APPENDIX.

ART. LXVII.—*Notice of a new Sub-order of Pterosauria;* by Professor O. C. MARSH.

THE first Pterodactyle discovered in this country was found by the writer, in 1870, in the Upper Cretaceous of Kansas; and during the next year two other species were obtained in the same region.* These three species were referred provisionally by the writer to the genus *Pterodactylus* of Cuvier, with which the remains then described essentially agreed. An examination of the large series of specimens of this order now in the Yale Museum, shows, however, that some of these fossils possess characters widely different from all forms known in the old world, and indicate a new and highly interesting type. The distinctive feature in this group is the *absence of teeth*, and hence the order may be called *Pteranodontia*, and the family *Pteranodontidæ*, from the typical genus described below.

Pteranodon, gen. nov.

This genus is readily distinguished from any Pterodactyles hitherto described by the cranial characters, which are well shown in a nearly perfect skull, and portions of others, in the Yale Museum. The cranium preserved is very large, and the facial portion greatly elongated. There is a high sagittal crest, which projects backward some distance beyond the occipital condyle. The latter is directed backward, and somewhat downward. The quadrate is long, and inclined well forward. The orbits are large, as are also the antorbital and nasal apertures. The maxillary bones are closely coossified with the premaxillary, and the whole forms a long, slender beak, which, in the specimens examined, tapers gradually to the pointed apex. There are no teeth, or sockets for teeth, in any part of the upper jaws, and the premaxillary shows some indications of having been encased in a horny covering. The lower jaws, also, are long and pointed in front, and entirely edentulous. The rami are closely united by a symphysis which extends from the apex to beyond the posterior extremity of the dentary bone, thus resembling the mandible of *Rhynchops* and some other birds. In several other respects, the jaws in this genus are more like those of birds than of any known reptiles.

The vertebræ in the present genus are similar to those in European Pterosaurians, and the altas and axis are united.

* This Journal, vol. i, p. 472, 1871; vol. iii, pp. 241 and 374, 1872.

There are four phalanges in the wing finger, and the metacarpal that supports it is longer than one half the ante-brachium. In one specimen, which probably belongs to this genus, there are four slender bones, apparently all metacarpals, which are pointed above, and do not reach the carpus. Another specimen, which is described below, and probably belongs to this genus, has five vertebræ in the sacrum.

The nearly complete skull mentioned above may be regarded as the type of the genus *Pteranodon*. Its principal measurements are as follows:

Length from occipital crest to end of premaxillary about 30 inches, or	760· mm.
Transverse diameter of occipital condyle,	8·4
Distance from occipital condyle to distal end of quadrate,	105·
Length of lower jaw about 23 inches, or	584·
Greatest depth,	62·2
Depth at articulation for quadrate,	23·2

The species represented by this specimen is well marked, and may be called *Pteranodon longiceps*. It is somewhat larger than *P. occidentalis* Marsh, which apparently has more slender jaws. The Yale collection contains portions of a skull indicating a much larger species, which is probably *P. ingens* Marsh. If this skull was of the same proportions as that just described, its length would be no less than four feet!

One of the smallest American species yet found is represented in the Yale Museum by several bones of the wing, a number of vertebræ, and the nearly complete pelvis. The wing-bones preserved are elongated, and very slender. The pelvis is unusually small, and there are five vetebræ in the sacrum. The last of the series indicates that the tail was short. The following are the principal dimensions of this specimen:

Length of ulna,	187· mm.
Length of metacarpal of wing finger,	300·
Antero-posterior diameter of outer condyle at distal end,	15·
Transverse diameter of shaft, above condyles,	13.
Length of first phalanx of wing finger,	347.
Extent of five vertebræ of sacrum,	57.

This species, which may be called *Pteranodon gracilis*, was about two-thirds the size of *P. velox* Marsh. It probably measured about ten feet between the tips of the expanded wings.

All the specimens here mentioned are from the Upper Cretaceous of Western Kansas. It is an interesting fact that the localities and geological horizon of these specialized, toothless, Pterodactyles are precisely the same as those of the *Odontornithes*, or birds with teeth, and the two doubtless lived together in the same region.

Yale College, New Haven, May 15, 1876.

Pteranodon comptus, sp. nov.

The smallest Pterodactyle known from American strata is indicated by portions of three skeletons in the Yale Museum. Among these remains are two distal ends of the characteristic metacarpal of the wing finger, other portions of the wing bones, and two sacral vertebræ. The large metacarpal is very slender, and elongated, and its outer distal condyle has its superior margin elevated above the shaft, and terminated proximally in a point. The ulna is comparatively large, and the proximal carpal has an oval air cavity on its radial side. The sacral vertebræ have their centra short, and medially constricted.

The principal measurements of the remains of this species are as follows:

Greatest diameter of ulna at distal end,	15· mm.
Transverse diameter of proximal carpal,	17·
Antero-posterior diameter of outer distal condyle of wing metacarpal,	12·8
Longitudinal extent of condyle,	11·6
Transverse diameter of shaft above condyle,	11·5
Length of medial sacral vertebra,	9·0
Transverse diameter of centrum,	8·4

The above specimens are all from the Upper Cretaceous of Western Kansas.

Yale College, May 22, 1876.