

中國新發現的板齒犀類化石

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板齒犀亞科是犀類中一個高度特化的分支。典型的更新世的板齒犀屬 (*Elasmotherium*) 從 19 世紀初開始,在亞洲北部(西伯利亞)及歐洲都有發現。但一直到本世紀初,都限於西伯利亞板齒犀(*E. sibiricum*) 一個單一種。後來,柏里俠克(1924)又記述了一個新種——高加索板齒犀(*E. caucasicum*)。至於這一類動物的起源及早期歷史,則長期以來均未為人們所知悉。

1922 年,瑞典林斯頓記述了我國山西保德三趾馬層中發現的一種中國犀 (*Sinotherium lagrelii*) 的化石,它代表板齒犀亞科中一種比較原始的類型,為這一類犀類的起源問題提供了初步的線索。

關於真板齒犀屬的化石,德日進曾報導過在河北宣化泥河灣發現的幾塊另星趾骨和一個臼齒碎片。這些碎片除了可以確定為這一屬的化石外,不能作進一步的鑑定。

林斯頓在詳細研究中國犀的材料時(1924)曾對這一亞科作過比較系統的整理。他把法國馬蓋朗研究的由伊朗馬拉格哈(Maragha)三趾馬層中發現的一種無角犀,亦歸入到板齒犀亞科內,訂名為伊朗犀(*Iranotherium*),認為是這個亞科中最較原始的一屬。最近又在伊比里半島發現了一個更原始的新屬(西班牙犀)。

以上幾乎包括了到最近為止的,關於板齒犀類的全部資料。其中只有西伯利亞板齒犀的材料較多,分佈也最廣,研究較為詳細。

最近,本文作者前後得到了三批在山西境內發現的板齒犀類化石的標本,其中包括三個新種。這些發現大大地豐富了我們關於板齒犀類的知識。

下面是關於三個新種和中國境內(河北、山西)先後發現的板齒犀類的簡述。

1. *Sinotherium lagrelii* Ringstrom (拉氏中國犀) 產於山西保德中新統上部或上新世下部。臼齒釉質層褶曲限於外脊內側及原脊後側。

2. *Parelasmotherium schansiense* Killgus (山西似板齒犀)——拉氏中國犀的同種異名。

3. *Sinotherium simplum* Chow 新種(簡單中國犀),產於山西保德(?),時代為上新世初期。臼齒釉質層不起褶曲,但臼齒構造上的其他特徵則都比拉氏中國犀進步,如有較多的材料,可能被證明為一個獨立的新屬。

4. *Elasmotherium inexpectatum* Chow 新種(古板齒犀),採自山西,確實地點不明,時代可能為更新世初期(泥河灣期)。較典型的歐洲及亞洲北部的板齒犀為原始。可能是裴氏板齒犀(見後)及其兩種真板齒犀的直接祖先。

5. *Elasmotherium* sp. (板齒犀種未定)——河北宣化泥河灣(更新統下部),僅有第二上臼齒後角碎片一塊,可與前一種相比較,可能屬同一個種。

6. *Elasmotherium peii* Chow 新種(裴氏板齒犀),產於山西平陸縣黃河岸。時代為更新

世中期。這是較古板齒犀進步的一種真板齒犀。與西伯利亞種和高加索種的關係尚難確定，但與後兩種的差別很明顯。西伯利亞種和高加索種的差別不大，許多特徵都顯示出兩者有明顯的過度性，可能為同一種。

板齒犀亞科的系統分類如下：

板齒犀亞科 (Subfamily Elasmotherii Dollo)

西班牙犀 (Genus *Hispanotherium* Clusafont et Villalta, 1947), 包括 1—2 個種。發現地點：西班牙及葡萄牙；時代：中新世。

伊朗犀屬 (Genus *Iranotherium* Ringstrom, 1924)

I. morgani Ringstrom (Marquenen). 發現地點：伊朗，時代：上新世初期。

中國犀屬 Genus *Sinotherium* Ringstrom, 1922)

S. lagrelii Ringstrom 1922. 發現地點：山西保德，時代：上新世初期。

S. simplum Chow, 1958. 發現地點：山西保德，時代：上新世初期(?)

板齒犀屬 (Genus *Elasmotherium* Fischer, 1808)

E. inexpectatum Chow, 1958. 發現地點：山西，時代：更新世初期。

E. peii Chow, 1958. 發現地點：山西平陸；時代：更新世中期。

E. sibiricum Fischer, 1808. 發現地點：歐洲及亞洲北部，時代：更新世中期。

E. caucasicum Borisiak, 1914. 發現地點：蘇聯歐洲東部；時代：更新世中期。

新 種 記 述

Sinotherium simplum, sp. nov. (簡單中國犀)

