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Article XVII.—NEW FOSSIL MAMMALS FROM THE PLIOCENE OF SZE-CHUAN, CHINA[1]

By W. D. Matthew and Walter Granger

The following is a preliminary notice of a collection secured during the winter of 1920–1921 by Mr. Walter Granger, palæontologist of the Third Asiatic Expedition sent out by the American Museum, the American Asiatic Association, and Asia Magazine, under leadership of Mr. Roy C. Andrews. The locality is a series of pits or fissures at the village of Yen-ching-kao in the vicinity of Wan-hsien, province of Sze-chuan. These pits have been worked by the natives for many years for the Chinese drug trade. Mr. Granger's account of their occurrence and stratigraphic observations and more extended descriptions of the fauna will be published later, this notice serving to place certain interesting novelties upon record.

The age of the fauna is provisionally placed as Upper Pliocene on account of the abundance of *Stegodon* remains and absence of any higher type of Proboscidean, but its final correlation is left open for the present.

The Chinese fossil mammals described by Owen in 1870[2] came from "a cave near the city of Chung-king-foo in the province of Sze-chuan." Chung-king is on the Yang-tse-kiang above Wan-hsien, about one hundred and forty miles distant in an air line. If correctly reported by the finders, Owen's specimens could hardly have come from the Yen-ching-kao pits; but it is apparently the same fauna, or at all events of similar facies and doubtless the same conditions of preservation. Possibly the Chinese informants of Consul Swinhoe, who sent the fossils to Owen, misled him, unintentionally or deliberately, as to the locality. This point will be further discussed at a later date. Owen regarded the fauna as Pliocene and described the following species:

Stegodon orientalis.	Parts of molars.
Rhinoceros sinensis.	Parts of 4 upper and 4 lower molars.
Tapirus sinensis.	Parts of 3 upper and 4 lower teeth.
Chalicotherium sinense.	Part of an upper molar.
Hyæna sinensis.	Canine, 2 premolars.

[1]Publications of the Asiatic Expeditions of The American Museum of Natural History, Publication No. 15.

[2]Quar. Journ. Geol. Soc., London, XXVI, pp. 417–436, Pls. xxvii-xxix.

