

ON THE DISTRIBUTION OF MEGACEROS IN CHINA

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In China, however, as due to relative late beginning of systematic scientific field-work we know few localities with *Megaceros*. Although it is today only a question of time to get additional materials of further localities, it may be too little in proportion to the vastness of Chinese territory to give an outline of Pleistocene *Megaceros* invasion and distribution in China already today or in the immediate future. On the other side it seems to us, that this extinct Asiatic-European genus of Middle and Late-Pleistocene age as well as *Euctenoceros* Trouessart 1898 of Villafranchian may be of stratigraphic significance to correlate the type-localities of Europe with those of Asia, especially China, if we succeed in getting additional materials from Asia. This paper therefore may be a preliminary study of this interesting question ¹⁾.

The European status, as far as we know, is following:

(1) Early-Pleistocene (Villafranchian, Ältestpleistozän):

There have been some materials of *Megaceros*-sized deer recorded, but it is quite uncertain if they belong to *Euctenoceros*-, *Orthogonoceros*- or *Dolichodoryceros*-group, of what only the last will be regarded by us of being close related to *Megaceros s. str.* The large cervid of European Villafranchian is as well as in China a member of *Euctenoceros*-group.

(2) Lower Middle-Pleistocene (Ältpleistozän):

The *Megaceros*-group *s. l.* is represented by the genus *Dolichodoryceros* Kahlke 1952. AS we have noted [Kahlke, 1951] side by side with *Dolichodoryceros* there is another *Megaceros*-sized cervid, *Orthogonoceros verticornis* (Dawkins) 1872, *Orthogonoceros* Kahlke 1952. The two species which are well distinguished will occur together at any locality of this type in Germany having been systematically excavated or investigated for a more or less long time.

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Dolichodoryceros süssenbornensis Kah. is a low specialized *Megaceros*-like cervid with extraordinary long and thin main-tines, recalling in some way the type of *Euctenoceros*. The palmation of antlers is very poor but in principle more advanced than in *Euctenoceros*, only the brow-tine (first tine) shows broad flattening. *Dolichodoryceros* has been recorded from Süssenborn (Germany, type-locality of *D. süssenbornensis*), Voigtstedt (Germany), Mosbach (Germany) and from different localities of the Forest bed of East-England. From this stock, however, or a close related, *Megaceros s. str.* is believed to have descended.

(3) Upper Middle-Pleistocene (~Mittelpleistozän):

The type-locality of European Upper Middle-Pleistocene *Megaceros* is Steinheim an der Murr (Germany). There is no member of the archaic *Dolichodoryceros*- or *Orthogonoceros*-group. The well preserved specimens of this locality, *Megaceros giganteus antecedens* Berckhemer, have been published in 1941. The Steinheim-*Megaceros* is a extreme specialized giant-deer with a short beam and broad palmated antlers. The brow-tine shows a high palmation as well. All in all a *Megaceros* that recalls the type of Choukoutien-giant-deer in a most curious way.

(4) Late-Pleistocene (Jungpleistozän):

The European *Megaceros* of this time may be divided into three sub-species: *Megaceros giganteus hibernicus* Pohlig 1892 of the British Isles, *Megaceros giganteus germanicus* Pohlig 1892 of Middle Europe and *Megaceros giganteus italicus* Pohlig 1892 of Italy. But this sub-species of the southern areas of Europe is still questionable [cf. Azzaroli, 1953, p. 50.] since there have been antlers recorded from Germany which are showing a similar type. The Late-Pleistocene polymorphous giant-deer shows a wide range of variation in size and antlers and is regarded as belonging to one species.

The Chinese Status, as we see, is following:

(1) Early-Pleistocene (Villafranchian, Ältestpleistozän):

As far as we know there is no trace of a cervid belonging to *Megaceros s. l.* in the *Probosidipparion*-fauna of Lower Sanmenian of North-China (Nihowan-beds). The large cervid of Chinese Villafranchian is a member of *Euctenoceros*-group, *E. boulei* (Teilhard and Piveteau 1930) and has its far-western equivalents in the deposits of France (Puy de Dôme, Alta Loire), England (Forest beds), and Italy (Toscana, Lombardia), cf. [Azzaroli, 1948, p. 61].