正型標本：右上第三臼齒 (V963)。

特徵：與拉氏中國犀 (*S. lagrelii*) 近似的一種較為原始的板齒犀，臼齒釉質層簡單，無任何曲褶；原尖大，扁圓形，與前脊接連部強烈地收口；後齒窩封閉成一環形小圈，嚼面與牙齒長軸斜交。

比較與討論：新種第三上臼齒的一般形態與拉氏中國犀的相當臼齒相近似，但在基本特徵上有很大差別，與後者及真板齒犀屬的區別，主要有下列幾點：

- (1) 釉質層不起褶曲；
- (2) 前刺在新種內幾乎不存在，而拉氏中國犀的前刺相當發育；
- (3) 拉氏中國犀的原尖呈圓形，而新種的前尖則為扁圓，成足狀構造，與真板齒犀的相似。
- (4) 拉氏中國犀的後齒窩不封閉，新種的後齒窩則封閉成環狀小圈。
- (5) 第三臼齒拉長、側扁，拉氏中國犀的第三臼齒則較寬、較短。

(6) 牙齒斜向生長，與象科的臼齒的使用方向相同。

以上各點特徵中 (1)、(2) 兩點是新種所特有，一般認為是原始性質。前刺的退化程度則可視為真板齒犀屬更為特化的性質。(3)、(4)、(5) 三點的性質接近於真板齒犀屬。

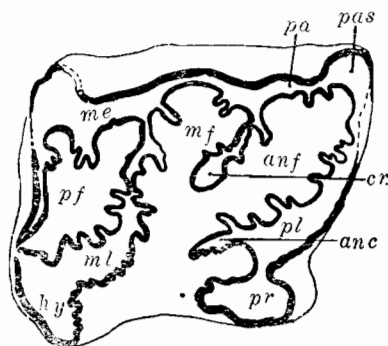


图 1. 板齒犀类臼齿构造简图

anc. 反前刺, *anf.* 前窩, *cr.* 外脊刺, *hy.* 次尖,
me. 後尖, *mf.* 中窩, *ml.* 後脊, *pa.* 前尖,
pas. 前附尖, *pf.* 後窩, *pr.* 原尖, *pl.* 原脊.

上述性質使新種系統的位置，特別是和拉氏中國犀的關係，很難以決定，可能代表一支由較拉氏中國犀更原始的祖先產生的一個特化的分支，和晚期的真板齒犀屬顯然沒有直接的關係。

Elasmotherium inexpectatum, sp. nov. (古板齒犀)

正型標本：第二右上臼齒 (V964)。

特徵和比較：本種是一種較小的真板齒犀。第二上臼齒橫切面輪廓呈正方形，與本屬其他各種呈長方形的情形完全不同。原尖並不像其他各種那樣成扁長。外壁外面成寬闊的雙褶曲。後脊位置比西伯利亞種靠前，但比裴氏犀靠後。牙齒的整個外形極似馬類的臼齒。

在特化方面，本種不及真板齒犀屬其他各種那樣顯著，時代也稍老。可能為其他三種的直接祖先。與其他較原始的種屬的關係則尚無法知道，因為除了比較小，上牙齒成方形和比較簡單等一般的原始性質外，看不出任何可與其他較老類型連接的重要的構造。

Elasmotherium peii, sp. nov. (裴氏板齒犀)

正型標本：上頰齒列 (P³—M³) (右)，DP², P³, P⁴, M², M³ 各一(左)。均屬同一個體。
 編號：V962。

特徵：中等大小的真板齒犀；M¹ 的輪廓近正方，M² 長，較狹，被後脊分成大略相等的前後兩部分，M³ 小，橫切面成三角形。

標本描述：P³—嘴面輪廓呈長方形；外脊短，外壁向外凸出。原尖、後尖、反前刺大，無前刺及外刺。

P⁴—與 P³ 相似，後尖和後附尖較不發達。有兩個小刺從外脊內壁伸入後齒窩。

M¹—橫切面輪廓正方形，有發育較好的外刺和反前刺。

M²—大，長方形，外壁綫平直。後脊起點在外脊中點稍後處，將牙齒分爲前後大略相等的兩部分，並向後內角彎曲斜伸，形成大的後齒窩。



Sinotherium lagrelii



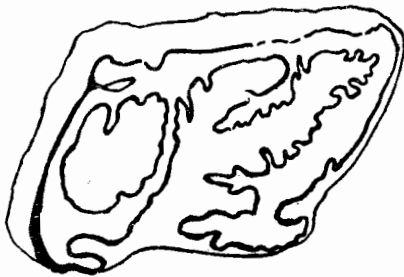
Sinotherium simplum



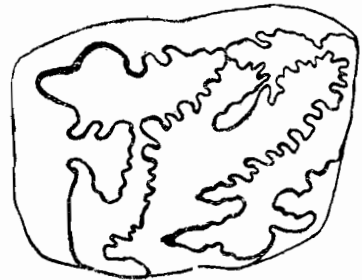
Elasmotherium inexpectatum



Elasmotherium peii



Elasmotherium caucasicum



Elasmotherium sibiricum

圖 2. 各種中國犀的第三臼齒以及真板齒犀的第二上臼齒的構造

(拉氏中國犀根據 Ringstrom, 真板齒犀根據 Gromova 和 Brandt 原圖重繪)