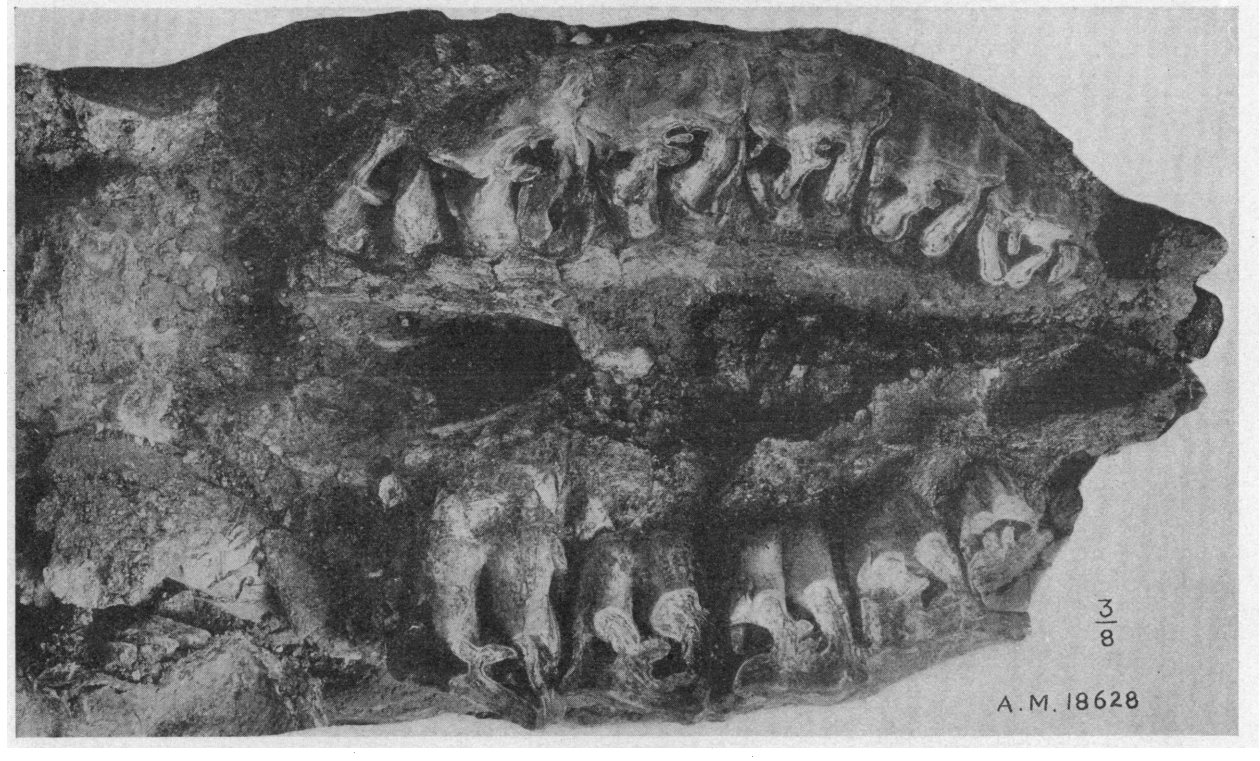

Fig. 1. *Rhinoceros sinensis* Owen. Amer. Mus. No. 18628. Palate of neotype skull. Natural size.

The first three genera are among the most abundant types of large animals in the Yen-ching-kao pits. *Chalicotherium* and *Hyæna* are rare. Owen's descriptions and figures accord very well with some of the species in our collection, so that we have referred them to his species, whether or not later investigation proves them to be exact topotypes.

Koken in 1885[1] described a collection secured by von Richthofen, apparently from the trading junks of the Yang-tse-kiang and understood by him to have come from far up the river in "caves in Yun-nan." Whether this was the real locality remains to be verified; one has the impression from the reading of von Richthofen's letter, quoted by Koken, that the traveller himself suspected that the locality might not have been correctly stated. It is certain at all events that the major part of Koken's collections, like Owen's, represent substantially the same faunal facies, and they seem to agree as to species, in part at least, with our collections. Koken also distinguishes an older fauna of supposed Lower Pliocene age, including *Hipparion*, *Camelopardalis*, *Palæomeryx*, etc., which is more extensively represented in Schlosser's later collections, and is probably substantially the same fauna as the fine collections secured recently by J. G. Andersson[2] and now being studied by Professor Wiman.

Schlosser in 1903[3] described a large collection secured by Dr. Haberer for the Munich museum, and revised the work of Owen, Koken and other previous writers. He concluded that Owen's fauna, except *Stegodon*, and most of Koken's material, was of Pleistocene age. There is no doubt, however, that the *Stegodon* is coeval with the rest of the fauna in Granger's collection, and one may assume that it was probably so in the Owen and Koken collections. Schlosser's material belonged mostly to the older Pliocene fauna distinguished by Koken and came from localities farther to the north.

The collections from Sze-chuan described by Professor Matsumoto in 1915[4] may have come in large part or all from the Yen-ching-kao pits; he does not state any exact localities, but the correspondence of the fauna is evident. Matsumoto divides the material studied by him into two faunas, one found in brown clay and more strongly petrified, the other in cave-loam, feebly fossilized and the teeth strongly colored. The former includes *Stegodon*, *Aceratherium hipparionum*, *Proboselaphus watasei* and *liodon*, *Bibos geron* and two unnamed species of *Buffelus*. The latter includes *Hyæna ultima*, *Rhinoceros sinensis* and *R. plicidens*.

[1]Koken, E. 1885. 'Fossile Saügethiere aus Chinas.' Pal. Abh., III, Heft 2.
[2]Andersson, J. G. 1922. Bull Amer. Mus. Nat. Hist., XLVI, pp. 727–737.
[3]Schlosser, Max. 1903. 'Fossile Saügethiere Chinas.' Abh. k. bayer. Akad. Wiss., XXII, Abt. 1
[4]Matsumoto, H. 1915. Science Reports, Tohoku Imp. Univ., Second Ser. (Geol.) III, No. 1, pp 1–28, Pls. I–X.