(2) Middle-Pleistocene (~Alt- und Mittelpleistozän):

Until today we do not know any fossil from China that is to refer to *Orthogonoceros* or *Dolichodoryceros s. l.* or to a related type.

Without knowing any ancestral form the well known giant-deer *Megaceros* (*Sinomegaceros pachyosteus* (Young) 1932 occurs at Choukoutien and other localities of Upper Sanmenian age. Teilhard, in 1936 established a second species of Choukoutien-*Megaceros*, less thick in jaw-bones, after having studied the *Megaceros*-remains of Choukoutien region, especially the recent (1951) discovered materials of layer 30—33 (Locality 1) we can not follow this view any more. As we will discuss in a second paper, Choukoutien-*Megaceros* shows a wide range of individual variation as already mentioned by Young in 1932b and Teilhard and Pei in 1941. Less thick jawed in the basal-layers of Locality 1 (as in Locality 13), the thickening is increasing in the upper layers. But there are extreme specimens in the lower layers as well as in the upper. On the other side the antlers in general show one type with the only exception that the broken specimens of Locality 1 are sometimes more extreme palmated. These facts may enable us to give a rough correlation of the different localities in the Choukoutien area as far as we know enough *Megaceros*-materials of each place. According to the above mentioned variation of jaws and antlers it seems impossible to make any conclusions on only a few specimens. In this way, however, we are able to correlate the basal-layers of Locality 1 (~level 28—33 m) with Locality 13 (partly?).

(3) Late-Pleistocene (Jungpleistozän):

It is still impossible to draw a first picture of the Late-Pleistocene *Megaceros* of China. The best preserved specimen, a skull with broken antlers in the Museum of Tientsin, was collected in Sjarassogol [Teilhard and Pei, 1941, p. 92]. The beam is well marked as well as the palmation. But all main-tines are missing and the brow-tines are broken too. We only can recognize that the animal also developed a broad flattening in this tine. As it is shown in the sketch map, *Megaceros ordosianus* Young reaches a similar south-distribution as the Choukoutien-giant-deer. Today, however, we may preliminary refer all *Megaceros* remains found together with the Late-Pleistocene fauna of China to *Megaceros* (*Sinomegaceros*) *ordosianus* (Young). After accumulating further materials in the Chinese collections a revision is necessary.

Distribution of Middle- and Late-Pleistocene *Megaceros*.

Cervidae Gray, 1821

Megaceros Owen, 1844

Sinomegaceros Dietrich, 1933

Megaceros (*Sinomegaceros*) *pachyosteus* (Young), 1932

Synonym:

- | | |
|--|-----------------|
| 1925. <i>Cervus canadensis fossilis</i> Zdansky, 1925 (p. p.), | [Zdansky, 1925] |
| 1925. <i>Pseudaxis magnus</i> Zdansky, 1925 (p. p.), | [Zdansky, 1925] |
| 1925. <i>Rusa pachygnathus</i> Zdansky, 1925 (p. p.), | [Zdansky, 1925] |

1925. *Epirusa hilzheimeri* Zdansky, 1925 (p. p.), [Zdansky, 1925]
 1927. *Cervus canadensis mongoliae* Gaudry, 1872, (p. p.), [Zdansky, 1927]
 1936. *Euryceros (Sinomegaceros) flabellatus* Teilhard de Chardin, 1936,
 [Teilhard, 1936]

"Middle" and Upper Middle-Pleistocene of China. Associated fauna: *Ursus arctos* Linné, *Ursus spelaeus* Rosenmuller, *Hyaena sinensis* Owen, *Crocota crocota ultima* (Matsumoto), *Machairodus inexpectatus* Teilhard, *Panthera tigris* (Linné), *Trogontherium cf. cuvieri* Fischer, *Dicerorhinus cf. kirchbergensis* (Jäger), *Coelodonta antiquitatis* (Blumenbach), *Equus sanmenensis* Teilhard and Pivetau, *Sus lydekkeri* Zdansky, *Paracamelus gigas* Schlosser, *Pseudaxis grayi* Zdansky, *Spiroceros peii* Young, *Bubalus teilhardi* Young, *Bison* sp., *Elephas* sp.