M³—較小，橫切面呈三角形。原尖大，內側凹進。

乳齒—僅左上第二個保存下來。低冠、方形，與一般犀類的中間頰齒相似。僅在原脊後面起褶曲，情形與拉氏中國犀中所見到的情況相似。

比較：新種比前述的一種（古板齒犀）稍大，臼齒引長，較複雜。和西伯利亞種及高加索種比較，第三臼齒小，第二臼齒扁長，後脊靠前。

新種名稱贈與裴文中教授。

NEW ELASMOTHERINE RHINOCEROSES FROM SHANSI

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I. Introduction

Remains of elasmotherine rhinocerotids are rarely known in China. Practically no progress has been made since Ringstrom (1924) published his description of *Sinotherium lagrelii* which in fact is the only better and definitely known form of this interesting group of rhinoceros in China. The occurrence of the true elasmotheres in this country was first reported by Teilhard de Chardin and Piveteau (1930) who described a radius and some foot bones of *Elasmotherium* sp. from the type locality of Villafranchian Nihowan beds in Northern Hopei. A few additional materials were collected later from this same locality and were noticed as "*Elasmotherium* sp., undescribed limb bones and tooth" in "Chinese Fossil Mammals" by Teilhard de Chardin and Leroy (1942, p. 65). Nothing more has been known since then. Therefore, it is really amazing to notice that a series of interesting new materials came into light within one month in the Autumn of 1957. These materials were obtained from three different sources, including over a dozen well preserved premolars and molars of three different forms which have all been designated as new species. These specimens are to be described in this paper together with the tooth fragment mentioned by Teilhard de Chardin and Leroy.

The writer is indebted to Prof. W. C. Pei for turning the specimens from the "Sanmen Gorge Reservoir" District over to the writer for studying and to Dr. E. Bejiaeva of the Paleontological Institute of Academy of Sciences USSR for sending the late Prof. Borisiak's papers and a photo of the dentition of *Elasmotherium sibiricum* for reference. He is also obliged to Mr. Huang Wanpo for furnishing stratigraphical information regarding the Sanmen specimens and to Miss Li Yuchin for her help during the preparation of the manuscripts. Thanks are also due to Mr. C. F. Wang and Miss W. C. Hu for making the photos and sketch drawings of the specimens respectively.

II. Material and the geological age of the fossils

The forms described in this paper include:

- (1) *Sinotherium simplum*, sp. nov.
- (2) *Elasmotherium inexpectatum*, sp. n.

(3) *Elasmotherium* sp.

(4) *Elasmotherium peii*, sp. n.

The first one, *Sinotherium simplum* sp. nov., is represented by a single last molar tooth which was acquired by the writer from the Provincial Medical Company of Heilungkiang, Harbin. The exact locality of this fossil was not known to the Company. But they were sure that it came from the province of Shansi together with a large amount of other mammalian fossils. The whole collection were examined by the writer in order to get more specimens of it as well as those of the others for an understanding of the fauna. The collection which includes numerous isolated teeth of *Ictitherium*, *Hypohippus*, *Hipparion* (2 or 3 spp.), *Chilotherium*, *Samotherium* and other giraffids, and various forms of *Gazella* and *Cervus*, etc. are characteristic of the steppe type *Hipparion* fauna of North China. Furthermore, as is indicated by the nature of the matrix and preservation of these fossils, they are most probably from the *Hipparion* red clays of the Early Pliocene (Pontian) of the Paotz district of northwestern Shansi. It is from this same general district that the type of *Sinotherium largrelii* described by Ringstrom was collected. Therefore the fossil is considered to be of Early Pliocene age as a component of the Pontian *Hipparion* fauna.

The description of *Elasmotherium inexpectatum*, sp. n., is also based on a single molar (M²) which was kept in the collection of the Municipal Committee of the Preservation of Antiquities in Shanghai. According to the report of the Committee the fossil came most likely from Shansi Province. This is supplemented by the fact that the enamel of the tooth is translucent and greenish coloured as is usually the case with the mammalian teeth from the lower Pleistocene Villafranchian of northern Shansi and Hopei. Besides, as indicated by the traces of matrix adhering to the tooth, the fossil was derived from some well cemented clean coarse-grained sands. The age of the fossil is tentatively considered as Early Pleistocene (*vide infra*).

