

THE "BRONTOTHERIDÆ," A NEW
FAMILY OF FOSSIL MAMMALS

VERY nearly a year ago Prof. O. C. Marsh, of Yale College, announced the discovery of a new order of Mammalia, the Dinocerata, huge elephantine forms, with three pairs of horns and large canine teeth, from the Eocene deposits of the country to the east of the Rocky Mountains, including the states of Dakota, Nebraska, Wyoming and the "Bad Lands" of Colorado, which was described and one of its species figured in this journal at the time (NATURE, vol. vii. p. 366). This same able zoologist has the opportunity of adding still another unexpected group of animals, this time from the Miocene beds of the same district, which, though Ungulate and

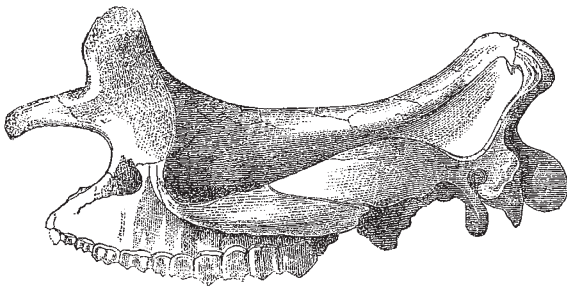


FIG. 1.—*Brontotherium ingens*, Marsh.

almost certainly Perissodactylate, are very different from any known form.

Brontotherium ingens is the name given by Prof. Marsh to the animal, the upper and side view of whose skull are shown in the accompanying drawings, copied from his paper in the *American Journal of Science and Art* for this month. The specimen here figured is 36 in. long, and 20 in. between the tips of the two horn-cores. The

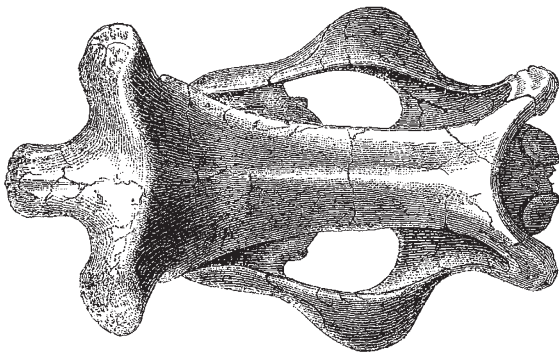


FIG. 2.—*Brontotherium ingens*, Marsh.

proportions of the skull are peculiar, the whole being elongate and very slight in depth. The high zygomatic arches, without any well-marked postorbital processes on them, or on the frontal bones, to divide off the temporal from the orbital fossæ, also add to the uncomplicated general appearance of the skull, whose aspect is rendered more abnormal by the development of a huge pair of horn-cores, which spring almost entirely from the firmly "coössified" nasal bones, which make the anterior upper part of the face exceptionally broad and heavy. The upper part of each horn-core is rugose and the base contains large air cells.

The teeth present many points of interest. The dental formula is $i. \frac{2}{2} c. \frac{1}{1} p.m. \frac{4}{3} m. \frac{3}{3} = 38$. The upper incisors are quite small, and so are the lower. The canines are short, stout, and not removed from the premolars by any interval. The premolars are much smaller than the molars, those of the lower jaw being very Palæotherium-like. The lachrymal foramina are small, and the infraorbital foramina are peculiarly large, as are the occipital condyles. The cervical and most of the dorsal vertebræ are distinctly opisthocœlous. The atlas is much expanded transversely; the odontoid process of the axis is stout and conical. The epiphyses of the vertebræ are, in most specimens, loosely united to the centra. The caudal vertebræ give indications of the tail having been long and slender.

The limbs are shorter than in the Elephant, having the toes arranged as in the Tapir, four in front and three behind. The whole of the distal end of the humerus is occupied by the articulation; the radius and ulna are distinct. The phalanges are all short, and the terminal ones are short and tubercular, as in the elephant. The femur has a small third trochanter; the tibia and fibula are separate, and each complete. The distal facets on the tarsal naviculare are subequal.

Prof. Marsh remarks that "the wide narial opening, the rugose extremity of the nasals, and the very large infra-orbital foramen, naturally suggest that there must have been an elongated, flexible nose, possibly as extensive as in the tapir. That there was no long proboscis, as in the elephant, is indicated with equal certainty by the length of the head and neck, which renders such an organ unnecessary."

That *Titanotherium proutii* of Leidy is closely allied to *Brontotherium*, Prof. Marsh considers very probable; but the former genus was determined from a specimen which wanted the skull, and it differs in some respects, *Megacerops* of Leidy, as well as *Symborodon* and *Miobasilus* of Cope, belong to the same group, but their identification has been established on data too imperfect for complete and correct description.

We have adopted Prof. Marsh's term horn-cores for the large conical bony processes on the nasal bones; but it is not at all certain that such is the nature of these protuberances; for it seems improbable that any large horns could be efficiently employed by its owner at the free end of so elongate and flat a skull; at the same time that if they were directed forward, they would seriously interfere with the animal's power of grazing. It must also be remembered that in *Rhinoceros* the horn is not supported on any osseous core, whilst in the wart-hog (*Phacochoerus*) the wart has a conical osseous support.

The discovery of these entirely new and unexpected types of previously existing animals in the comparatively unexplored region of the Rocky Mountains must give a great stimulus to evolutionary thought; for, more than anything, it helps to illustrate to what extent the geological record is incomplete; and further, how great stress ought to be laid on the imperfection, not of the geological record—but of what seems to vary very nearly inversely as it—human palæontological information. The recent exhumation of these several fully differentiated mammals from American Eocene and Miocene beds, when considered in connection with the occurrence of equally specialised and somewhat parallel lines of development in Europe, tends to substantiate the considerable antiquity and the wide distribution of the higher members of the vertebrate subkingdom, and ought to lead to a more thorough search for prototypal forms in the higher secondary strata, other than the few at present known, so that the vast gap which at present exists in our knowledge of the pedigree of the mammalia, may be filled, partly at least, from the record of Mesozoic formations.