

VERTEBRÆ.

There are available for present description one cervical and three dorsal vertebræ belonging to the 1916 skeleton, Cat. No. 2289. In both skeletons the greater part of the tail is missing, in the type from behind the sixth caudal, in the paratype from behind the fifth, but in each the remainder of the vertebral column is apparently present. Until the enclosing matrix is removed the vertebral column as a whole cannot be described in detail, but the four vertebræ of the paratype so far taken from the rock supply with accuracy the characteristics of the majority of the presacral vertebræ, and indicate the changes in form and proportion that took place in passing back from the head.

There was a general increase in size in the presacral vertebræ in passing back in the series.

The cervicals, and the anterior dorsals at least, were strongly opisthocœlous. Neural spines were absent, or feebly developed in the majority of the cervicals until apparently late in the series. In the dorsals they were short anteriorly in the series but gained slightly in length posteriorly. The transverse processes in the anterior dorsals were long and stout, and pointed upward with an inclination outward and forward. In the posterior dorsals they were almost horizontal, and less robust. The cervical and dorsal ribs with the exception of the last dorsal, or possibly the last two or three, were double headed.

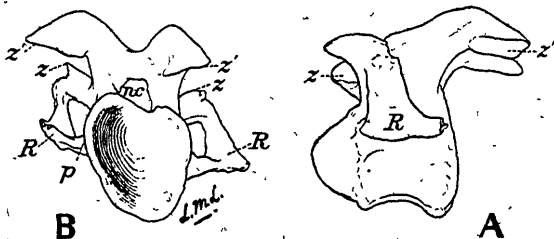


Figure 30. Cervical vertebra of paratype of *Edmontosaurus*, Cat. No. 2289; $\frac{1}{2}$ natural size. A, left lateral view; B, posterior view. nc, neural canal; ns, neural spine; p, parapophysis; R, rib; tp, transverse process; z, prezygapophysis; z', postzygapophysis.

Cervical Vertebra. This vertebra (Figure 30) from the paratype of *Edmontosaurus* is apparently from near the middle of the cervical series. The centrum is deeply cupped behind, and the anterior end is correspondingly convex. It narrows to the front, and has a length considerably in excess of the posterior height and breadth which latter are

about equal. The ventral surface is narrow and flat, and angulated laterally where it passes into the excavated sides of the centrum. The anterior face is bounded posteriorly by a definite protruding girdle against which the narrow rim of the concave posterior end of the preceding centrum fitted. The neural arch is lower than broad enclosing a large neural canal. The transverse process is short and stout and is directed obliquely upward and outward horizontally in line with the neural canal; it terminates distally in a facet for the attachment of the tubercle of the rib, and gives off superiorly a short prezygapophysis. Laterally a short parapophysis with a narrow vertical diameter provides for the attachment of the head of the rib considerably below the level of the floor of the neural canal. The posterior zygapophyses are long, robust, and curve backward far beyond the posterior end of the centrum. The articulating surfaces of the post- and prezygapophyses facing downward and upward respectively, are