ON A COLLECTION OF MAMMALIAN FOSSILS FROM CHIACHIASHAN NEAR TANGSHAN.

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Some years ago Mr. Kao of the Kailan Mining Administration collected some vertebrate fossils from Chiachiashan near Tangshan. These materials were sent to the Musée Huangho-Peiho in Tientsin. As examined by P. Teilhard de Chardin they proved to be interesting enough to warrant a further investigation of the locality. In the month of April 1930 the members of the Cenozoic Laboratory of the Geological Survey of China, under the leadership of Prof. Davidson Black, paid a visit to this fossiliferous locality. In the months of January and February 1931 I was again sent to this site by Drs. W. H. Wong. and Davidson Black, the directors of the Geological Survey and the Cenozoic Laboratory respectively, and in the course of the preliminary excavation I collected the materials here described.

On the east bank of the river Touho, running through the east of Tangshan town, there is one isolated hill of Lower Ordovician limestone, named Chiachiashan, about 80 meters high above the present river bed. On the southern and eastern slopes of it there are many limestone quarries. By the excavation of these quarries some pockets filled by red clay and breccia are exposed, of which two, the Pocket A and the Pocket B, are now known to bear fossils. Although future investigation might prove these two pockets are connected in some way, I describe them separately in this paper because the specimens found from the two pockets are in a somewhat different states of fossilization and because, on account of the rubbish accumalated on the surface, the true relationship of them is unknown (v. Fig. 1).

The subdivisions of the Pocket A are given in Fig. 2. The remains found in the Pocket A are highly fossilized and very fragmentary. A few of them seem to have been crushed during or after the sedimentation. Some of tho bone fragments, as well as of the limestone breccia, are covered by a thin layer of black manganese stained material. In this place numerous coprolithes were collected and some bone fragments show the trace of gnawing marks by large Rodents (v. Fig. 3).

The level of the Pocket B is lower than the Pocket A and its sediments are strongly cemented by a hard matrix. The bones, it contains, are often grayish and the teeth blackish in color. The fossils said to be collected from