Localities (Figure 1, Distribution of *Megaceros* in China):

1. Panchiapu (河北宣化龐家堡), [Zdansky, 1927, p. 16]
2. Chingshang (河北懷柔), [Zdansky, 1927, p. 17]
3. Choukoutien (北京周口店), [Localities 1, 2, 3, 7, 9, 11, 13, 15; 19, Zdansky, 1928; Young, 1932a; Young, 1932b; Pei, 1936; Teilhard, 1936; Du, 1950; Pei, 1934; Teilhard and Pei, 1934; Pei, 1939; Hu, 1953].
4. Luanping (河北灤平), [Young, 1932, p. 61]
5. Chingshihling (河北井陘縣青石嶺), [Young and Pei, 1934, p. 65]
6. Huailai (河北懷柔), [Teilhard and Young, 1930, p. 4]
7. Chihcheng (河北赤城), [Young and Chow, 1956, p. 608; Chia and Chai, 1957, p. 54]
8. Chingshuichian (山東益都清水澗), [Zdansky, 1925, p. 47; Young, 1936, p. 183]
9. Yenchiaichuang (山東益都闕家莊), [Matsumoto, 1926, p. 35]
10. Yuanchü (山西垣曲), [Zdansky, 1925, p. 76]
11. Talichung (河南湯陰大李莊), [cf. this paper, p.]
12. Tiwu (河南澗池), [Young and Pei, 1933, p. 84; Young, 1935, p. 37]
13. Tungkou (河南澗池), [Young and Pei, 1933, p. 84; Young, 1935, p. 37]
14. Yungtsin (山西永濟), [Young, 1936, p. 513]
15. ? Fenglingtu (山西永濟風陵渡), [Bien, 1934, p. 444]
16. ? Chingyang (甘肅慶陽), [Teilhard and Young, 1930, p. 4]
17. ? Yülin (陝西榆林), [Teilhard and Young, 1930, p. 16]

Carvidae Gray, 1821

Megaceros Owen, 1844

Sinomegaceros Dietrich, 1933

Megaceros (Sinomegaceros) ordosianus (Young), 1932

Synonym:

1925. *Cervus canadensis fossolis* Zdansky, 1925 (p. p.), [Zdansky, 1925]
 1927. *Cervus canadensis mongoliae* Gaudry, 1872 (p. p.) [Zdansky, 1927]

Late-Pleistocene of China. Associated fauna: *Ursus arctos* Linné, *Ursus spelaeus* Rosenmüller, *Crocota crocota ultima* (Matsumoto), *Panthera tigris* (Linné), *Coelodonta antiquitatis* (Blumenbach), *Equus hemionus* Linné, *Equus przewalski* Poliakoff, *Sus scrofa* Linné, *Cervus canadensis fossilis* Zdansky, *Bubalus swansjocki* Boule and Teilhard, *Bos primigenius* Bojanus, *Bison* cf. *priscus* (Bojanus), *Mammonteus primigenius* (Blumenbach).