The tooth fragment of *Elasmotherium* sp. is kept in the collection of the Institute of Vertebrate Paleontology which was noticed by Teilhard de Chardin and Leroy (1942). It is from the type locality of Nihowan that its geological age is now regarded as Early Pleistocene.

The specimens from the Sanmen Gorge District were obtained by a party of the Institute of Vertebrate Paleontology from a native collector in the District of Pinglo in southern Shansi. According to the observation of Mr. Huang Wanpo the fossils are from the iron yellow sandy beds under the loessic deposits on the northern bank of the Huangho. There are several successive sandy beds outcropping on the bank from ten to twenty metres above the level of the lowest terrace. The age of these beds is still in dispute among the geologists. Judging from the structure of the teeth of the new elasmothere which is comparatively close to the *E. caucasicum* from the Middle Pleistocene of the Soviet Union, it is tentatively considered to be early Middle Pleistocene or late Early Pleistocene.

III. Description of the fossils

Genus *Sinotherium* Ringström

Sinotherium simplum sp. nov.

(Pl. I, figs. A & A₁)

Type.—A third upper molar (dex.). V 963.

Diagnosis.—A large *Sinotherium*-like elasmotherine rhinoceros; enamel of molar teeth simple and without sinuous foldings; protocone large, flattened and strongly constricted; post fossette closed into small pit-like ring; grinding surface of the crown in a plane diagonal to the longest axis of the tooth.

Locality and Horizon:— See above

Description:—The tooth is of gigantic dimensions. The grinding surface of the crown has a maximum length of 105 mm and a maximum width of 50 mm. The tooth is highly hypsodonty, heavily coated with cement material and with well developed roots.

The ectoloph has nearly straight external wall without parastyle. The protoloph turns around backward from the much squeezed anterior border to such an extent that it becomes parallel to the ectoloph. The metaloph is much reduced and turned sharply backward to come into contact with the hypostylic fold to encircle completely the pit-like postfossette.

The protocone which is flattened into an elongated foot-shaped structure is strongly constricted off from the protoloph. While the crista and antecrochet are well developed, the presence of the crochet, on the other hand, is merely indicated by a low broad swelling on the internal wall of the ectoloph behind the crista.

The enamel layer as mentioned above is simple and without any trace of sinuous folding. The crown of the tooth is entirely buried in cementing material except at the centre of the prefossette and medifossette basins which are only partially filled up and leave a triangular cavity as in *Sinotherium lagrelii*, though to a greater extent.

The tooth is so obliquely set in the alveolus that the plane of the grinding surface is normal to the diagonal of the tooth.

Measurements (in mm):

	<i>Sinotherium lagrelii</i> (after Ringstrom)	<i>S. simplum</i>
Length, M ³	105mm	105
Width, M ³	60mm	50

Though the new tooth from Shansi is similar to that of *Sinotherium lagrelii* in general, it differs from the latter in several ways which are more or less of primary importance.

In comparison with the corresponding tooth (M^3) of *Sinotherium lagrelii* and the true elasmotheres, the differences shown by the new species can be summarized as follows.

- (1) The entire lacking of the sinuous fold of the enamel.
- (2) The crochet is almost absent in the new species, but it is well developed in *Sinotherium lagrelii*.
- (3) The protocone which is elongately rounded in *S. lagrelii*, is flattened as in *Elasmotherium*.
- (4) While there is a well developed pit-like closed postfossette basin in the new species, it is wide open posteriorly in *Sinotherium lagrelii*.
- (5) M^3 is comparatively more elongate or laterally compressed than in the others.
- (6) The tooth is more obliquely set in the alveolus and the grinding surface of the crown is more diagonal to the longest axis of the tooth, so that the tooth functions more like that of an elephant than that of horses as the others do.

Among the characters listed above the first one or the simplicity of the enamel is unique among the elasmotherine rhinoceroses. This is an unspecialized feature closer to *Sinotherium lagrelii*, particularly to *Iranotherium morgani*, but even in those two species, though the enamel varies slightly, it is more or less broadly folded at certain places. The reduction of the crochet seems to be a specialized feature, which has gone to the extreme in the genus *Elasmotherium* in which it is entirely lacking. Also the points (3), (4), (5), are more like the cases seen in *Elasmotherium* in which the protocone is of the same elongate type and the postfossettes become small and ring-shaped.

Considered as a whole, the new form seems to be much more specialized than *Sinotherium lagrelii* except that the enamel is more or less folded in the latter. In this respect it is difficult to ascertain at present whether the new species is phyletically earlier or later than the *S. lagrelii*. It may represent a specialized offshoot from the more generalized form close to *S. lagrelii* and is in no way directly related to the true elasmotheres of the Eurasian Pleistocene.

***Elasmotherium inexpectatum*, sp. nov.**

(Pl. I, figs. B & B₁)

Type:—A second upper molar (dex.).V 964.

