

III. A SMALL TITANOTHERE FROM THE LOWER UINTA BEDS.

By O. A. PETERSON.

HETEROTITANOPS PARVUS gen. and sp. nov.

Plate XI.

Type.—Skull, lower jaws, vertebral column, ribs, limb-bones, calcaneum, and astragalus of young individual. No. 2909.

Horizon.—Upper A., Uinta Eocene.

Locality.—White River, Uinta County, Utah.

The specimen on which this genus is proposed is unfortunately a very young individual, the only material representing this form in the entire collection. It was found articulated in hard sandstone concretion, and lower down in horizon A of the Uinta sediment than any mammalian remains heretofore described from that formation.

Generic Characters.—Dentition: $I\frac{3}{3}?$ $C\frac{1}{1}?$ $P\frac{3}{3}?$ $M\frac{3}{3}$. Deciduous dentition: $I\frac{3}{3}?$ $C\frac{1}{1}$ $M\frac{3}{3}?$. *Rapid increase in size of the deciduous upper cheek teeth from first to last tooth.* D^4 with perfectly formed internal tubercles (proto- and hypocones) and the antero-external angle very greatly developed. Molars hypsodont. M^1 with large conical proto- and hypocones, the external faces of the ectoloph less emarginated antero-posteriorly than in the Titanotheres generally and the median vertical ridge of the ectoloph projecting forward to a greater degree.

General Description.—The skull and lower jaws were found in the talus and separated from the rest of the skeleton. The front of the nasals, the premaxillaries, and symphysis of the lower jaws were broken off and were not recovered. The vertebral column and the ribs were, as stated, found in position, but all of the feet, except the left calcaneum and astragalus, are lacking. The skeleton pertains to a very young individual, so that the characters here presented may not in all cases compare well with those in fully adult specimens.

The facial region is rather short, the large orbit being placed well forward. The latter is bounded posteriorly by a postorbital process of the frontal which is considerably developed. The infraorbital foramen is of large size and placed well above the alveolar border.

The maxillary is deep and the palatine plate is located high, so as to give to that region a great transverse convexity. There is a considerable diastema between the canine and the cheek-teeth. The frontals are well elevated over the orbits as in the *Titanotheres* generally, but whether or not there were nasal protuberances, or horn-cores, cannot be determined from the specimen. The parietals are evenly rounded and considerably inflated laterally due to the large brain-case. There is no sagittal crest and the lambdoidal ridges are extremely

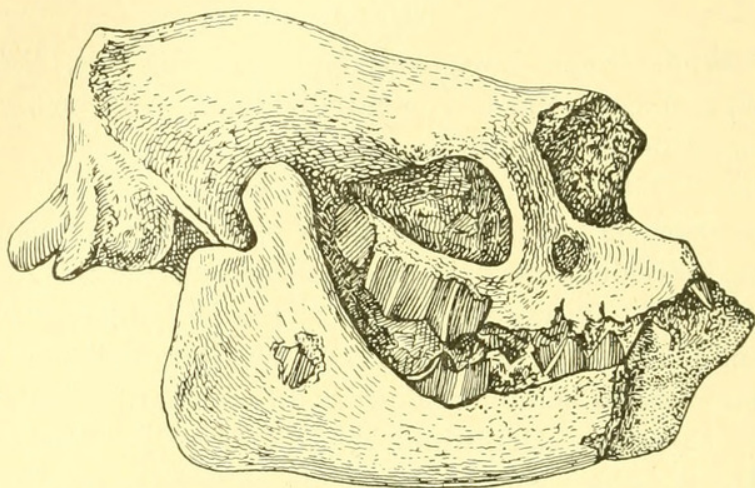


FIG. 1. *Heterotitanops parvus* Peterson. Right lateral view of skull. (Type. No. 2909.) $\times \frac{1}{2}$.

faintly indicated. The occipital plate, though well outlined, is not defined by such sharp angles as is usually the case in the *Titanotheres*. This is no doubt due to the immature condition of the skull. The great projection of the condyle back of the vertical plate of the occiput is also no doubt a juvenile character.

The under border of the lower jaw has not the fore-and-aft curvature usually seen in very young specimens of other vertebrates. Judging from the impression left by the specimen in the rock the ramus continued of a uniform depth from $M_{\frac{3}{2}}$ to the symphysis. The latter is apparently quite heavy. The vertical ramus is of well-proportioned diameter antero-posteriorly. The coronoid process is broad, extends well backward as well as upward, and has a broad and rather attenuated termination.

