

A P P E N D I X .

ART. L.—*Principal Characters of American Pterodactyls*;*
by Professor O. C. MARSH.

THE remains of *Pterosauria*, or flying lizards, hitherto found in this country, are all from the Upper Cretaceous deposits of Kansas. They are remarkable for their large size, some having a spread of wings not less than twenty-five feet. They differ widely from the Pterodactyls of the old world, especially in the *absence of teeth*, and hence have been placed by the writer in a new order, *Pteranodontia*,† from the typical genus *Pteranodon*.

In this genus, the skull is much elongated. The orbits, and the antorbital and nasal apertures are large. The maxillary and premaxillary bones are coossified, and entirely edentulous. The atlas and axis are united. The scapular arch presents some peculiar features, not before known in any vertebrate. The scapula, which is firmly coossified with the coracoid, has at its distal end an oblique articular face. This articulation is separated from the corresponding facet of the opposite scapula by a thin median plate, which is apparently a neural spine of a dorsal vertebra. The two scapulæ thus brace each other, and aid in securing powerful flight. In *Pteranodon* the fourth finger is greatly elongated, and the wing metacarpal is longer than half the antebrachium. There are five separate carpal bones, beside the pteroid bone which supported the membrane. The pteroid is not a true carpal, but is perhaps homologous with the small bone in the foot of a bat which supports the patagium. The first three metacarpals are very slender, pointed above, and do not reach the carpus. At their distal end they supported sharp, curved claws. In some species, the distal phalanx of the wing finger is not straight, but falciform.

The pelvis in *Pteranodon* is of moderate size. The ilia are elongate, and the acetabulum is imperforate. The ischia are broad, and united on the median line. The tail is short and slender, and the distal caudals are sometimes coossified. The posterior limbs are well developed. The tibia has at its distal end a pulley-like articular surface. There are two tarsal bones of

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nearly equal size, and a small lateral bone, which may possibly be the distal end of the fibula. There are four metatarsals of nearly the same length, and their ungual phalanges are pointed, but not much curved.

The known species of *Pteranodon* are as follows: *Pteranodon occidentalis* Marsh (*Ornithochirus harpyia* Cope), *Pteranodon ingens* Marsh (*Ornithochirus umbrosus* Cope), *Pteranodon velox* Marsh, *Pteranodon longiceps* Marsh, and *Pteranodon comptus* Marsh.

Nyctosaurus, gen. nov.

A second genus of American Pterodactyls is represented in the Yale Museum by several well preserved specimens. This genus is nearly related to *Pteranodon*, but may be readily distinguished from it by the scapular arch, in which the coracoid is not coossified with the scapula. The latter bone, moreover, has no articulation at its distal end, which is comparatively thin and expanded. The type of this genus is *Pteranodon gracilis* Marsh, which may now be called *Nyctosaurus gracilis*. It was a Pterodactyl of medium size, measuring about eight to ten feet between the tips of the expanded wings. Its locality is in the upper Cretaceous of Western Kansas. The type specimens of all the above species are preserved in the Museum of Yale College.