

# NOTES ON SOME MAMMALIAN FOSSILS FROM THE LATE CENOZOIC OF SINKIANG

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The writer recently through the courtesy of some geologists working in the Autonomy of Sinkiang secured a few fossil mammalian teeth collected from that region. Although fragmentary, these materials are worthwhile to receive immediate attention because of the meagreness of our knowledge concerning the vertebrate (particularly mammalian) history of Sinkiang. However, on account of the fragmentariness of the fossils only a brief and preliminary account could be given here.

## 1. The *Equus* Teeth from Dzungaria Basin

*Equus sanmeniensis* Teilhard and Piveteau

(Text figs. 1, 2)

The species is represented by two fragments of the rear of the ascending branch of mandible (the right and left ones of the same individual) and five lower cheek teeth (two premolars and three molars).

The bones and teeth are clean white in color and well fossilized. They were collected from a greenish grey marly bed at Ulanbulan, Dzungaria Basin, Northern Sinkiang. Cat. No. V. 856, 1-7.

**Description :** The mandible, of which only the rear part of one of the two specimens are well preserved enough for observation, is of large size and heavily built. The condyle and the crest on the posterior border of the ramus which serves for the attachment of the occipital muscles are much expanded and stouter than in almost any of the large-sized living horses.

*The teeth*—The lower premolars (one P<sup>3</sup> and one P<sup>4</sup>) are very large and with thick enamel layer and cement coating. The metastylid and metaconid are rounded oval and widely separated from each other lingually by a broad V-shaped valley. Plication of the enamel only faintly shown on the lingual border of the protoconid and hypoconid basins at the early stages of wear.

The lower molars (M<sub>1-3</sub>) differ from the premolars only in their slightly inferior size and in having deeper, narrower valley between the protoconid and hypoconid, and with a faint trace of ectostylic spur.

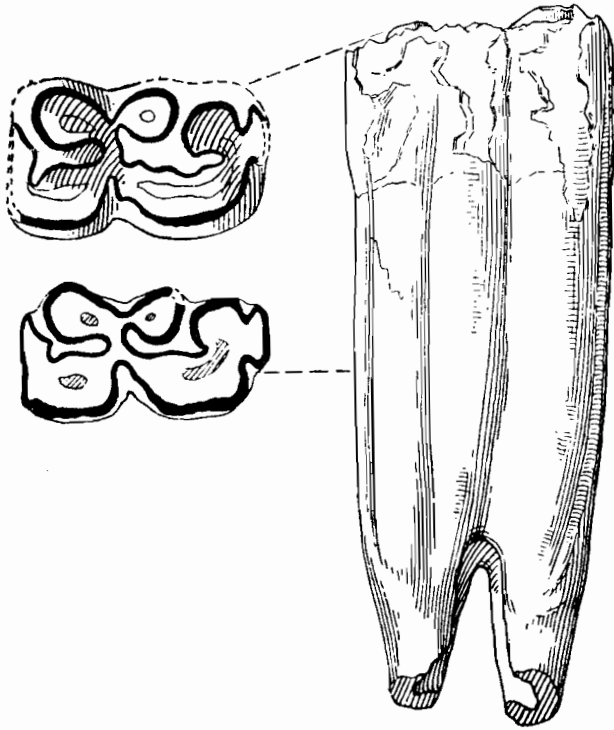


Fig. 1. *Equus sanmeniensis*, fourth lower premolar.

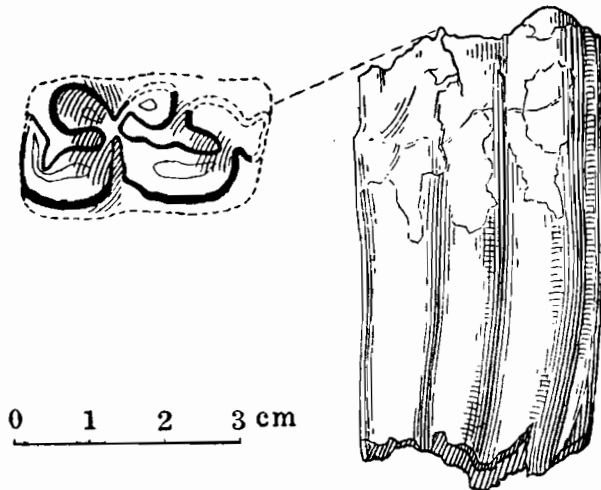


Fig. 2. *Equus sanmeniensis*, second lower molar.