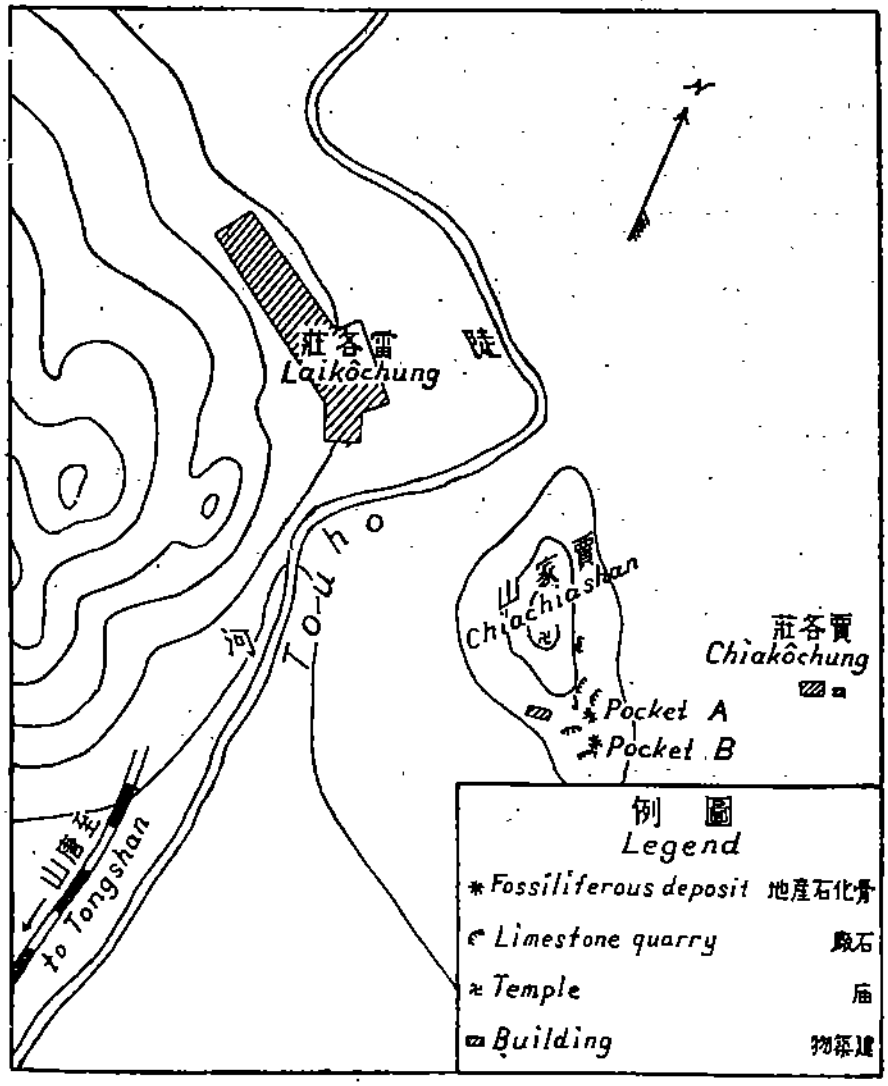

Fig. 1 Map of Chiachiashan, northeast of Tangshan, showing the locations of the Pocket A and the Pocket B.(Scale, 1:10,000)

this Pocket (vide infra) are chiefly picked up from the surface and but few of them were found *in situ* (v. Fig. 4).

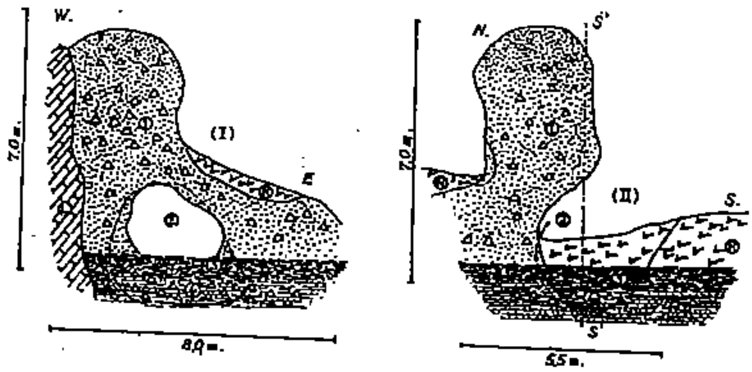

Fig. 2. Transverse (I) and Longitudinal (II) sections of Pocket A. The place marked by heavy dotted line is excavated. The transversal section passes by SS'. 1, upper breccia containing red clay, limestone fragments, and few of bones; 2, hollow part of sediments (or cave); 3, sandy layer with fine black stratifications; 4, lower breccia containing sand, limestone fragments and bone remains; L, limestone, R, rubbish on surface.

Using the fragmentary remains from Chiachiashan fossiliferous deposits we recongnize the following forms:

INSECTIVORA

Talpidae indet.—One broken ulna. (Pocket B)

Erinaceus sp.—A lower jaw (Pocket A in the Museum in Tientsin). The size of this form is slightly larger than that of the *Erinaceus* from Nihowan. [1]

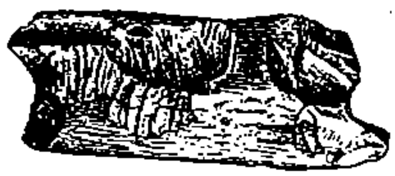

Fig. 3. Bone from Pocket A showing the gnawing marks by large rodents. X ½.

CARNIVORA

Canis (*Nyctereutes*) *sinensis* Schlosser—One incomplete lower jaw readily recognizable by the shape of the molar and the horizontal ramus (Pocket A).