As already stated both upper and lower incisors are wanting. The upper canine is just protruding through the alveolar border. Its crown is damaged, but it appears to possess the shape and pro-

portions found generally in the Eocene Titanotheres. The deciduous cheek-teeth are three in number and their increase from first to last is unusually rapid. The crowns of the first and second deciduous cheek-teeth are broken off, but the greater part of the last tooth is preserved. The principal feature of this tooth is the presence of two large internal tubercles which are conical in shape and covered with a heavy coating of enamel. The antero-external angle of the tooth is extensively developed, so that the antero-posterior diameter is considerably greater than the transverse. M^1 is just appearing through the alveolar border and has been freed for the purpose of study. The proto- and hypocones usually found in the Titanotheres are present, and well developed, while the external face of the ectoloph is less concave fore-and-aft and the median vertical ridge has a somewhat greater forward projection than is generally the case in the Titanotheres. The germ of M^2 is quite well advanced, while that of M^3 has apparently not yet been formed.

The first lower cheek-tooth is seen buried in the ramus, but is not represented in the illustrations. $D_{\overline{2}}$ and D are injured while $M_{\overline{1}}$ is well preserved. Its crown is like that of the typical Eocene Titanotheres and needs no description. $M_{\overline{2}}$ is well advanced towards maturity while $M_{\overline{3}}$ is not yet indicated.

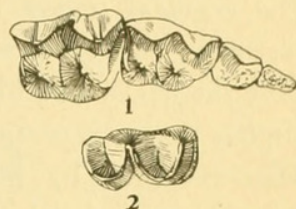


FIG. 2. *Heterotitanops parvus* Peterson. (Type. No. 2909.) $\times \frac{1}{2}$.

1, Deciduous dentition and permanent M^1 ; 2, Permanent M_T .

MEASUREMENTS.

	Mm.
Total length of skull from canine to and including the occipital condyle....	142
Transverse diameter of skull at the parietal region.....	46
Greatest transverse diameters of frontals.....	54
Length of alveolar border, canine to and including M^1	67
Length of deciduous cheek dentition.....	38
Antero-posterior diameter of D^3	21
Transverse diameter of D^3	15
Antero-posterior diameter of M^1	24
Transverse diameter of M^1 , approximately	20
Antero-posterior diameter of M_T	25
Transverse diameter of M_T	12

The axial and appendicular parts rest on the concretionary sandstone block in the position in which they were found imbedded.

(See Plate XI.) In the posterior dorsal and the lumbar region the ribs are distorted over the vertebræ in such a manner that an exact count of them cannot now be made with entire certainty. The vertebral formula is, however, approximately as follows: Cervicals seven, dorsals 16 or 17, lumbar 3(?), sacral 4 or 5, caudal 14 or 15. The cervical region is short and quite robust, the anterior dorsal vertebræ, though possessing well-proportioned neural spines, do not have the heavy and high processes seen in the true *Titanotheres*. The lumbar region is certainly very short and this space could hardly have been occupied by more than three or possibly four centra. The anterior face of the sacrum is quite even with the supra-iliac border of the pelvis, which is characteristic of the *Titanotheres* generally. Four or five short and broad centra, which represent the sacrum, are visible. The end of the caudal region is represented by eight centra and in the space between this series and the sacrum there is room for six or seven more.

The thoracic cavity was of large size judging from the rather long ribs. There are apparently six elements in the sternum.