**Dimensions** (in mm):

|                 | Ulanbulan                        | Nihowan    | Loc. 13, CKT |
|-----------------|----------------------------------|------------|--------------|
| Length, breadth |                                  |            |              |
|                 | P <sub>3</sub> .....37/23.....   | 32/22..... | 30.5/19.5    |
|                 | P <sub>4</sub> .....35/22.....   | 24/22..... | 29/20        |
|                 | M <sub>1</sub> .....32.5/19..... | 28/19..... | 26/18.5      |
|                 | M <sub>2</sub> .....32/20.....   | 30/19..... | 26.5/18      |
|                 | M <sub>3</sub> .....38.5/29..... | 36/18..... | 36/16        |

**Comparison and Discussion:** The fossil horse described here is evidently quite close to, if not identical with, the large Villafranchian species, *Equus sanmeniensis*, of Nihowan, described by Teilhard and Piveteau (1930). Beside being of large size, it is distinguished by its simple nonplicated enamel pattern and having rounded oval metaconid and hypostylid.

In comparison with the teeth of *E. sanmeniensis* or cf. *sanmeniensis* from the different localities at Choukoutien (Loc. 1, 9, 13 etc.), the Choukoutien specimens universally have smaller size, thinner enamel layer and more or less flicated fossette forder. From these points of view, while the fossil Horse from Sinkiang is structurally identical with typical Nihowan forms, marked differences exist between it and that from Choukoutien.

From the above description and comparison we can infer with fair certainty that geological age of the marly bed at Ulanbulan, Dzungaria, from which the fossil teeth were found is Villafranchian or Early Pleistocene.

2. A Rhinoceros Tooth from Northern Sinkiang

*Chilotherium* sp.

(Text fig. 3)

**Descriptions:** The specimen was given to the present writer for studying through the kindness of Dr. C. C. Young. It is reported that the specimen was collected by a geological party somewhere in Northern Sinkiang without definite locality or stratigraphical references.

The tooth is probably a first upper molar of the right side. Cat. No. V. 857. The specimen is highly fossilized and white in color.

The structure of the tooth is rather peculiar from the first impression. It is rather hypsodont, with prominent cingulum on the anterior and postero-internal borders and a small but distinct median tubercle at the entrance of median valley. The outer wall of the ectoloph is rather flat, but with a sharply demarcated parastyle fold. The protoloph and the metaloph turn but slightly backwards.

The protocone is comparatively small in size and not constricted. The anticrochet is indicated merely by a vestigeal indulation which will soon disappear on slightly further

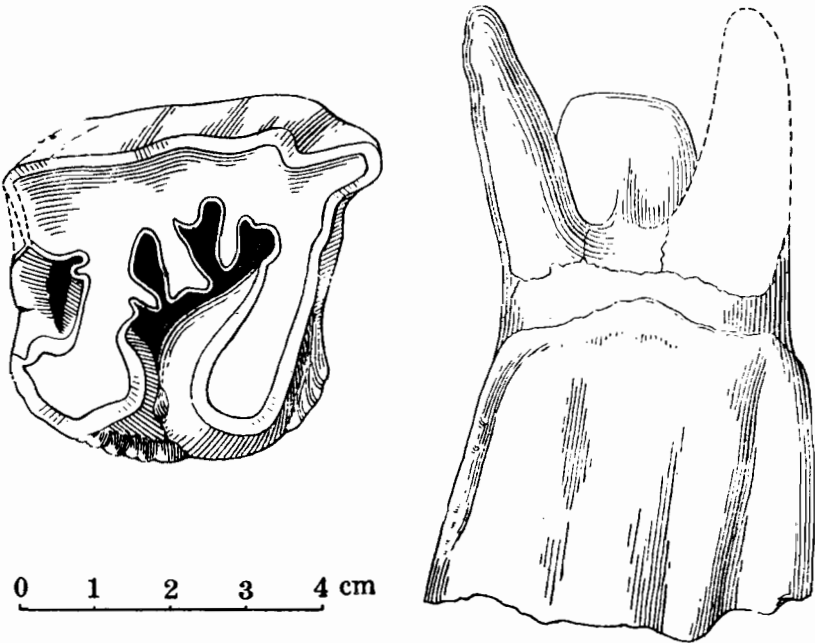


Fig. 3. *Chilotherium* sp., first (?) upper molar.

wearing. The crista is slender but well developed.