1. Teilhard de Chardin and Piveteau, Jean. Les Mammifères fossiles de Nihowan (Chine). Annales de Palae. Tome XIX. 1930.

Ursus sp.—One lower jaw with only P_4 *in situ*, some broken teeth, and phalanges (Pocket A). The size and the shape of the lower jaw are just the same as in *U. angustidens* Zdansky[1] from Choukoutien.

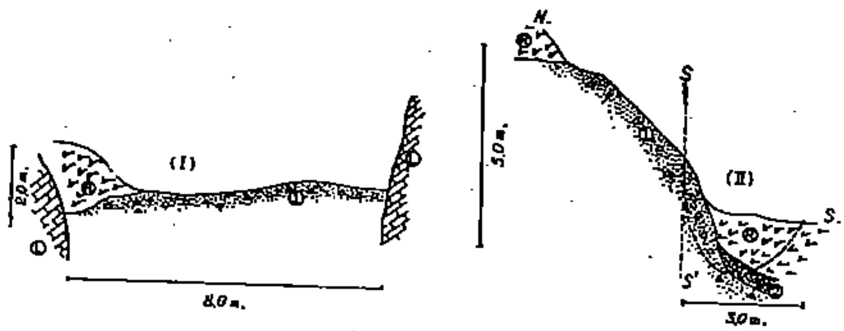

Fig. 4. Transverse (I) and Longitudinal (II) sections of Pocket B. The place marked by heavy dotted line is excavated. The transversal section passes by S'S'.1, breccia containing hard matrix and limestone fragments; 2, yellowish sandy layer; L, limestone; R, rubbish on the surface. Fossils are chiefly collected from the surface of 1 and a few is found *in situ*.

Meles sp.—One incomplete lower jaw and one upper canine (Pocket B). The M_1 of this specimen of ordinary *Meles* type.

Mustela (*Putorius*) sp.—One lower jaw (Pocket B). The size is slightly smaller than in the Choukoutien *Putorius*[2].

? *Hyaena* sp.—This form is represented by one crushed lower jaw with the teeth all damaged (Pocket A).

? *Machairodus* sp.—One broken upper carnassial found *in situ* from Pocket B is probablly referable to the genus *Machairodus* on account of the flatness and narrowness of its posterior blade and of the wideness of its hinder root. But the root is much longer than in P^4 of the ordinary Choukoutien *Machairodus*.

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1. Zdansky, O. Die Säugetiere der Quartärfauna von Chouk'outien. Palaeon. Sinica, Ser. C, Vol. V, Fasc. 4, pp. 39-42. 1928.

2. Pei, W.C. On the Mammalian Remains from Loc. 5 of Chouk'outien Fossiliferous Deposits. Palaeon. Sinica, Ser. C, Vol. VII, Fasc. 2, (in press).

RODENTIA

Trogontherium cf. *cuvieri* Fischer—One fine lower jaw with tooth row complete The teeth are of the type of the Chouk'outien *Trogontherium* (Pocket A).

Microtus sp.—One incomplete lower jaw with only M_3 (Pocket B).

Cricetulus sp.—One lower jaw with M_2 and M_3 (Pocket B); its size is very small.

Mus cf. *rattus*—One lower jaw with M_1—M_3 (Pocket B); its shape is similar to the common *Mus rattus*.

Piphneus cf. *tingi* Young—One lower jaw in which the section of the broken teeth is still recognizable (Pocket B); its size is rather small and its fold of the molars transverse; M_3 reduced and with a single outer re-entrant [1]. A skull showing the characteristic M^3 is kept in the Museum in Tientsin (Pocket A).

Prosiphneus cf. *intermedius* Teilhard and Young[2]—This curious form is represented by only one isolated right M_1 found from the surface of Pocket B (v. Fig. 5). The root of our specimen is exceedingly short and fused and the crown very hyposodont. This form is already known from Shansi[1] and represents a very advanced type of *Prosiphneus*.

