

COMMUNICATION ON THE DISCOVERY OF NEW ROCKY MOUNTAIN FOSSILS,

MADE BY PROF. O. C. MARSH

At the meeting of the American Philosophical Society, Dec. 20, 1872.

Professor O. C. Marsh, of Yale College, gave a brief account of some of the more important results of his palæontological researches in the Rocky Mountain region during the last three years. He had directed his attention mainly to the extinct vertebrates of the Cretaceous and Tertiary formations, and had obtained more than 200 species new to science, about 150 of which he had already described. Among the new types of fossil vertebrates thus discovered, were Pterodactyls, or Ornithosaurians, the first detected in this country. He had described three species of these from the Cretaceous of Kansas, all of gigantic size. Prof. Cope had subsequently redescribed two of the species in the Proceedings of this Society (Vol. XII. p. 420), but the names *Pterodactylus occidentalis*, Marsh, and *P. ingens*, Marsh, given in the American Journal of Science (Vol. III. p. 241) had priority. A second and quite unexpected discovery of great interest was that of the *Ichthyornidae*, or cretaceous birds with biconcave vertebræ, two species of which Prof. Marsh had recently described. A third discovery was that of fossil *Cheiroptera*, or Bats, not before observed in this country. The three known species were found in the Eocene of Wyoming. A fourth new type was that of extinct Marsupials, also from the Eocene. A fifth discovery of great importance, was that of fossil *Quadrumana*, several genera and species of which he had found in the Eocene. Prof. Marsh stated that he had obtained indications of fossil Monkeys in this formation more than a year before, but had delayed announcing the discovery until the evidence was conclusive. A sixth new type of animals, and perhaps the most interesting of all, were the gigantic Eocene Mammals, which he had recently assigned to the new order *Dinocerea*. These animals had limb bones somewhat like those of Proboscidiæ, as stated in the original description of the type species, *Tinoceras anceps*, Marsh. The skull, however, presents a most remarkable combination of characters. It is long and narrow, and supported two, and possibly three, pairs of horns. The top of the skull was concave, and on its lateral and posterior margin there was an enormous crest. There were large decurved canine tusks resembling those of the Walrus, but no upper incisors. The six premolar and molar teeth were quite small. Several species of these remarkable animals have already been described, but at present they cannot all be distinguished with certainty. In addition to the type species already mentioned, Prof. Cope has given the name *Loxolophodon semicinctus*, to a single tooth, which may possibly belong to this group. Dr. Leidy has described a characteristic specimen as *Uintatherium robustum*, and a canine tooth, apparently part of the same animal, under another name. The remarkable feature of the skull in this group was first indicated in the name *Tinoceras*, which the speaker had proposed for one of the genera. Prof. Cope subsequently proposed the name *Eobasileus*, but was mistaken in regard to the main char-

acters of the skull. What he called incisors are canines; and the large horns are not on the frontals, but on maxiliaries. The top of the skull moreover is not convex, but concave, and the occiput is oblique, and not vertical. Prof. Marsh stated that he had described several species of this group, one of the most singular of which, *Dinoceras mirabilis*, Marsh, was represented in the Museum of Yale College by a nearly perfect skeleton, and portions of several others. In all of the species the limb bones differ considerably from those of Proboscidi-ans, while the skull is so totally unlike anything hitherto known, that he could not refer these extinct animals to that group, and hence had proposed for their reception the order *Dinocerea*.

ON A SPECTROSCOPIC OBSERVATION OF THE AURORA OF APRIL 10, 1872.

BY PERSIFOR FRAZER, JR.

(Read before the American Philosophical Society, April 19, 1872.)

On the night of April 10, 1872, a very beautiful Aurora was seen from Philadelphia, spreading over 25° or 30° of the Northern Heavens.

The night was clear, and the wind was from N. W. and slightly cool. A heavy bank of cloud covered about one-sixth of the horizon to the north, and from the crest of this bank the Aurora seemed to proceed, shooting up fitfully in sprays and bundles to near the zenith, and traversing from west to east and back again with average rapidity. One detached streamer crossed the zenith from N. E. to S. W., and remained permanent in position, giving only occasional fluctuations of light.

Observations were commenced with a Browning angle measuring spectroscope, the light condensed through a 13 foot focus, 9 in. diam. lens.

The observations were made solely with reference to the green line in the Aurora, and the purpose in view was to verify or not the observations of Piazzzi Smith in regard to its coincidence with the green hydro-carbon line seen at the base of every candle and illuminating gas-flame.

Four observations gave the following results :

1. Green line of Aurora.....	92 $^{\circ}$	35'	0''
2. " " 	92 $^{\circ}$	35'	0''
3. " " 	92 $^{\circ}$	48'	0''
4. " " 	92 $^{\circ}$	20'	0''

The line became exceedingly faint during the 3d and 4th observations



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