古脊椎动物与古人类
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山东莒县一新鱷

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山东莒县文化局送来一极有意义的化石要求鑑定。这个化石代表一小型近于完整的骨骼的負型。虽然骨骼本身未能保存，但由于負型完好，可以鑑定。我們对于莒县文化局同志把这个标本送来研究表示感謝。

描 述

鱷目 Crocodilia

Atoposauridae 科

山东鱷 *Shantungosuchus*（新属）

莒县山东鱷 *Shantungosuchus chuhsienensis*（新种）

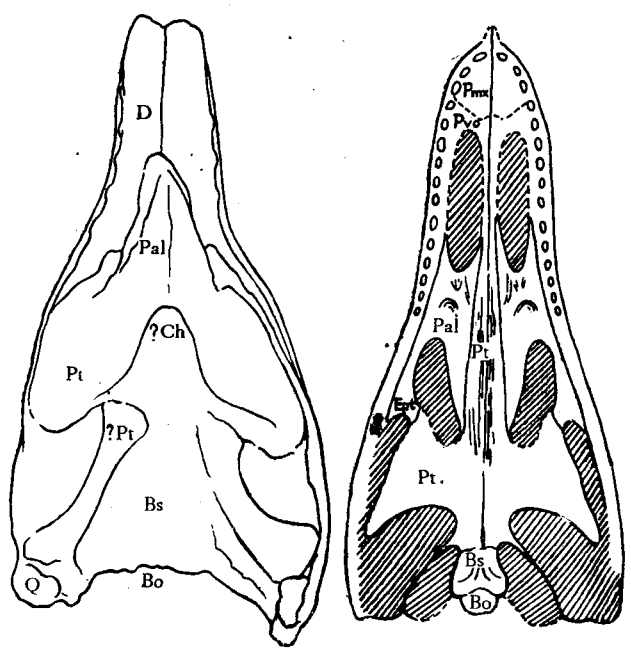

图1 左：莒县山东鱷头骨腹視 ×8/10.
右：*Sphenosuchus scutus* 的头骨 ×8/10.

Fig. 1. Left: Ventral view of *Shantungosuchus chuhsienensis* Young. Hoth., × 8/10.
Right: *Sphenosuchus scutus*, × 8/10. Abbreviations as commonly adopted.

标本： 一灰綠色砂岩石块上的近于完整的骨骼的負型。标本号：IVPP. V. 2484。

层位与地点： 上侏罗統，山东莒县大山，位于外城东北約30公里。

特性： 头骨自上看为拉长的三角形，嘴部細小而尖。牙齿深埋于牙根孔中，且彼此位

置很靠近。頸椎 7，背椎 18，荐椎 2，尾椎只保存 11 个。頸椎的椎体比較短，而背椎的較长。四肢骨細小，前肢比較长，尺骨比肱骨稍短。而脛骨却显著地比股骨为长。

描述：除了尾末端和前后脚損伤以外，全部骨骼作为負型，可在石块上看見。保存化石的那一面的岩石呈棕紅色，表示这一石块已暴露于外很久，經风化改变了原来的灰綠色，而化石本身也在这样的情况下早就被毁了。在嘴部的尖端，微有一些骨骼的痕迹（約 3 毫米长）。为研究便利，我們从这一負型标本作出一正型的模型，可以看出骨骼的結构。原来負型标本保存的是动物的腹側和下頷，此在正型模型上看的很清楚，两下頷前端很好的表示出来。也可以說明，何以背板（如有的話）和多数肋骨未能看到。

头骨：头骨呈延伸的三角状，头长約为頸长的三倍，而寬約为长的一半。嘴部长而尖，模型上可看出下頷骨的表皮是相当粗糙的（在正型上看的更清楚），在下頷后，翼状骨印痕完好保存，方骨和方顴骨的印痕以及基枕骨等也均保存。

牙齿：牙齿并未保存，但是右側有 15 个牙孔，左側有 13 个牙孔可以辨别。显然是属于下頷的。这些牙孔大小差不多一样，很整齐的排列，而且彼此很靠近，但是清楚地彼此分开。沒有看見清楚的蝶状骨的牙齿。

脊椎骨：一共有 25 个，荐前脊椎骨的印痕可見，其中大約 7 个为頸椎，而 18 个为背椎和荐椎(2)。尾椎的数目不知道，因尾末端未保存。一个到两个前尾椎（紧在荐椎之后）由岩石所盖。在此后，有比較可辨認的 10 个尾椎。保存最好的是后部背椎。頸椎較短，其他的均稍延长。在背椎两側有一些棒状印痕，可能代表肋骨末端。其他紧連脊椎的印痕可能代表背椎的背棘或側棘，就更不清楚了。