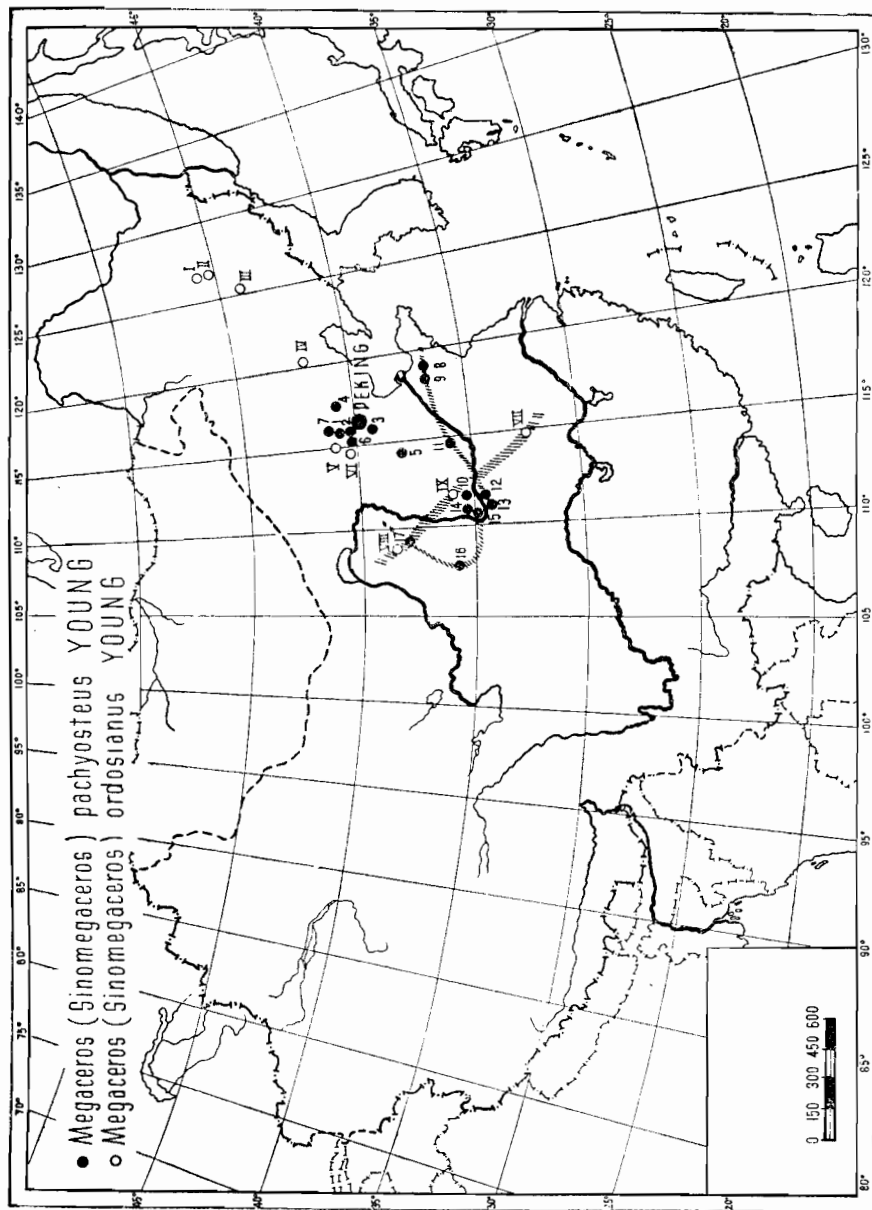
Localities (Figure 1, Distribution of *Megaceros* in China):

- I. Harbin-Chengyangho (黑龍江哈爾濱), [Tolmacheff, 1953, p. 5]
- II. Harbin-Kuhsiantung (黑龍江哈爾濱顧鄉屯), [Yin, 1931, p. 159; Tokunaga and Naora, 1934, p. 62—64]
- III. Changchun (吉林長春), [Licent and Teilhard, 1930, p. 23—35]
- IV. ? Chaoyang (遼寧朝陽), [Zdansky, 1925, p. 79; Young, 1932b, p. 61]
- V. Shangpoti (河北宣化), [Zdansky, 1925, p. 82]
- VI. Chiaoniwan (河北宣化), [Zdansky, 1925, p. 82]
- VII. Hsintsai (河南新蔡), [Pei, 1956, p. 98]
- VIII. Sjaraossogol (內蒙伊克昭盟, 薩拉烏蘇河), [Boule, Breuil, Licent and Teilhard, 1928, p. 57—59; Teilhard and Pei, 1941, p. 92]
- IX. Tingtsun (山西襄汾丁村), [Kuo, Young, Pei, Chow, Woo and Chia, 1955, p. 101]

Examining the whole Middle-Pleistocene fauna of North-China, it is stated that this fauna on one side becomes more and more palaeartic, a process that was already started with the beginning of Villafranchian. *Euctenoceros boulei* have died out but is replaced by another big-antlered cervid of the same zoogeographical region, the giant-deer. But besides the immigration from the North and North-West there comes from the South the water-buffalo-group and *Sinanthropus pekinensis* (*Pithecanthropus pekinensis*), both showing Indo-Malayan affinities, cf. Teilhard [1941, p. 25].