The fossette borders of the metaloph are rather strongly folded. There is a prominent "metaconule fold" and a large crochet, the latter rising from the junction of the metaloph and the ectoloph and bifurcating toward the tip.

All the valleys are rather deep and without cement filling.

**Discussions:** This tooth exhibits a number of features which are both primitive and advance. Its comparative flatness of the external wall, non-constricted protocone, absence of an anticrochet and moderate hypsodonty indicate its affinity to the genus *Chilotherium*, the most common form among the Pliocene Rhinoceros of China. But on the other hand, the present tooth differs from that in all the known species of the genus in having a more strong parastylic fold, better developed cingula, and more complicate and larger crochet. It represents therefore very likely a new species of *Chilotherium* or other related genus. Before more and better specimens are accessible it seems to be appropriate in assigning it to the present genus without specific references.

The fossil is more probably Pliocene in age as judged from the structures of the tooth in general.

3. Locality with *Hipparion* fauna in the Namas River region

Fossils from this locality seem to be rather abundant and various although they are mostly represented by badly shattered undeterminable fragments (largely due to improper ways of collecting). The following are the only ones that can be recognized in the collection.

Giraffid. Indicated by some fragments of a broken molar, about the size of that of *Samotherium*.

Cervid. A median sized cervid deer represented by some much worn teeth and lower jaw fragments.

*Hipparion* sp. (Cat. No. V. 858, 1—2). The species is comparatively well represented by the presence of a posterior upper premolar and a anterior lower molar. The upper tooth is characterized by having rather large, elongate, flattened (externally) oval protocone and moderately plicated fossette borders. On the lower tooth the labial walls of the protoconid and hypoconid columns are broadly rounded. The valley between the metaconid and the metasylid is shallow and broadly open. There is a distinct accessory column by the anterior



Fig. 4. *Hipparion* sp.  
A posterior upper premolar (above) and a low molar.

external wall of the protoconid. The ectosylid fold seems to be unusually strongly developed.

The size as well as the structure of the teeth in general are not much divergent from the typical *H. richthofeni* of North China Pontian.

4. Locality with Remains of Antelope (gen. et sp. indet.) in Ulhu, Northeast of the Lake Eric

Only a few very fragmentary pieces of bones were collected from that district. They were preserved in light greyish sandy clay. The only recognizable form is a median-sized antelope, represented by the distal half of a right horn core. It is bent but slightly backward and with many sharp-crested ridges and rather deeply grooved. The maximum diameter of the preserved part is about 35 mm.

The geological age of the fossil is probably Pliocene.

5. Locality with Remains of *Rhinoceros* at Kokomaden, about 15 kilometers South of the Ulengo River in the District of Ishblak, Dzungaria Basin

cf. *Chilotherium* sp. Fossils include some fragmentary limb bones and the frontal portion of the symphysially coalesced mandibles. The left side is still with the roots of P<sub>1</sub>—P<sub>3</sub> preserved *in situ*. The lower tusks are well developed and closely set. It may either belong to a species of *Chilotherium* or *Aceratherium*.