四肢骨：关于肩胛骨带，可辨的很少。有一长約 10 毫米的印痕（在頸椎和肱骨之間）可能代表肩胛骨。其末端略为加寬。

肱骨：肱骨长而小，相当直。尺骨亦如此。橈骨和肱骨約相同。尺骨頂端清楚的加寬，好象表示有肘突（Olecranon），手掌骨只有两个可見，也有几个趾骨的印痕，这些都是右側的，左側者未保存。

在荐椎两旁各有一較深的"裂縫"好象代表腸骨的印痕。股骨长而細，最突出的性質是要比脛骨为短，后两側的均保存。腓骨只右側有一部分可見。在两側足掌骨只保存一部分，但可使我們知其大致的长度。其他脚骨未保存。

标本測量（單位：毫米）

头长	(Length of the skull)	52
最大寬度	(Maximum breadth)	27
方骨部寬	(Breadth behind the quadrate)	23
坐骨前脊椎长	(Length of the presacral vertebrae column)	104
頸长	(Length of the neck)	18
背长	(Length of the dorsals)	94
坐骨长	(Length of the sacrals)	11
保存总长	(Preserved length from the tip of the skull to last vertebra)	231
估計长	(Estimated length of the whole body).	330
头骨长和寬比	(Ratio index of the length and the posterior breadth of the skull) $\frac{23 \times 100}{52}$	44
肱骨长	(Length of the humerus (right))	31
尺骨长	(Length of the ulna (right))	29
手掌骨长	(Length of the metacarpals)	11
股骨长	(Length of the femur (right))	36

胫骨长	(Length of the tibia (right))	41
足掌骨长	(Length of the metatarsals)	21
前肢总长	(Total length of the anterior limb exclusive of phalanges)	71
后肢总长	(Total length of the posterior limb exclusive of phalanges)	98
两者比	(Ratio index of both)	72
肱骨与尺骨比	(Ratio index of humerus and ulna)	93
股骨与胫骨比	(Ratio index of femur and tibia)	1.14

討　論

因为观察的标本沒有眞正的骨骼保存，几乎所有結构只能从印痕上辨訊，所以很难把动物的形态詳节一一看到。但尽管如此，由于印痕保存相当的好，所以可以足够鑑定出它的系統位置。这标本的主要特征是，头骨的三角形状，下頜骨的折曲結构，凹齿状牙，短頸长尾，以及纖瘦的四肢骨等。小的体骼，三角状头骨和瘦长的四肢骨等性質表示可能和晚侏罗世的小体形的鱷魚十分接近。这就是 Apotosauridae 一科。但所不同的是延伸的头骨和前后肢的下部的比較伸长，都很难和这一科的一些属相比較。*Alligatorium franconicum* 的头长寬比为 55，而其四肢也較瘦长，但是我們这一标本的头骨更长一些，四肢骨也更长，特别是尺骨和胫骨。所以我們把这一标本当作一新属、新种，取名莒县山东鱷(*Shantungosuchus chuhsienensis* gen. et sp. nov.)。

这一标本的头骨有些地方很象晚三迭世的一些假鱷类，如 *Sphenosuchus*，甚至也和一些喙头类，不无相似之处，如 *Menjurosuchus*；但是不論是地質年代，还是解剖上的构造，都不能支持这种看法。尽管如此，和前者的特别相似，很可能表示它們之中有血統关系。

发現山东鱷化石的地层情况不太清楚，一般层序可能和距莒县約 75 公里的产盘足龙的蒙阴系有些相近。这个发現表示在山东的上侏罗統中不但有大的恐龙，也有其他小的爬行动物。

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ON A NEW CROCODILE FROM CHUHSIEN, E. SHANTUNG

(Summary)

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A very interesting specimen has been kindly sent to the Institute for determination by the Bureau of Culture of Chuhsien, Shantung. It deals with a nearly complete specimen of a negative imprint of a tiny skeleton.

DESCRIPTION

Order Cocodilia
Family Atoposauridae
Genus *Shantungosuchus*, new genus
Shantungosuchus chuhsienensis, new species

Material A slab of greyish green sandstone with the nearly entire imprint of a skeleton. Cat. No. IVPP. V. 2484.

Horizon and locality Upper Jurassic from the western slop of a hill "Tashan" about 30 km N. E. of the city of Chuhsien, Shantung.[1)]

Diagnosis Skull triangular in outline and long stretched. Snout slender and pointed. Teeth deeply implanted in alveoli and closely situated. Vertebrae number: Neck, 7; dorsal, 18; sacral, 2 and caudal about 11 are visible. Centrum of Neck Vertebrae comparatively short and that of the dorsals long stretched. Limbs slender. Anterior limbs comparatively long. Ulna slightly shorter than humerus while tibia is distinctly longer than femur.