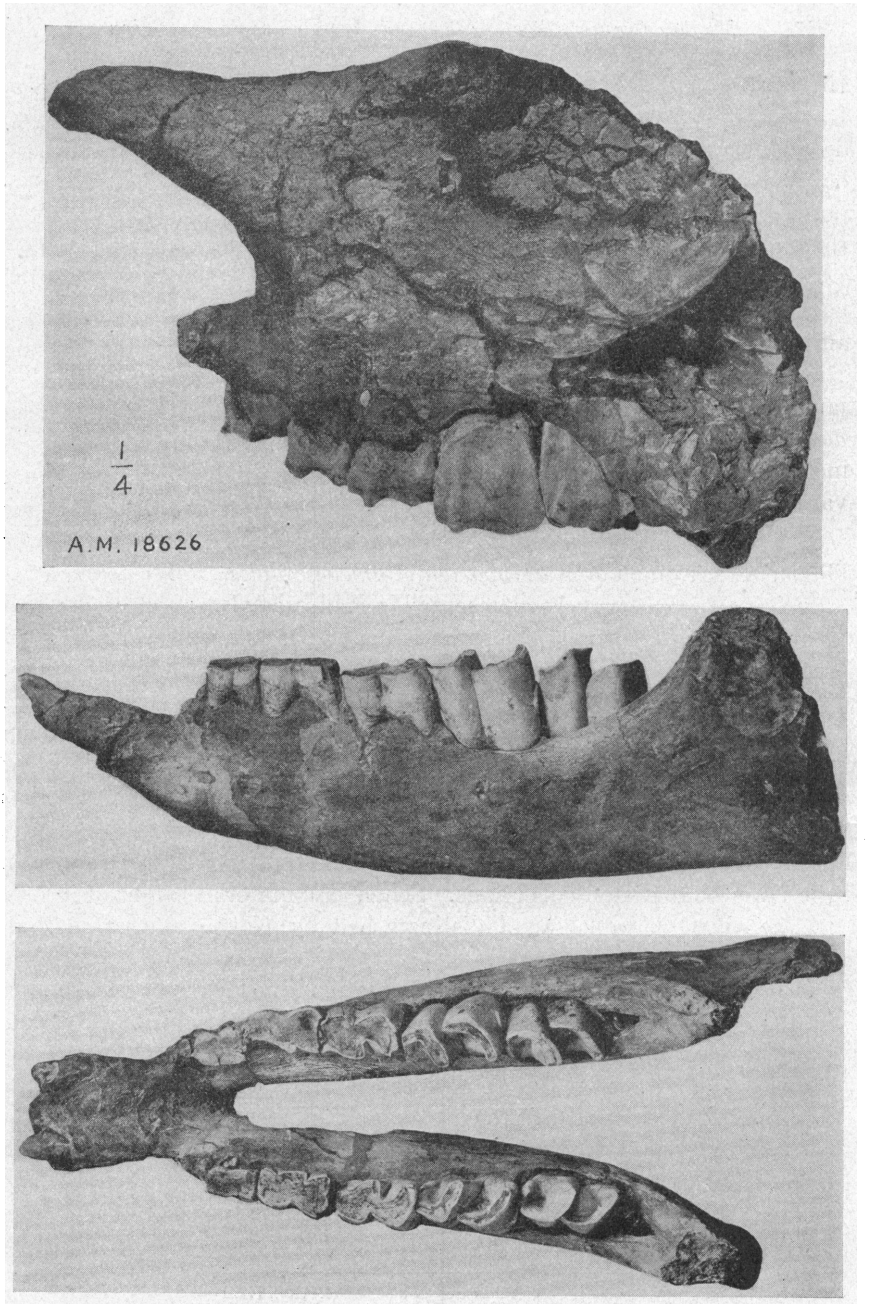

Fig. 2. *Rhinoceros sinensis.* Front of skull and jaws, No. 18626, young individual with milk dentition, the last molar not yet emerged and the second unworn. Natural size.

He regards the first as Upper Pliocene, the second as Lower Pleistocene. In our collections the *Stegodon* material was limited to certain pits occurring low down on the slopes of the mountain valley, and did not occur in pits higher up on the mountain; but we are provisionally disposed to regard this as a matter of limitation of range, and to consider the material from all the pits as of substantially the same geologic age.