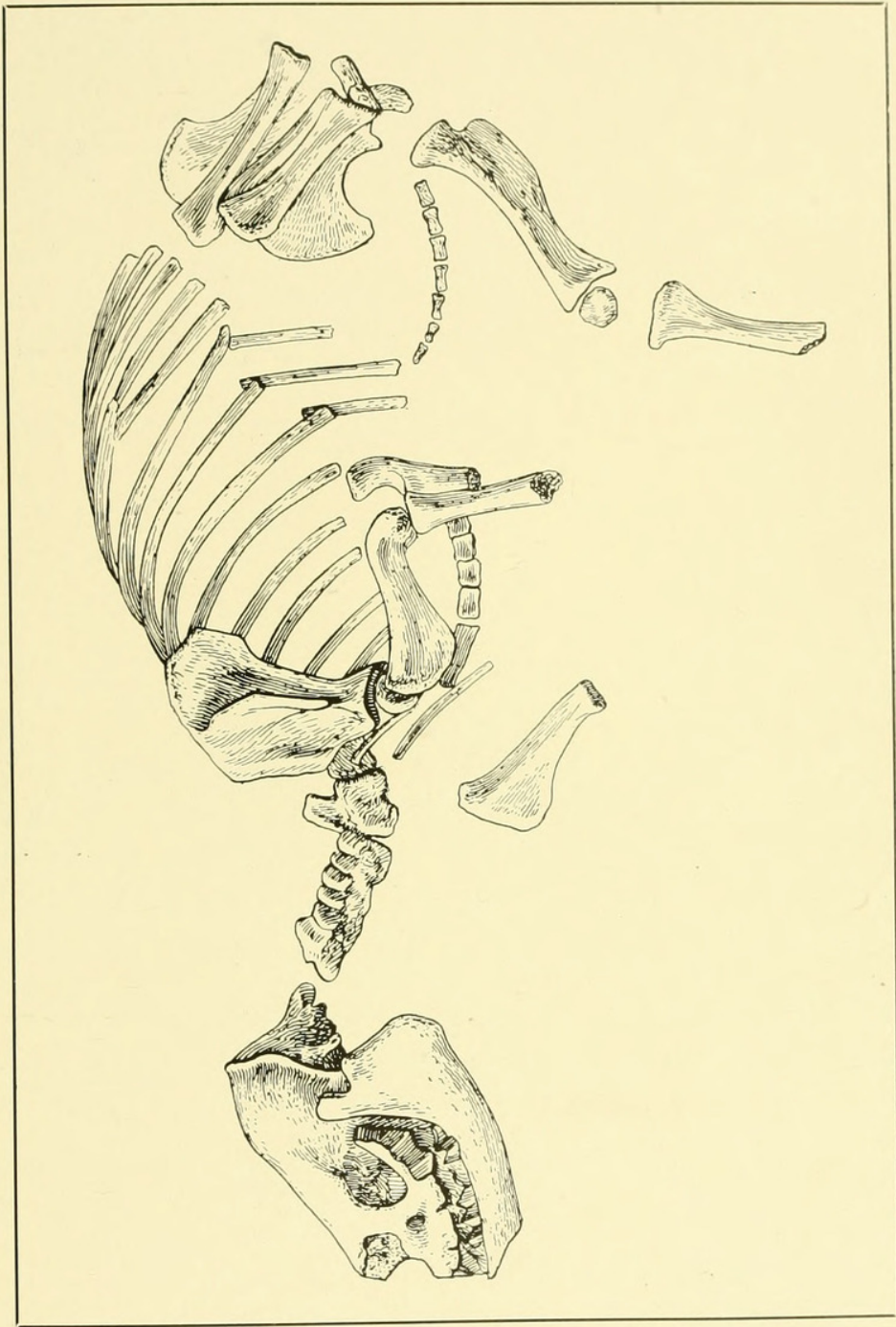
The scapula is quite titanotheroid in its general outline, the spine being less overhanging than usual, which is probably a juvenile character. The general proportion of the limb-bones is not unlike that in the Uinta *Titanotheres*, if one may judge from the immature condition of the specimen.

MEASUREMENTS.

	Mm.
Length of vertebral column from atlas to tip of tail, measurement along the curves, approximately.....	655
Scapula. Greatest height.....	90
Scapula. Greatest transverse diameter of blade.....	64
Humerus. Greatest length, approximate.....	90
Radius. Greatest length, approximate.....	70
Femur. Greatest length, approximate.....	114
Tibia. Greatest length, approximate.....	85

SYSTEMATIC POSITION.

That the above described form belongs to the *Titanotheriidae* can hardly be questioned. From the fact that there are only three pre-molars one might be led to regard it as closely related to *Lambdotherium* from the Wind River formation, but on a closer survey of the material it is clear that the upper and lower first molars are more



Heterotitanops parvus Peterson. Type. No. 2909. C. M. Cat. Vert. Foss. $\times \frac{1}{4}$.

closely allied to such forms as *Titanops borealis* (Cope) and *Limnohyops*. It is possibly a form which paralleled *Lambdotherium*, which lived in the Wind River epoch, and may be regarded as a second aberrant form of the Titanotheriidae, with closer affinities to the latter than to *Lambdotherium*.

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