



SKELETON OF TRACHODON IN THE U. S. NATIONAL MUSEUM. (Mounted by Alban Stewart.)

THE DINOSAUR TRACHODON ANNECTENS

By F. A. LUCAS

The skeleton of *Trachodon*, or *Claosaurus*, recently placed on exhibition in the U. S. National Museum, is an unusually perfect example of that group of extinct reptiles, the dinosaurs. It was included in the Marsh collection and was one of two nearly complete skeletons obtained by Mr. J. B. Hatcher some years ago on Lance creek, Wyoming. The completeness of the specimen is due to the fact that the animal was either engulfed in quicksand, and so came to his end, or that by some favorable accident, such as a cloudburst or a freshet, the body was otherwise covered with sand immediately after death, and before decomposition had set in. Whatever may have happened, the result was that the bones remained in place, the ribs being attached to their respective vertebræ and the great thigh bones remaining in their sockets, the legs even having the position they would take in walking. This is shown in pl. LXXII, for in mounting the skeleton the ends of the thigh bones were left as found. Some examples of *Trachodon* have been obtained in which the impression of the skin was preserved in the surrounding rock, and from these it is known that this animal was covered with small, irregularly six-sided, horny plates, somewhat like those covering portions of the bodies of crocodiles. Unfortunately the wearing away of the rock in which the present specimen was contained had exposed some of the bones, and portions of them had been damaged and the front of the skull weathered away before its discovery in the summer of 1891. The rock containing the bones was then taken up in sections and shipped to Yale University where a large portion of the matrix was removed in order that the bones might be studied. This revealed the presence of long, slender bones, or ossified tendons, that had been embedded in the muscles overlying the backbone in the region of the back and upper part of the tail, and still situated as they were in life. These tendons are not shown in the specimen as mounted, because in order to display the vertebræ it was necessary to remove the tendons and the underlying rock; they are, however, present on the right side which is buried in the background. The object of these tendons is to afford support to the muscles of the back and tail and to strengthen

these regions of the body. Similar ossified tendons are found in many diving birds, such as auks and loons, the object being to brace the body against the strain it is called upon to undergo when a fish is caught and is carried in the beak. In the case of *Trachodon* the strain was due to the weight of the tail, which was, as we shall see, held clear of the ground in walking.

The final preparation of the skeleton, its mounting, and the restoration of the missing or damaged parts was most skilfully performed by Mr. Alban Stewart, of the U. S. National Museum, who devoted to it many months of patient work.

Trachodon is a typical example of that group of dinosaurs called Predentata because the front of the lower jaw is formed by a bone preceding the tooth-bearing portion, and therefore termed the pre-dentary bone. This was probably encased in horn, like the beak of

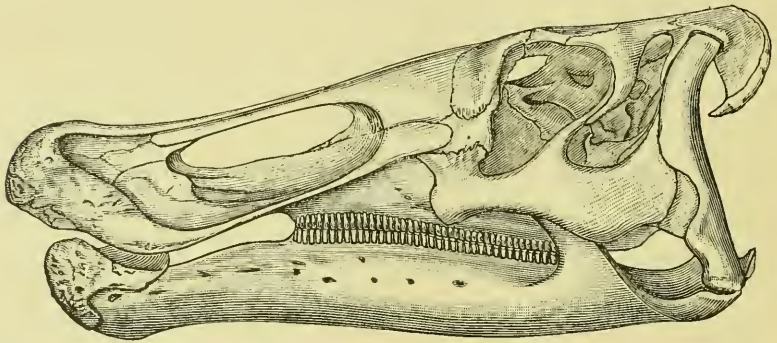


FIG. 40.—Skull of *Trachodon*, showing the pre-dentary bone.

a turtle, and served for nipping off the branches or herbage on which these animals fed. As the members of the Predentata had but three well-developed toes on the hind feet, and often no more, so that their feet resembled those of birds, the group has also received the name of Ornithopoda, or bird-footed. The animals of this division were all herbivorous and were probably preyed upon by their carnivorous relatives. The particular subdivision, or family, of which *Trachodon* is a member is called the Iguanodontidæ (iguana-toothed), from the name *Iguanodon* bestowed by Mantell on the first species found in England, the name being given because the teeth were attached to the inner side of the jaw as in iguanas. In the case of *Trachodon* there were several series of teeth placed one above the other, the entire series moving slowly upward, new teeth forming at the base to supply the place of those worn away at the top. This arrangement greatly increased the number of teeth, there being over two



SKELETON OF TRACHODON (HADROSAURUS) AS RESTORED BY
B. WATERHOUSE HAWKINS.

hundred on each side of the lower jaw, so closely packed together as to appear like a mosaic pavement.