Diagnoses:—A true elasmothere of comparatively smaller size, second upper molar quadratic in outline, with larger protocone and postfossette.

Locality and Horizon:—See above.

Remarks:—This is a comparatively small-sized true elasmothere, smaller than all the known species of this genus. The outline of the second upper molar is quadratic instead of being rectangular as in the others. The protocone is not so elongated and flattened as in the other species. The external wall of the ectoloph is broadly un-

dulating or with double convex surface instead of being nearly straight. The metaloph is more anteriorly located than in *E. sibiricum*, but more posterior in position than *E. peii*, sp., nov. The tooth is in general more straight and prism-shaped, like that of a horse.

The structure of the tooth as a whole is not so specialized as the other known species of this genus. It is highly probable that this new species is more directly ancestral to the new Chinese form, *E. peii* from Pinglo, Shansi, which is also slightly later in geological age.

***Elasmotherium* sp.**

(Pl. I, fig. C)

This is represented by a molar fragment from Nihowan of the Hsuanhwa District in northern Hopei which was noticed by Teilhard de Chardin and Leroy (1942). The fragment is of the same colour and condition of preservation as the type molar of the above described species.

The fragment, as shown by the photo which was taken from a polished section made by Teilhard, is comparable to the postero-external part of a second left upper molar. The specimen includes parts of the metaloph posterior of the ectoloph and the cement filling in the postfossette.

In all probability this belongs to the same species as the form from Shansi, i.e. *E. inexpectatum*, presumably of Early Pleistocene Villafranchian of Shansi.

***Elasmotherium peii*, sp. nov.**

(Pl. I, figs. XX; Pl. II, figs. XX; Pl. III, figs. XX)

Types:—Upper cheek teeth row (P^3 — M^3) of the right side, one each of DP^2 , P^3 , P^4 , M^2 and M^3 of the left. All belong to one individual and are beautifully preserved except RP^4 , LP^3 and LM^3 which are partly broken. Catalogue no. IVP—V 962.

Diagnoses:—Moderately large elasmotherine; M^1 quadratic in outline; M^2 long, narrow and divided into nearly equal anterior and posterior halves by the metaloph; M^3 small and more triangular in cross section.

Horizon and Locality:— See above.

Description:— The permanent cheek teeth are highly hypsodont, crowded together and diagonally set in the alveola, especially the last ones. The external wall of the whole row bends into a broad curvature.

P^3 —Rectangular in outline, ectoloph short and with convex external wall. Protocone, hypocone, and antecrochet large, crochet and crista absent. Postfossette large and closed posteriorly.

P^4 —Similar to the above in structure, proportionally larger and longer. Protocone

oval in shape. Hypocone and hypostyle less well developed. There are two crista-like spurs (or "*crstellae*") outcropping in the postfossette basin.

M¹—Quadratic in outline. It differs from P⁴ in having well-developed crista and larger antecrochet. Protocone large and elongate. Metaloph slender and subparallel to the posterior edge of the tooth.

M²—Large, rectangular and with nearly straight external wall, with small antecrochet, moderately developed crista and a small anterior *cristella*. The metaloph originates from a point slightly posterior to the midpoint of the ectoloph and turns diagonally backwards to encircle a very large postfossette basin.

M³—Comparatively small, simple and more triangular in outline. The metaloph has reduced to a crista-like spur behind the larger crista. The protocone is large and deeply concaved on the free internal side.

Comparative measurements of the *Elasmotherium* (in mm):

	<i>E. inexpectatum</i>	<i>E. peii</i>	<i>E. sibiricum</i> *	<i>E. caucasicum</i> *
Length, P ⁴	—	47	43	40—60
Width, P ⁴	—	57	50	50—57
Length, P ¹	—	59	48	43—65
Width, M ¹	—	63	58	63—75
Length, M ²	70	84	68	69—86
Width, M ²	59	63	61	70—76
Length, M ³	—	70	80	77—113
Width, M ³	—	62	52	60—65
Length, P ⁴ -M ³	—	260	239	299—324
M ² , L/W	1.18	1.32	1.11	1.98—1.13

*Data from Gromova (1932) after Brandt and Borissiak.

Milk Dentition:— Only the second milk molar of the left maxilla is available. It is a rather large tooth, quadratic in outline. It is rather brachyodont and looks somewhat like a posterior intermediate cheek tooth of an ordinary rhinoceros except that the external surface is more flat and that the enamel is folded on the posterior side of the protoloph, recalling very much the condition seen in the molars of *Sinothierium lagrelii*.

The first milk molar is most probably present, for there seems to be on the anterior wall of the second milk molar an area of contact suggesting the presence of another small tooth.

Comparisons:— This new species is distinguished from *E. inexpectatum*, sp. nov. by its larger size, more complicated and elongated M². It differs from *E. sibiricum* and *E. caucasum* by its smaller M³, more elongated M² with much anterior metaloph and larger postfossette.