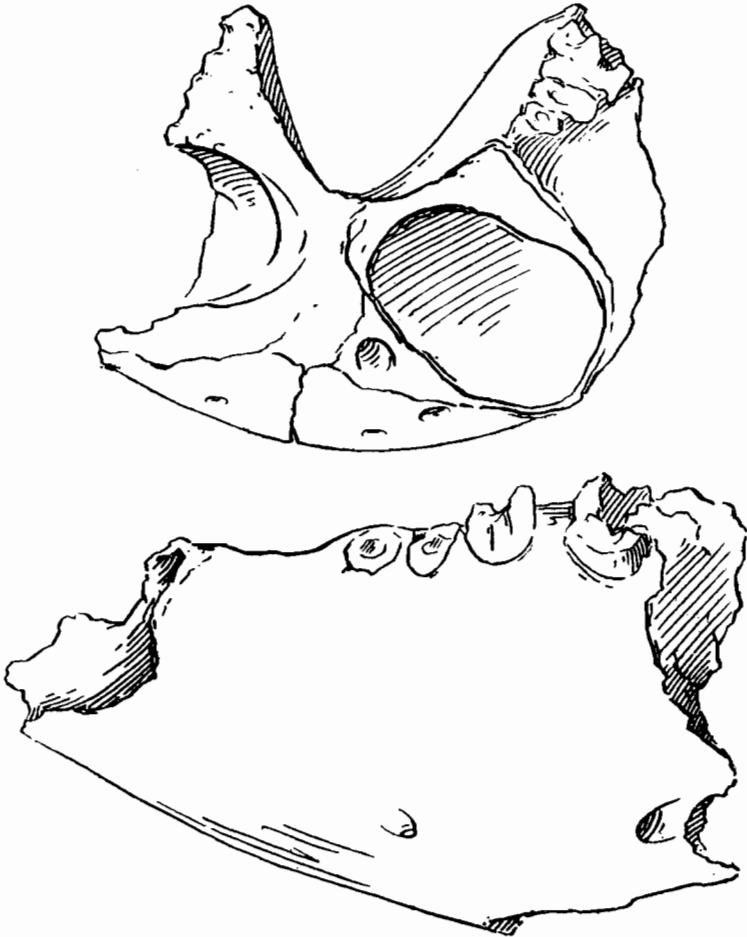


Fig. 5. cf. *Chiloterium* sp.  
Sketch of fragmentary mandible, about two third of natural size.

#### CONCLUSIONS

From the materials described above and somewhere else by the present writer (1956), at least three continental Cenozoic horizons with characteristic mammalian fossils are now known to be present in the Autonomy of Sinkiang, which can be summarized as follows:

- (1) Eo-Oligocene with *Eudinoceras*—Northern Dzungaria Basin.
- (2) Pliocene (mostly lower part) with *Hipparion*, *Chiloterium*, giraffid, cervid, etc.—Namas River region and other localities in Northern Sinkiang.

(3) Villafranchian with *Equus sanmeniensis*—Ulanbulan, Northern Dzungaria.

Beside above three horizons there may be some other zones which might have been overlooked. In addition, what have been described now are but few of the many fossil vertebrates discovered in Sinkiang in the recent years which had been saved and sent to the Laboratory for identification. Had more systematic searches been made, we are certain of finding more interesting and better materials from the vast territory of the Autonomy which is so far still unexplored from the point of view of vertebrate palaeontology.

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## 新疆新採集的哺乳類化石

(摘要)

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關於新疆廣大區域內哺乳動物的歷史，一直到最近以前可說還是一片空白。最近一、二年，隨着地質普查和找礦工作的進展，這方面的材料才開始被發現。到目前為止，雖然採集到的標本還很少，且都較殘破，但是至少已經給今後的工作，提供了一些初步的線索。這篇簡報是關於一些新採集的材料之簡單敘述。標本全部都是地質部和石油部的各地質隊過去一年內在新疆（限於北部）各地採集後送交古脊椎動物研究室鑑定的。筆者願向採集這些標本的同志和上述各單位表示感謝。

化石地點都根據野外標簽上所註明的地名或區域。其中有一些相當明確，也有一些則很籠統。也有一些沒有寫上根據野外觀察確定的產出層位，對破碎的標本鑑定更增加了一些困難。

### 一. 準噶爾盆地烏蘭布蘭的馬化石

#### *Equus sanmeniensis* (圖 1,2)

材料包括兩塊下頷骨後半的垂直枝部分，其中一個保存較好；下前臼齒 2 枚及(三及第四)和白齒三枚(第一至第三各一枚)，標本採自灰綠色泥灰岩層中。

這種馬的化石，根據所採集的材料可以觀察到的主要特徵如下：

- (1) 下頷骨壯大，超過最大的現代馬，髁狀突 (process condyloideus) 特別寬大。
- (2) 下頰齒壯大，釉質層厚，很少或近於沒有摺曲。
- (3) 下原尖及下後尖齒柱的外壁成寬闊的弧形。
- (4) 下後尖與下副尖成圓形，兩者間的谷成“V”形。

以上這幾點都是三門馬下臼齒的主要特徵，和泥河灣種型標本的完全符合，而且比周口店各地點發現的三門馬化石更為典型；因此，可以比較肯定認為烏蘭布蘭產馬化石地層的時代為維拉方期或更新世初期。