Description With the exception of the damage of the considerable part of the tail and most of the anterior and posterior feet the whole imprint of the skeleton is clearly shown on a slab of greyish green sandstone. The surface of the side with the impression is brown in coloration. This shows that the surface was long exposed and subjected to weathering so that the original bone may long been lost during the exposition of the stratum. A cast has been made from the imprint which shows more clear part of its structure. The negative imprint shows the ventral impression of the skeleton and lower jaws. It is clearly shown in the positive cast with the anterior part of the lower jaws indicated.

The skull—The outline of the skull is triangular which is considerably elongated. The length of the skull is about three times that of the neck and the breadth is about the half of the whole length. The snout is long and pointed. The cast shows that the surface of the lower jaws is rather sculptured. Posterior to the lower jaws the posterior part of the pterygoid is well indicated. The impressions of quadrate and quadratojugal as well as of the basioccipital and basisphenoid are also distinctly recognisable.

The teeth—None of the actual tooth is preserved. But there are about fifteen alveoli at the right and thirteen at the left side, apparently belong to the lower jaws. They are subequal in size, regularly arranged and closely situated. No trace of pterygoid teeth is observed.

The vertebrae—There are 25 presacral vertebrae probably seven of which belong to the neck and eighteen to the dorsals and two sacrals. The number of the caudal vertebrae is unknown, because the posterior part of the tail is not preserved. One or two of the anterior caudal vertebrae immediately behind the sacral is covered by the matrix. Posterior to that there are ten more or less clear traces of caudal vertebrae. The centrum of the neck vertebrae are short while the others are more or less considerably elongated. There are traces of rod-like impressions at both sides of anterior dorsal vertebrae. They may be interpreted as the tip part of the ribs.

The limb-bones—There is a long impression about 10 mm long between the neck vertebrae and the proximal end of the right humerus. It represents most probably the scapula.

1) 山东莒县大山。

The humerus—It is long and slender and almost straight. The same are the ulna and the radius which are almost equal in length with the humerus. The proximal end of the ulna is distinctly expanded as if a weak olecranon is formed. The metacarpals are preserved by two and traces of the phalanges are observable too.

The deep long furrow at each side of the sacrals may indicate the impression of the ilium. The femur is long and slender too. It is rather unexpected to observe that it is distinctly shorter than the tibia which is also preserved on both sides. Only part of the trace of the fibula is observable at the right side. In both sides only part of the metatasals are preserved[1].

DISCUSSIONS

Since the actual bone is not preserved and the structure of it is merely represented by impression, it is of course very difficult to get all the anatomical details of the animal. Yet, the preserved condition of the specimen is sufficient for getting a precise determination of its systematic position. The general outline of the skull, the distinct sculpture surface of the lower jaw, the deeply implanted teeth, the short neck and apparently long tail and the slenderness of the limbs are the most characteristic features observed at first glance. The smallness of the skeleton, the triangular shape of the skull, the sculpture of the lower jaw and the slenderness of the limb-bones suggest that we have to deal with the small crocodiles in the upper Jurassic, the family Apotosauridae. But the long-stretched head and the relatively long lower limbs of both the anterior and posterior ones excluding any further comparison with the few known members of this family. The length and breadth index of the skull of *Alligatorium franconicum* described by Broili is 55 and the limbs of it are also slender but the Chinese form is characterized by its more long stretched skull and more long limbs especially that of the ulna and tibia. The Chinese form represents evidently a new crocodile for which we propose to name it as *Shantungosuchus chuhsienensis* gen. et sp. nov. with the diagnosis given above.

This new form resembles in some respects the Upper Triassic small pseudosuchians, f. i. *Sphenosuchus* and even some rhyncocephals, especially *Monjurosuchus*. But either the geological age or the anatomical features exclude these possibilities entirely.

The stratigraphy of the *Shantungosuchus* bearing area is not clear. The general sequence may be similar to the Mengyin Series with *Helopus zdanski* which is only about 75 km apart from Luhsien.

1) For measurements see Chinese text.

图 版 I 說 明

莒县山东鱷，新属新种，全貌，×2/3.

Shantungosuchus chuhsienensis gen. et sp. nov.

The entire imprint as preserved on the slab of sandstone. × 2/3.

图 版 II 說 明

同上的正型模型，×2/3.

Shantungosuchus chuhsienensis gen. et sp. nov.

The positive cast reproduced from the negative type specimen showing better the lower jaws. skull and the limbs in relief. × 2/3.

图版 III 說明

莒县山东鱷，上图，头骨与下頜；下图，原負型，均原大。

Shantungosuchus chuhsienensis gen. et sp. nov.

Upper figure. The same skull and lower jaw of the cast.

Lower figure. The skull and lower jaws in original negative both 2 nat. size.