In Europe, *Euctenoceros*, the big-antlered deer of Villafranchin is replaced by Early Middle-Pleistocene (~Altpleistozän) *Orthogonoceros* and *Dolichodoryceros*, at least all by *Megaceros* (Late Middle-Pleistocene Mittelpleistozän). Together with the first true giant-deer *Megaceros giganteus antecedens* Berckhemer, that recalls the type of Choukoutien. *Megaceros*, quite remarkably the same water-buffalo-group with characteristic horn-cores is reaching Middle-Europe (Steinheim/Murr and Schönebeck/Elbe).

In 1941, Teilhard, correlating these facts, came to the conclusion, that the two invasions into Middle-Europe and North-China, the both extreme outside provinces of the palaeartic area, appear to have taken place approximately at the same time. We may add as due to an increasing of climate in the whole region. Even if we suppose that the invasion of *Megaceros* and water-buffalo-group was some time earlier in China than in Eu-



1. Panchiapu (龐家堡);
2. Chingshang (河北怀柔);
3. Choukoutien (周口店);
4. Luanping (灤平);
5. Chingshihling (青石嶺);
6. Huailai (懷來);
7. Chihcheng (赤城);
8. Chingshuichian (清水澗);
9. Yenchiachung (蔚家庄);
10. Yuanchü (桓曲);
11. Talichuang (大李庄);
12. Tiwu (河南滎池);
13. Tungkou (河南滎池);
14. Yung'sin (永濟);
15. Fenglingtu (凤陵渡);
16. Chingyang (庆阳);
17. Yülin (榆林)。

- I. Harbin-Chengyangho (哈尔滨);
- II. Harbin-Kuhsiangtung (顯乡屯);
- III. Changchun (長春);
- IV. Chaoyang (朝阳);
- V. Shangpoti (河北宣化);
- VI. Chiaoniwan (河北宣化);
- VII. Hsintsai (新蔡);
- VIII. Sjarassogol (沙拉烏苏河);
- IX. Tingtsun (丁村)。

Fig. 1. Sketch-Map showing the fossil localities mentioned in this paper.
 ● 1-17 Localities of *Megaceros (Sinomegaceros) pachyosteus* (Young).
 ○ 1-IX Localities of *Megaceros (Sinomegaceros) ordosianus* (Young).

rope, we have to remember that the main-fauna of Steinheim an der Murr (Germany) is of Upper Middle-Pleistocene age (\sim Mittelpleistozän, Mindel-Riss-Interglacial) and that together with the Steinheim-fauna an early man of *Homo*-group is living while together with the far-east prolongation of that mixed "palaeartic" *Megaceros-Bubalus*-fauna a member of *Pithecanthropus*-group is to be found.

Recently Pei Wen-chung [1957, p. 13] comparing the Middle-Pleistocene fauna of China with some European suggested to be of the same age stated "that the mammalian fauna of China is by no means different, in general character, from that of Forest bed in England, Abbeville (Camps de Mars) in France, Val d'Arno in Italy and Mosbach in Germany." For reasons given above, our opinion this matter is, that the Choukoutien-fauna belongs to the palaeartic area of the Great-Interglacial-Period *s. l.* (Mindel-Riss-Interglacial), that means not to be correlate with the European localities given by Pei [1957, p. 13] but approximately with the closing phases of European Middel-Glaciation or the early phases of Mindel-Riss-Interglacial. In this opinion we agree (*p. p.*) with Black, Teilhard, Young, and Pei [1933, p. 61], not with Pei [1931, p. 177; 1939, p. 10; 1957, p. 13] and Kurtén [1956, p. 40-41; 1957a, p. 266; 1957b].

The *Megaceros*-mandibula of Talichung.

