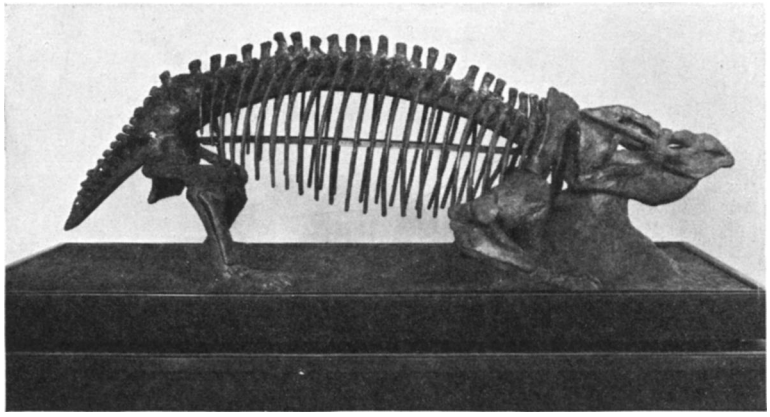

FIG. 1.—Lateral aspect of skeleton of *Dicynodon tigriceps*. Length of original about 6½ feet.

secondary sexual character, the males presumably possessing the tusks.

The vertebral column is composed of 26 presacral vertebrae, 5 sacrals, and about 15 caudals. It is mounted in such a way that the vertebrae midway between the anterior and posterior extremities form the apex of an arch which slopes fore and aft to bring the skull and the tip of the tail close to the ground. This appears to have been the condition which existed in the living animal. No sharp line of demarcation is visible between the dorsal and cervical and dorsal and lumbar vertebrae in the mounted specimen. The dorsal part of the atlas is composed of a pair of elements which forms the arch; the dorsal part of the axis has a narrow arch and a broad but short spine. The central and intercentral elements of these vertebrae can-

not be made out in the mounted specimen. The remaining presacral vertebrae are all very much alike, with the possible exception of the first five or six on which the facets for the articulation of the ribs are not clear. The neural spines of all the dorsal vertebrae are about 2 inches long, being short in comparison to the size of the animal. The 5 sacral vertebrae are similar to the dorsals except for the transverse processes which are large and fused to the ribs. The centra of the first 8 caudal vertebrae are preserved. A rapid decrease in their size posteriorly indicates that the tail was composed of not more than 15 segments. Thirteen are represented in the mounted skeleton, the last 5 being restored.

Several complete ribs and many nearly complete ones were found associated with the spinal column. Free ribs are present on all the presacral vertebrae with the possible exception of the atlas for which no rib was found. They are all relatively long, the maximum length being reached on about the fifteenth vertebra. Even the most anterior cervical and the most posterior dorsal ribs are over one-half the length of the longest dorsal one. The arched curve of the spinal column brings the distal ends of most of the ribs into approximately the same horizontal plane, giving the trunk a barrel-like appearance. The five sacral ribs are very heavy and are indistinguishably fused to the transverse processes of the vertebrae. All the caudal ribs appear to have been fixed.

The limbs have been mounted in the position which they must have assumed when the animal was walking. The shoulder and pelvic girdles and the long elements of the limbs are complete except for the pubo-ischio symphysis of the pelvis. In the shoulder girdle there is a well-developed, spatula-like scapula, a coracoid and precoracoid, a large clavicle, and a moderately large interclavicle. The pelvic girdle has an expanded ilium to which the sacral ribs attach, and a comparatively small pubis and ischium.

The limbs in the dicynodonts are partially rotated from the primitive position, in which they project straight out to either side, so that the knee points forward and the elbow points somewhat backward. In *Dicynodon tigriceps* the rotation is much more pronounced in the hind limb than in the front. The tendency of this rotation is to bring the limbs under the body and to make for efficient locomo-

tion. The limb bones of the large dicynodonts are relatively short and heavy and possess strong processes for the insertions of muscles. Only a few of the carpals, tarsals, and more distal elements of the feet were found associated with the specimen of *Dicynodon tigriceps;* the remaining parts have been restored from other specimens.

The general outlines of the skeleton, the indications of a heavy limb musculature, and the toothless condition of the jaws which almost certainly terminated in a horny beak, suggest that the large dicynodonts were sluggish, herbivorous forms which lived in areas of abundant, soft vegetation. The climate of the region must have been radically different from that which today can support only a meager flora. However, very few plant fossils are found in the beds in which the vertebrate remains occur, and, consequently, it is difficult to picture the precise conditions under which the Upper Permian fauna existed. But it may be confidently inferred that the region was one of moderate to warm temperatures the year round and of sufficient rainfall to support a moderately luxuriant flora.

The dicynodonts must have been entirely defenseless against attacks of the contemporary large carnivorous reptiles such as the gorganopsians, unless, as seems highly improbable, the tusks which were present in the males were a means of defense. They may possibly have sought protection in swamps and other localities in which a heavy growth of vegetation would render them inconspicuous. But it can hardly be doubted that these large, rather clumsy, slow-witted herbivores furnished a major source of food for both the true carnivores and the carrion feeders of their times. It is Broom's opinion that the destruction of these forms by the carnivores accounts for the rare occurrence of complete skeletons which makes the one now mounted in the Walker Museum a particularly valuable addition to the collection of dicynodonts.