The specific name is erected in honor of Prof W. C. Pei for his important contribution to the study of Pleistocene mammals of China.

IV. A SUMMARY OF THE ELASMOTHERINE RHINOCEROS OF CHINA

1. *Sinotherium lagrelii* Ringstrom, 1922—A less specialized form from the upper Miocene or lower Pliocene of northwestern Shansi, probably closely related to the more generalized *Iranotherium morgani* from the Pontian of Maragha.

2. *Parelasmotherium schansiense* Killgus, 1923—synonymy of the above.

3. *Sinotherium simplum* Chow, sp. nov. —more specialized than *S. lagrelii* in general but with simple unfolding enamel, probably from the lower Pliocene of Shansi.

4. *Elasmotherium inexpectatum* Chow, sp. nov.— a smaller form of the genus from the early Pleistocene, Villafranchian of Shansi, more primitive than *E. peii* and probably ancestral to the latter species.

5. *Elasmotherium* sp. Teilhard—Probably same as the preceding one from the Nihowan Villafranchian of northern Hopei.

6. *Elasmotherium peii* Chow, sp. nov.—A more specialized form from the lower Pleistocene of Pinglo District ("Sanmen Gorge Reservoir") in southern Shansi comparable to *E. sibiricum* and *E. caucasicum*. The relationship between these three species is still difficult to ascertain at present but it seems that *E. peii* is somewhat more primitive than the two known forms from the Soviet Union. And the differences between *E. sibiricum* and *E. caucasicum* are not so distinct as those between them and *E. peii*.

Bibliography

- [1] Borissiak, A., 1914(a): Sur la dentition d'*Elasmotherium caucasicum* n. sp. Bull. l'Acad. Imp. Sci. St.-Petersbourg. Ser. VI.
- [2] Brandt, J. F., 1864: Observations de *Elasmotherii Reliquiis*. Mem. l'Acad. Imp. Sci. St.-Petersbourg. Ser. VII, T. VIII, No. 4.
- [3] Brandt, J. F., 1878 (a): Mittheilungen uber die Gattung *Elasmotherium* besonders den Schadelbau derselben. Mem. l'Acad. Imp. Sci. St.-Petersbourg Ser. VII, T. XXVI, No. 5.
- [4] Brandt, J. F., 1878 (b): Tentamen Synopses Rhinocerotidum viventium et fossilium, Mem. l'Acad. Imp. Sci. St.-Petersbourg Ser. VII, T. XXVI, No. 6.
- [5] Gromova, V., 1932: Beiträge zur kenntnis der quartären fauna des wolgagebietes, und der geschichte der säugetiere osteuropas und nordasiens überhaupt. Travaux de la commission pour l'étude du quaternaire, 11, pp. 69—108.
- [6] Killgus, H., 1923: Unterpliozäne Säuger aus China. Pal. Zeitschr. Vol. V, Fasc. 3, pp. 251—257.
- [7] Ringstrom, T. J., 1922: *Sinotherium lagrelii*, a new Fossil Rhinocerotid from Shansi, Bull. Geol. Sur. China, No. 5, pp. 91—94.
- [8] Ringstrom, T. J., 1924: Nashorner der Hipparion-Fauna Nord-Chinas Pal. Sin., Ser. C, Vol. 1, Fasc. 4, pp. 123—151.

- [9] Teilhard de C. P. and Licent, E., 1942: Chinese Fossil Mammals.
 [10] Teilhard de C. P. and Pivctau, J., 1930: Les Mammifères fossiles de Nihowan (Chine). Ann. Paleont., Vol. XIX, pp. 19—21.
 [11] Crusafont, M., Villata, J. F. de, 1947: Sobre un interesante Rinoceronte (*Hispanotherium* nov. gen.) de valle del Manzanares. Nota preliminar. Las ciencias año XII, num. 4 (Not seen).

