

APPENDIX.

ART. XLI.—*A New Order of Extinct Jurassic Reptiles (Cœluria);*
by O. C. MARSH. With Plate X.

THE remains previously described by the writer, and named *Cœlurus fragilis*,* prove on further investigation to represent a new group of much interest. Portions of the skeleton of some ten or twelve different individuals have now been secured from the same horizon in the upper Jurassic that yielded the type specimen, and all are in the Museum of Yale College. A study of these remains, which are mostly vertebræ, shows clearly that they differ widely from the corresponding parts in any of the known orders of reptiles, living or extinct, but the nearest affinities of the new group cannot as yet be determined with certainty.

The most marked feature in all the known remains of *Cœlurus* is the extreme lightness of the bones, the excavations in them being more extensive than in the skeleton of any known vertebrate. In the vertebræ, for example, the cavities are proportionally larger than in either Pterodactyls or Birds, the amount of osseous tissue retained, being mainly confined to their exterior walls. In Plate x, a cervical, dorsal, and caudal vertebra are figured, with transverse sections of each to illustrate this point. Even the ribs of *Cœlurus* are hollow, with well defined walls to their large cavities. No limb bones of *Cœlurus* are as yet known with certainty, and those provisionally referred to that genus are, owing to their fragility, too imperfectly preserved for accurate determination.

The vertebræ of *Cœlurus* now known are from various parts of the column, and most of them are in good condition. Three of these are represented natural size in Plate x. The cervicals are large and elongate, and were locked together by strong zygapophyses. The first three or four behind the axis had the front articular face of the centrum somewhat convex, and the posterior one deeply concave. All the other cervicals were biconcave, and this was the case also with the vertebræ of the trunk and tail. The articular faces of the cervicals are

* This Journal, vol. xviii, p. 504, Dec., 1879.

inclined, showing that the neck was curved. The anterior cervical ribs were coössified with the centra, as in Birds. Figures 1, 1a and 1b, Plate x, represent a cervical vertebra from near the middle of the neck. The cavities in the cervicals are connected with the soutide by comparatively large pneumatic openings. The neural canal is very large, and traces of the neuro-central suture are distinct.

The dorsal vertebræ of *Cælorus* are much shorter than the cervicals. The centra have a deep cup in front, and a shallow concavity behind. These articular faces are nearly at right angles to the axis of the trunk. The neural spine is elevated, and compressed. The transverse processes are elongate. The ribs preserved have undivided heads. A posterior dorsal is represented in Plate x, figures 2, 2a and 2b. The suture of the neural arch is distinct in this specimen. The foramina leading to the cavities in the dorsal vertebræ are quite small.

The caudal vertebræ are elongate, and very numerous. They are all biconcave, and all appear to have been without chevron bones. An anterior caudal is figured in Plate x, and the accompanying section shows the inner structure. In most of the caudals, the neuro-central suture has entirely disappeared.

Taking the vertebral column of *Cælorus* as a whole it clearly indicates a large and powerful neck, a trunk of moderate size, and a very long weak tail. So far as the vertebræ suggest anything in regard to the limbs, those in front should be as large or larger than those behind, as in Pterodactyls, and not the reverse, as in animals that leap.

The characters given above prove conclusively that *Cælorus* cannot be placed in any known order. Its remains preserved suggest resemblances to Dinosaurs, to Pterodactyls, and more remotely to Birds, and it is apparently a generalized Sauropsid, which, when fully investigated, may serve to bridge over some of the present breaks in the lines of descent. The sum of its known characters indicates that it is a reptile and not a bird. Its structure so far as known presents more similarity to that of Dinosaurs, than Pterodactyls, but for its nearer affinities we must await the discovery of further remains. An arboreal Dinosaur would not surprise anatomists familiar with the marvelous diversity of forms in that comprehensive group of reptiles.

The order represented by the remains here described may be termed *Cæloria*, and the family, *Cæloridae*, from the type genus *Cælorus*. The remains now known are all from the *Atlantosaurus* beds of the upper Jurassic of Wyoming Territory.

Yale College, New Haven, March 14th, 1881.