Professor Matsumoto's researches[1] upon this and related faunas have been of peculiar value to us as a guide in searching for the probable affinities and identifications of our material.

The Granger collection includes skulls, jaws and numerous parts of jaws of *Stegodon* and *Tapir*, incomplete skulls and many jaws of *Rhinoceros*, a tooth of *Chalicotherium* and a large series of other animals, including a large bovid, smaller antelopes and two or three deer, a pig, various carnivora and a very abundant rodent.

The following notes upon certain described species are a necessary preliminary to the discussion of our new collections.

Stegodon orientalis Owen

Schlosser regards this species as identical with *S. insignis* of India, basing the reference upon the fragmentary teeth described by Owen. Matsumoto regards it as distinct, upon the evidence of the referred material which he describes and figures. The Yen-ching-kao material includes a fairly complete adult skull, two young skulls, a series of palates and lower jaws and many teeth. It should enable us to estimate the affinities of the species more exactly when it has been cleaned up and studied.

Rhinoceros sinensis Owen

Schlosser in his masterly review recognizes this species as valid and considers it most nearly related to *platyrhinus* of the Siwaliks and to the Atelodine group of Pleistocene and modern times. It was, however, practically absent from his Chinese collections at Munich, which seem to have come mostly from the "red clays" of Shan-si, Shen-si and Sze-chuan, but as they were not observed in place the real character and age of the formations remain doubtful. Probably they are chiefly Lower Pliocene. Most of the rhinoceros teeth he refers to *R. habereri*, related in his opinion to *R. palæindicus* and thus to the typical modern *Rhinoceros* of India.

Matsumoto appears disposed to assign *R. sinensis* to the *Teleoceras* group; but if our material be correctly referred, the affinities of Owen's

[1]Matsumoto, H. 1915, *loc. cit.*; 1921, *idem*, V, No. 3, pp. 75–91, Pls. XIII–XIV.