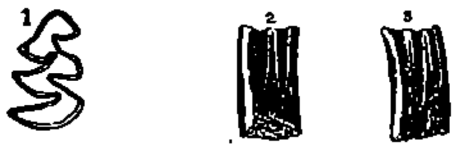

Fig. 5 Right M1 of *Prosiphneus* cf *intermedius* Teilhard and Young from Pocket B. 1, crown view x 4 : 2, inner view x 2 ; 3, outer view x 2.

Ochotona sp.—Two broken lower jaws with only the posterior molars. (Pocket B).

Lepus sp.—Several lower jaws, maxillia with upper teeth, and numerous skeleton bones (Pockets A and B). *Lepus* is the most abundant fossil form in the Chiachiashan fossiliferous deposits but its specific determination is very difficult.

1. As in the Nihowan Specimen A in Teilhard and Piveteau "Les Mamm. Fossiles de Nihowan" p.122, Fig. 38, A. 1930.
2. Teilhard de Chardin and Young, Fossil Mammalia from Late Cenozoic of North China. Palaeon. Sinica, Ser. C. Vol. IX. Fasc. 1. (in press)

PERISSODACTULA

Equus cf. *sanmeniensis* Teilhard and Piveteau—This large horse is represented by many isolated lower and upper teeth and some limb bones (Pocket A).

ARTIODACTYLA

Suidae indet.—One broken M_3 (Pocket B).

Cervus cf. *boulei*. Teilhard and Piveteau—A large deer is represented in our collection by a small piece of antler (a flat tine), many lower jaws, and several limb bones (Pocket A).[1] By the shape and flatness the antler seems to belong to the *Cervus boulei* from Nihowan.[2]

Bison cf. *palaeosinensis*—This form is represented by one fine lower jaw, many isolated teeth and limb bones (Pocket A). The size of the lower jaw is exactly the same as that of *Bison palaeosinensis* Teilhard and Piveteau.

?*Moschus* sp.—One upper canine and three upper molars from Pocket B. The root of the upper canine is swollen and filled by dentine, instead of being hollow as in the ordinary Musk deers living and fossil from Chouk'outien. Only one tooth from Chouk'outien shows the same archaic (?) character.

CONCLUSION

Geologically the Chiachiashan fossiliferous deposits are clearly of the same origin as the Chouk'outien one : they are due to the gradual filling in of hollow spaces in the Ordovician limestone by sandy and brecciated sediments. The presence of the Carnivorous bones and coprolithes would favour the suggestion that the Pocket A was an inhabited cave.

Concerning the age of the Chiachiashan fossiliferous deposits we should compare with the condition as occurring at the Nanyeli cleft[3] whose fauna connects both the Chouk'outien formation and the Nihowan beds. From Chiachiashan we now know that (a) *Siphneus* cf. *tingi*, *Cervus boulei* and *Bison palaeosinensis* are the forms special to the Nihowan beds, (b) *Trogontherium*, *Ursus*, *Mustela* (*Putorius*), and *Moschus* (?) common with the Chouk'outien

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1. Besides these materials here noted there are serveral isolated teeth of deer which may be the same form as *C. boulei* found from Pocket B.
2. Teilhard de Chardin and Piveteau, Jean. Les Mammifères fossiles de Nihowan (Chine). Annales de Palae. Tome XIX. 1930.
3. Licent, E. Nanyeli Sanmenian Fissiliferous Deposit. Bull. Geo. Society of China, Vol IX No. 2. 1930.

formation and (c) *Canis (Nyctereutes) sinensis* and *Equus sanmeniensis* known from both Nihowan and Chouk'outien. If the isolated tooth of *Prosiphneus* was not rewashed from some older sediments we must conclude that there is one archaic form occurring in the Chiachiashan deposits.

Putting all the facts together the Chiachiashan deposits are evidently of the Basal Plistocene or Uppermost Pliocene in age and linking the younger Chouk'outien formation and the older Sanmenian Nihowan beds. By this new fact it is more and more clear that the Upper Pliocene and Lower Pleistocene sediments in North China constitute a long and continuous series.