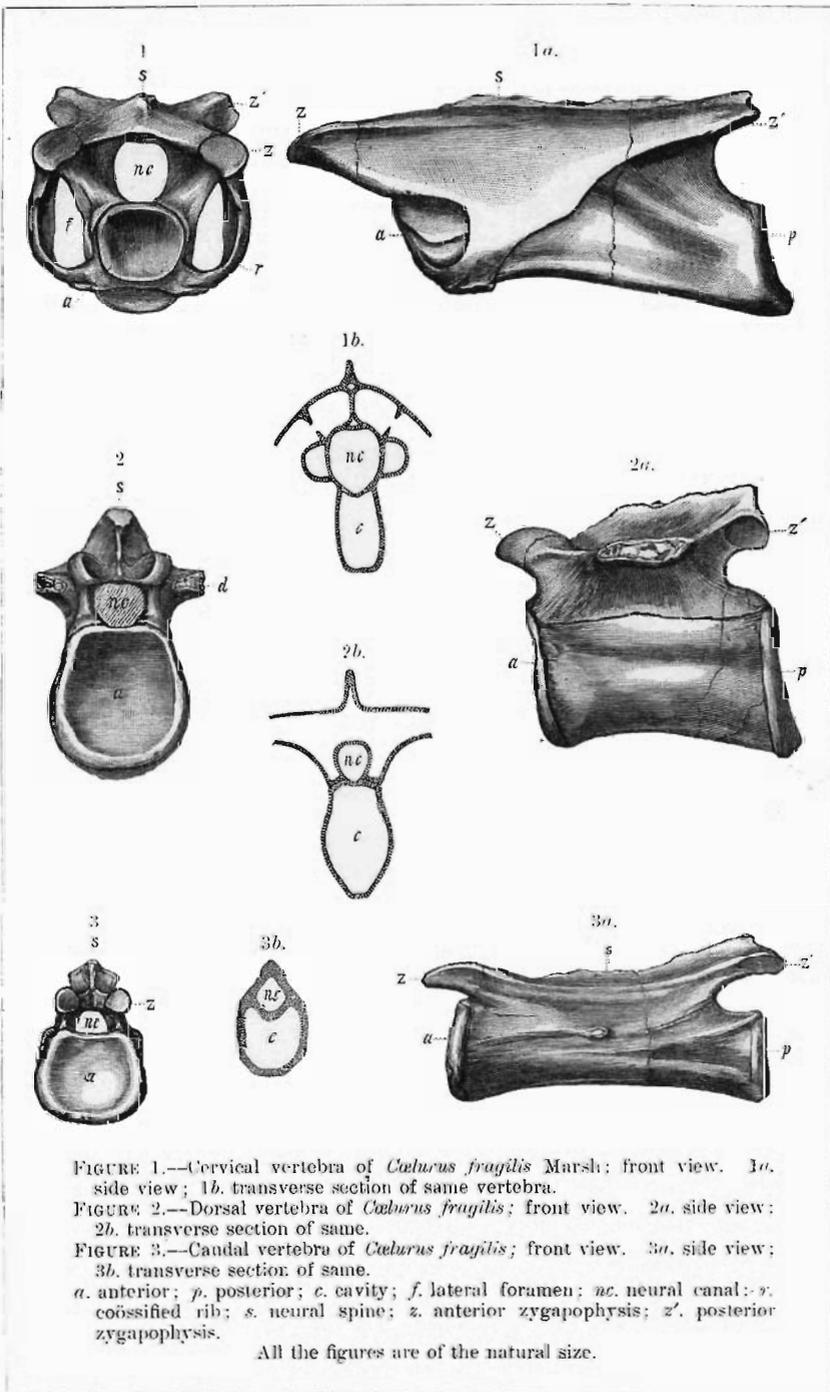


FIGURE 1.—Cervical vertebra of *Calurus fragilis* Marsh; front view. 1a. side view; 1b. transverse section of same vertebra.
 FIGURE 2.—Dorsal vertebra of *Calurus fragilis*; front view. 2a. side view; 2b. transverse section of same.
 FIGURE 3.—Caudal vertebra of *Calurus fragilis*; front view. 3a. side view; 3b. transverse section of same.
 a. anterior; p. posterior; c. cavity; f. lateral foramen; nc. neural canal; s. ossified rib; z. anterior zygapophysis; z'. posterior zygapophysis.

All the figures are of the natural size.