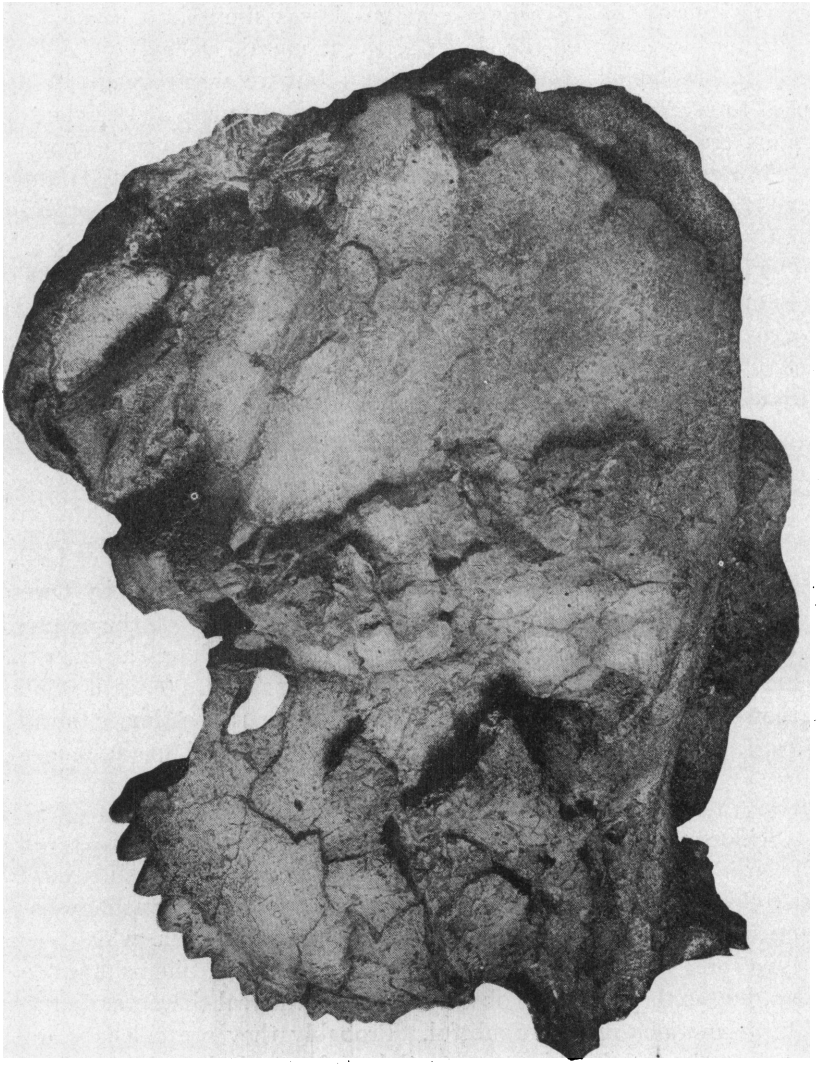

Fig. 3. *Stegodon orientalis* Owen. No. 18630, adult skull, laterally crushed. One-fifth natural size.

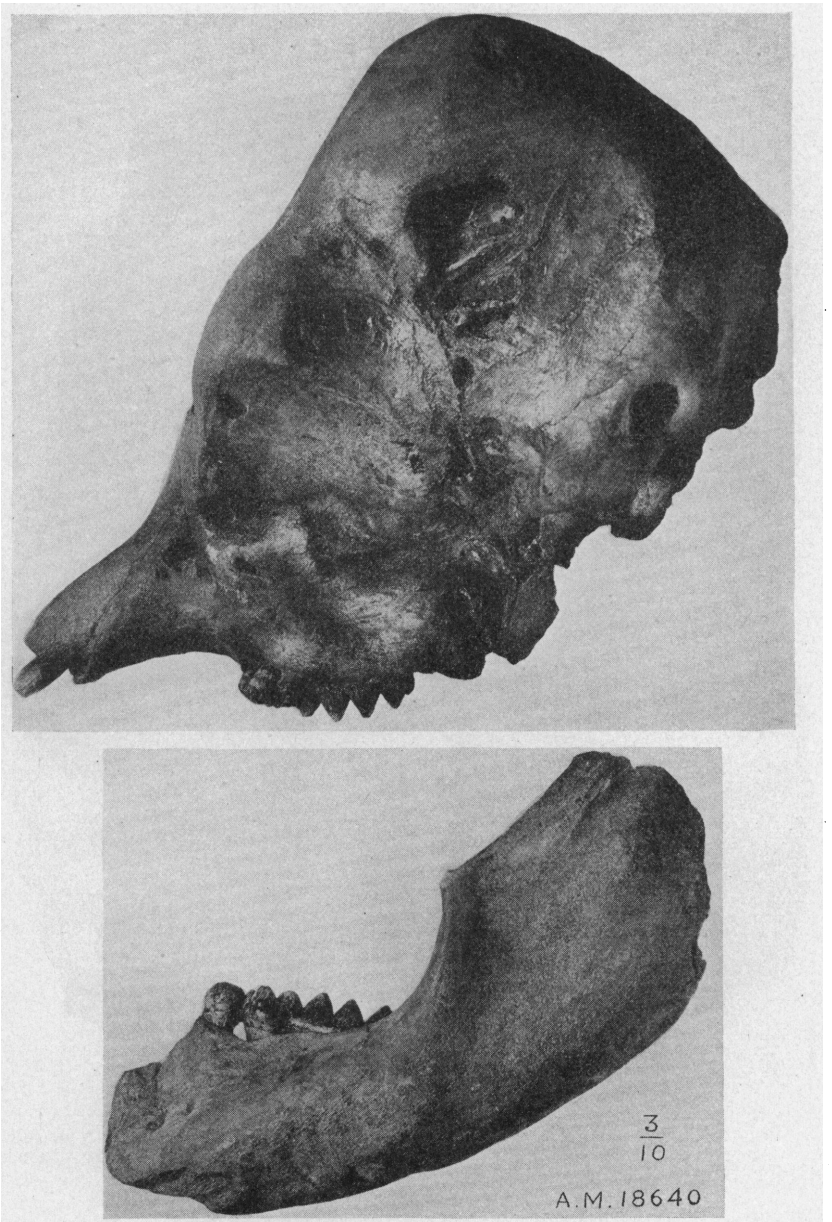

Fig. 4. *Stegodon orientalis*. No. 18640. Young skull and lower jaw, uncrushed. Three-tenths natural size.