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II.—THE EXTINCT RHINOCEROSES. By HENRY FAIRFIELD OSBORN. Mem. Amer. Mus. Nat. Hist., vol. i, pt. 3 (1898), pp. 75-164, pls. xiii-xx.

SINCE the appointment of Professor Osborn as Curator of Vertebrate Palæontology in 1892, the American Museum of Natural History has published some of the most remarkable contributions to our knowledge of the Tertiary Mammalia which have yet reached us from the New World. Year after year expeditions have been sent to the West to make systematic geological explorations, and to collect fossils in the Tertiary lake-deposits, which began to yield their startling novelties to Leidy in the early fifties. The collections have been prepared, and the best specimens mounted, under the direction of a skilled preparator, Mr. Hermann. Preliminary studies have then been made by Professor Osborn, Dr. Wortman, Dr. W. D. Matthew, and Mr. Hatcher; and the results have been published in a series of "Bulletins," illustrated by the well-known careful drawings of Mr. Rudolf Weber.

A still more important departure has now been made, in the issue of the first two sections of an exhaustive quarto memoir on the extinct rhinoceroses by Professor Osborn himself. This is illustrated, not only by diagrams and the usual text-figures of fossils, but also by nine lithographed plates; and the plan of the work is not confined to a bare record of the facts, but also comprises a discussion of some of the most fundamental problems in the philosophy of Palæontology. We commend the memoir both to the notice of the specialist in the study of mammals, and to the general reader who desires to become acquainted with the latest-discovered facts bearing upon the phenomena of organic evolution.

Professor Osborn first discusses the differentiation of the Hyracodonts, Arynodonts, and true Rhinoceroses. These, he remarks, may be popularly described respectively as the Cursorial or Upland Rhinoceroses, the Aquatic Rhinoceroses, and the True or Lowland Rhinoceroses. To the first family belong agile, three-toed genera (such as *Hyracodon*), simulating the Miocene horses in skeletal structure and in the development of true hoofs. To the second family are referred short, heavy animals, with four-toed spreading feet, enlarged canine teeth, and probably a prehensile lip or proboscis (such as *Metamynodon*). The third family comprises rhinoceroses much like those still surviving in the Old World, the extinct American forms only differing from the latter in the non-development of the nasal horn. These families were all differentiated, at least in the North American area, before the middle portion of the Eocene period; and as they are traced upwards in time, they exhibit a curiously parallel course in the evolution of the molar teeth, while in the characters of the incisor teeth, skull, vertebræ, and limbs they rapidly become more and more divergent. Professor Osborn describes this parallelism and divergence in detail and adds much to the value of his memoir by giving concise tabular summaries of his results. It is indeed strange that we should thus



receive the most important and fundamental information concerning the ancestry and evolution of the rhinoceroses from the Tertiary formations of the New World, where no one, prior to the discoveries of 1850, could ever have suspected the occurrence of so characteristic an Old World type of mammalian life.

In the second chapter of the memoir, Professor Osborn deals with the true rhinoceroses, and begins with a useful synopsis of the existing species of the Old World, illustrated by a series of drawings of the skulls. Next, he gives a brief historical statement of the discovery of the extinct rhinoceroses, both in Europe and North America. Finally, he discusses the characters of the skull and teeth in formulating a basis of classification to be adopted in the technical account of the extinct rhinoceroses which follows. There is also a "preliminary bibliography."

Of the technical part of the memoir only the first section is now published, namely, a description of the cranial and dental characters of the hornless rhinoceroses ("Aceratheres") from the American Oligocene, or White River Beds, of which a stratigraphical table is inserted. Seven species of *Aceratherium* are successively treated; and the so-called *A. trigonodum* is placed in a new genus, *Leptacatherium*, on account of the persistence of its upper canines. Two important immature skulls with the complete milk-dentition are referred to *A. occidentale*.

The forthcoming sections of this memoir are announced to deal, not only with the remaining American forms, but also with those of the Old World. We understand that Professor Osborn is at present enjoying a year's leave of absence from his professorial and curatorial duties, and is thus favoured with the opportunity of continuing his extensive studies of the European collections. We await the result, so far as our knowledge of the extinct rhinoceroses is concerned, with great interest and high expectations.

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## REPORTS AND PROCEEDINGS.

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### GEOLOGICAL SOCIETY OF LONDON.

I.—June 22, 1898.—W. Whitaker, B.A., F.R.S., President, in the Chair. The following communications were read:—

1. "Post-Glacial Beds exposed in the Cutting of the new Bruges Canal." By T. Mellard Reade, C.E., F.G.S.

The following beds, enumerated in descending order, were found in this cutting:—

5. Argile des polders supérieure.
4. *Cardium (edule)*-sand.
3. Argile des polders inférieure.
2. *Scrobicularia (plana)*-clay.
1. Peat with the remains of trees.

Mechanical analyses of beds 5 and 2 are given. The argile des polders supérieure consists mainly of extremely finely divided material, in which sponge-spicules and foraminifera were found.