圖 版 I 說 明

Sinotherium simplum Chow, n. sp. V963

- A. 右 M³; 外側面 2/3 A₁. 右 M³; 嚼 面 2/3

Elasmotherium inexpectatum Chow, n. sp. V964

- B. 右 M²; 外側面 2/3 B₁. 右 M²; 嚼 面 1/1
 C. *Elasmotherium* sp. 第二上白齒後角碎片橫切面

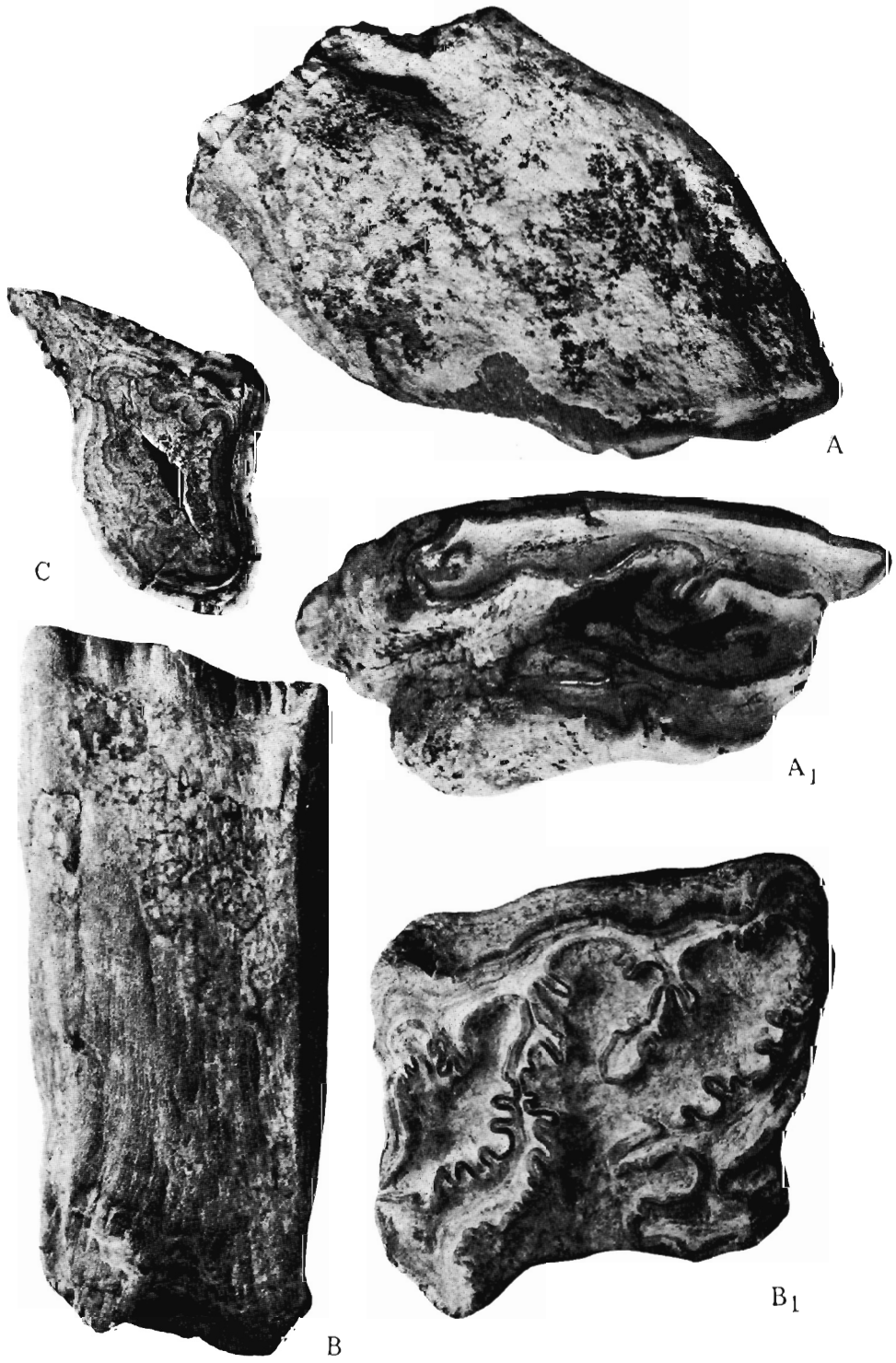
Explanation of Plate I

Sinotherium simplum Chow, n. sp. V963

- A. Right M³; external lateral view. 2/3
 A₁. Right M³; crown view. 2/3

Elasmotherium inexpectatum Chow, n. sp. V964

- B. Right M²; external lateral view, ×2/3, B, crown view. 1/1
 C. *Elasmotherium* sp.