The fossil was collected in 1957 by the Party No. 127 of Central- and South-China Bureau of Coal-Geology in gravels near Talichung (大李庄) in Northern Honan and handed to the Institute of Vertebrate Paleontology, Academia Sinica, Peking. No further remains of associated fauna have been recorded. The specimen, a left lower jaw (Cat. No. V 925) of *Megaceros* (*Sinomegaceros*) *pachyosteus*, is broken and very much worn. The thickening of the jaw-bone is something intermediate (?), P_2 is missing, also parts of M_2 (reconstructed) and P shows the advanced condition.

Dimension (in mm):

P_2-M_3	P_3-M_3	P_4-M_3	M_1-M_3	M_2-M_3	P_2-P_4
ca. 119,5*	106,3	88,8	72,8	—	ca. 46,8*

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* Measurements taken at the alveolus of P_2 .

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Megaceros 在中国的分布

(摘要)

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中国目前 *Megaceros* 的材料除了周口店以外还很贫乏；我們根据现有资料对于 *Megaceros* 在中国的分布作了初步的研究和作了一个分布图。

一般学者認為 [参看 Teilhard, 1941] 中国北部更新世中期的动物羣的全北区的色彩愈来愈濃了，这个过程从維拉方期就已經开始。

在本文中对于欧洲和中国的更新世大角鹿的发展作了比較。中国維拉方期的大角鹿与欧洲的大角鹿属于同一屬 [*Euctenoceros*, 参看 Teilhard, Piveteau 1930; Azzaroli, 1948]；但至今在中国还没有发现过相当于欧洲中更新世初期的大角鹿 (*Orthogonoceros*, *Dolichodoryceros*)。

对比中国和欧洲中更新世晚期的动物羣，这两个全北区的兩端地区中都发现了真正的大角鹿 *Megaceros*：如中国的 *Megaceros (Sinomegaceros) pachyosteus* (Young)，欧洲的 *Megaceros giganteus antecessors* Berckhemer。

Teilhard 在 1936 年根据周口店第 9 及第 13 地点新发现的 *Megaceros* 的材料定了一新种。这一新种的下颌骨的腫厚程度較淺。但是我們研究了周口店的 *Megaceros* 的材料，

特别是最近(1951年)发现的第30—33层(LOC. 1)的材料后,我们与 Teilhard 有不同的意见。这一个问题将在另一篇文章中再讨论。

这二个全北区两端地区的更新世晚期的动物群的特点是 *Megaceros* 的存在:如欧洲 *Megaceros giganteus* 的3(?)个亚种和中国的 *Megaceros ordosianus*。

最近裴文中[1957, 页13]将中国更新世中期哺乳动物群与英国的 Forest bed, 法国的 Abbeville (Camps de Mars), 意大利的 Val d'Arno 和德国的 Mosbach 的动物群相比, 认为与它们是同时代的。我们的意见是周口店动物群属于全北区广义的大间冰期(明德-里斯间冰期)的。也就是说不能和裴文中所说的那些欧洲的动物群相比, 而与欧洲明德间冰期的末期或明德-里斯间冰期的早期接近。在这个问题上我们与 Black, Teilhard, 杨鍾健, 裴文中的意见[1933, 页61]一致, 与裴文中[1931, 页177; 1939, 页10; 1957, 页13]和 Kurtén [1956, 页40—41; 1957a, 页226; 1957b]的意见不同。(胡長康节译)。



EXPLANATION OF PLATE I

Megaceros (*Sinomegaceros*) *pachyosteus* (Young) (The *Megaceros*-mandibula of Tali-chung), Left Lower Jaw Cat. No. V 925.

Fig. 1. Lateral view, $\times \frac{1}{2}$.

Fig. 2. Dental view, $\times \frac{1}{2}$.

圖版 I 說明

Megaceros (*Sinomegaceros*) *pachyosteus* (Young) (大李庄发现的 *Megaceros*.) 左下
頷骨編號 V 925.

图 1. 側面視, $\times \frac{1}{2}$.

图 2. 頂面視, $\times \frac{1}{2}$.