### 二. 北疆發現的一種犀牛化石

地點及層位不明。標本只有一個上頰齒，由大小及一般輪廓觀察，像是第一個上臼齒，其主要特徵有下列幾點：

- (1) 齒冠相當高，前後齒沿 (cingula) 發達，並在舌面中間的入口處有一很小但很顯著的小瘤。
- (2) 外脊外壁比較平坦，但前端(原尖外側)的前尖摺曲很顯著。
- (3) 橫脊向後傾斜度不大。
- (4) 原尖不很大，無收口現象。
- (5) 反前刺 (anticrochet) 幾乎不存在，外刺細長。
- (6) 後脊前後沿相當強烈地摺曲。有顯著的後小尖摺曲和大的，末端分叉的前刺 (crochet)。

上列各點特徵，有一部分，如 (3)、(4) 及 (1) 接近於原始性質，(2)、(5)、(6)，一般說來進步的性質。由其外壁平坦，原尖連續，無反前刺等性質表示與 *Chilotherium* 屬相接近，但這一屬內的一般種的齒沿較不發達，前刺較小和簡單。因此，這個標本很可能代表這一屬或和它相近屬的一個新種。

化石的時代由其臼齒構造的一般性質觀察，比較接近於上新世(初期)的種類。

### 三. 納瑪斯河三趾馬 (*Hipparion*) 屬的化石

這一地點的化石數量和種類均較多，但可能主要由於採集不得法，都異常破碎。其中可辨識的有下列幾種：

長頸鹿 (Giraffid) 由一個臼齒的幾塊殘片為代表，大小與沙莫獸 (*Samotherium*) 的相近。

鹿 (Cervid) 一種中等大小的鹿類，包括一些下頷和白齒碎塊。

三趾馬 (*Hipparion* sp.) 有上前臼齒及下臼齒各一枚。其主要特徵為：上前臼齒前尖



及副尖軸質層摺曲程度中等，原尖長扁圓，外壁很平。下臼齒下原尖及下後尖的外壁成寬闊的弧形；兩者間的谷很淺，強烈張開。唇面前角上上有一獨立的小柱，下外小柱 (ectostylid) 顯得特別長大。

這種三趾馬的大小和構造與典型的李氏三趾馬 (*Hipparion richthofeni*) 的很接近。這個地點的層位應與華北各省一般所謂“三趾馬紅土”的層位相當。

#### 四. 烏爾禾地區伊里克湖東北產羚羊類化石地點

這裏發現的破碎骨片，能作初步鑑定的只有中等大小的羚羊一種，僅有上半截角心一段。角心向後彎度不大，表面有許多較深的溝和尖頂脊稜。保存部分直徑(前後)約 35 毫米。

化石的時代可能為上新世。

#### 五. 準噶爾盆地依希不拉克地區烏倫古河南約 15 公里產犀牛化石地點

發現材料有殘破的犀牛肢骨數塊及左右邊癒合的下頷前端部分一塊。右半下頷骨上保存有第一至第三前臼齒的白根。中部接合線相當長(約 100 餘毫米)。一對下門齒很發達(根部直徑達 38 毫米)，兩側牙齒間隔很近(16 毫米)，由這些性質表示化石代表一種 *Chilotherium* 屬的犀牛，但也可能是為 *Aceratherium* 一屬的。

#### 總 結

根據上面敘述的和筆者不久前發表(1956)的資料，我們現在知道在新疆至少有下列三個含哺乳類化石的重要層位，每層都有典型的代表種屬，可總括如下：

(1) 上始新統或下漸新統 *Eudinoceras* 層——準噶爾盆地北部。

(2) 下上新統 *Hipparion* 層 (*Hipparion*, *Chilotherium*, 長頸鹿、羚羊等)——納瑪斯河、烏爾禾及北疆其他地區。

(3) 下更新統(泥河灣) *Equus sanmeniensis* (三門馬) 層——準噶爾盆地烏蘭布蘭。

此外，可能還有由於資料不够而被忽略的其他層位存在。上述一些現有的零散發現已經足夠表明，如果進行比較詳細和系統的調查和採集，可以找到更多的重要和有意義的化石，但目前就古脊椎動物學上說，包括新疆在內的中國西北邊疆可說還是一片未開發的處女地。