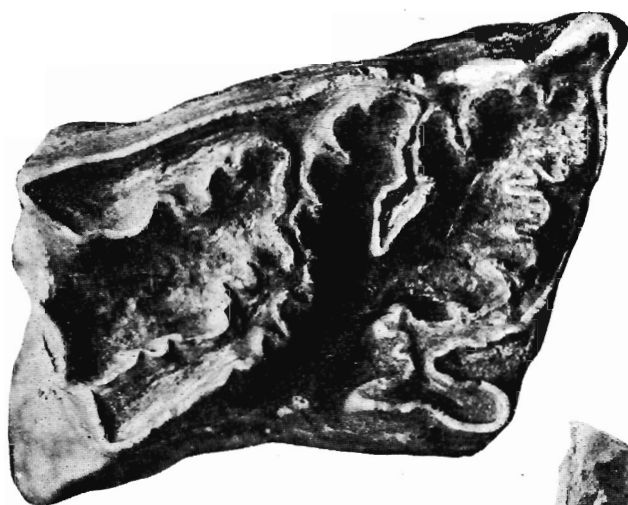


周明鎮：中國新發現的板齒犀類化石

Chow: New Elasmotherine Rhinoceroses from Shansi

圖版 II

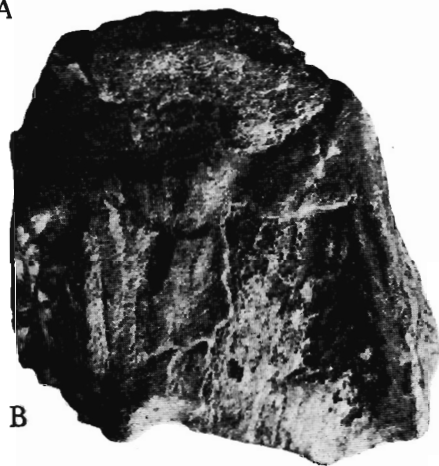
Plate II



A



C



B



B₁



A₁

圖版 II 說明

Elasmotherium peii Chow, n. sp. V962

- | | |
|--------------------------------|---|
| A. 右 M ² ; 嚼面 1/1 | A ₁ . 右 M ² ; 外側面 1/2 |
| B. 左 DP ² ; 外側面 1/1 | B ₁ . 左 DP ² ; 嚼面 1/1 |
| C. 左 P ¹ ; 嚼面 1/1 | |

Explanation Of Plate II

Elasmotherium peii Chow, n. sp. V962

- A. Right M²; crown view. 1/1
- A₁. Right M²; external lateral view. 1/2
- B. Left DP²; external lateral view. 1/1
- B₁. Left DP²; crown view. 1/1
- C. Left P¹; crown view. 1/1

圖 版 III 說 明

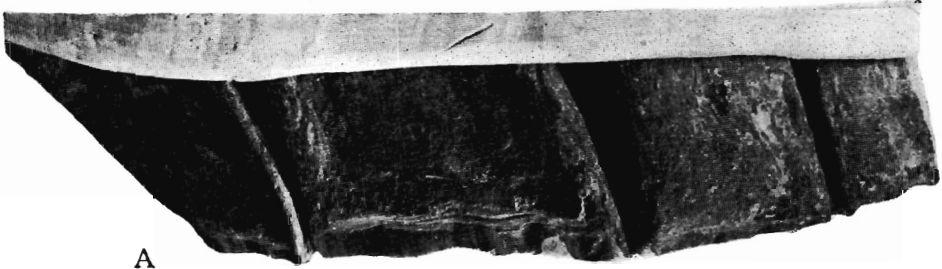
Elasmotherium peii Chow, n. sp. V962

- A. 右上頰齒; 外側面 1/2 A₁. 右上頰齒; 嚙面 1/2
B. 左 M²; 橫切面 1/1 B₁. 左 M³; 橫切面 1/1

Explanation Of Plate III

Elasmotherium peii Chow, n. sp. V962

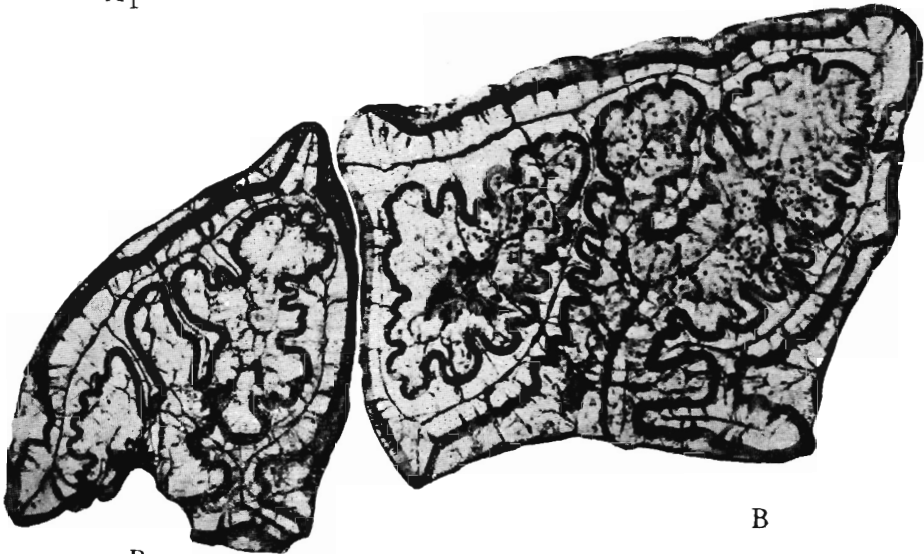
- A. Right upper cheek teeth, external lateral view. 1/2
A₁. Right upper cheek teeth, crown view. 1/2
B. Left M²; transverse section. 1/1
B₁. Left M³; transverse section. 1/1



A



A₁



B₁

B