The family of *Iguanodons* had an extensive geographical range, for their remains have been found in Austria, Belgium, and England; and in New Jersey, Colorado, Wyoming, Montana, and Alberta, in North America. The first hint of their presence in this country was the discovery of teeth in the Judith River region, Montana, in 1856; but not until a partial skeleton was found near Monmouth, New Jersey, was it fully realized that these teeth belonged to some relative of the European *Iguanodon*.

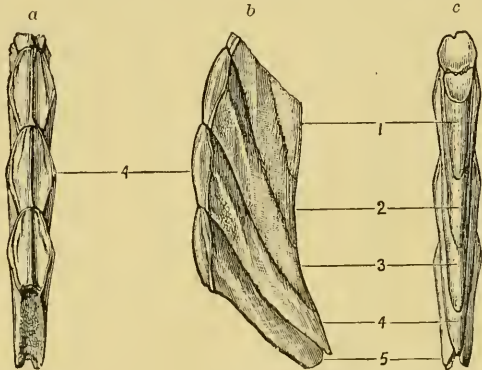


FIG. 41.—Series of five teeth of *Trachodon*, showing the new teeth at the bottom, and the old, worn teeth at the top. Somewhat reduced.

The New Jersey specimen was described by Doctor Leidy under the name *Hadrosaurus foulkii*, and the bones,

which were deposited in the Academy of Natural Sciences of Philadelphia, furnished the basis for a restoration of the skeleton by Mr. B. Waterhouse Hawkins. At this time the structure of the dinosaurs was not well known, and Mr. Hawkins, who was not a comparative anatomist, while recognizing the upright position of the animal, restored the missing parts from the skeleton of a modern iguana, the result being the skeleton shown in plate LXXIII. While this restoration was far from cor-

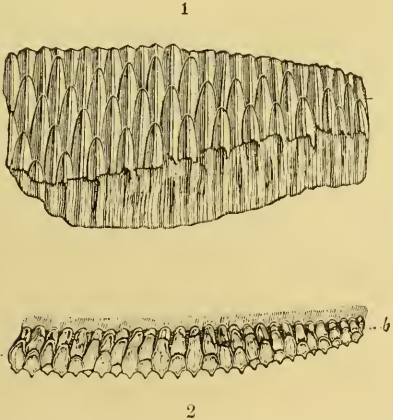


FIG. 42.—Group of *Trachodon* teeth (1) seen from the outer side and (2) from above. Much reduced.

rect, especially in regard to the skull, it was a decided improvement on that of *Iguanodon* shown at the Crystal Palace,

Sydenham, which represented this dinosaur as a sort of elephantine reptile walking on all fours. That *Trachodon* and his kindred walked erect and carried their tails clear of the ground is indicated by their structure, while much light is thrown on the subject by tracks made by various dinosaurs. At Hastings, England, is a series of thirty great bird-like tracks, ascribed to *Iguanodon*, and showing no imprint of fore-feet nor any furrow such as would have

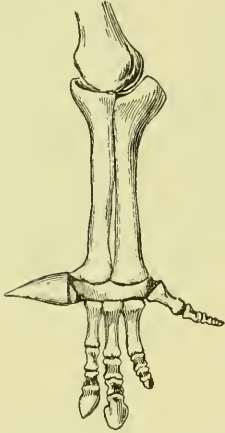


FIG. 43.—Fore-foot of *Iguanodon*.

been made by the dragging of a heavy tail. Just such furrows, associated with the prints of four feet, are present in some of the famous specimens from Connecticut valley, while they are absent when the impressions are three-toed, like those at Hastings.

The front foot of *Trachodon* had four toes, the innermost being movable, somewhat like a thumb, so that the foot could be used for grasping. The forefoot, however, was by no means so long and slender as might be inferred from a glance at the skeleton, since the longer bones were surrounded by flesh, the effect being that of a hand with an exceedingly long palm and short, stubby fingers. The forefoot of the related *Iguanodon* had a thumb like a short, stout spike, standing out at right angles to the other digits (figure 43) and probably serving some useful purpose in gathering or handling food. When this spike was first found it was separated from the other bones of the hand, and was supposed to belong on the nose, after the fashion of the horn of the rhinoceros.

What may be called the companion to the skeleton in the U. S. National Museum, that mentioned near the beginning of this article, is on exhibition in the museum of Yale University, and was the first complete skeleton of a dinosaur to be mounted in the United States. The Yale specimen is slightly the larger of the two, measuring a trifle over 29 feet in total length, but had suffered more from the weather and so needed more restoration. The skeleton in the U. S. National Museum is 26 ft. 4 in. long; 11 ft. 6 in. high from the base to the top of the head, and 8 ft. 2 in. to the top of the hips; the skull is 3 ft. 5 in. long, the thigh bone 3 ft. 4 in., while the track would have been about 21 inches in length and breadth.