

ON SOME TRACES OF VERTEBRATE LIFE IN THE JURASSIC AND
TRIASSIC BEDS OF SHANSI AND SHENSI.

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The thick and widely exposed Jurassic and Triassic beds of Western Shansi and Northern Shensi are extraordinarily barren of animal fossils. With the exception of the ganoid fishes found by C. C. Wang, Licent and Teilhard (1) in the special horizon (jasper-bearing limestone) which underlies the Upper-Jurassic red cross-bedded sandstones, south-west of Yu-lin (榆林), no remains of Vertebrata have been so far reported from the powerful continental deposits which, during the pre-Cretaceous times, accumulated in the big Shansi and Shensi basins.

It may be interesting therefore to mention that, during our last geological trip (summer expedition of the Cenozoic Laboratory of the Geological Survey, 1929), we found twice traces of vertebrate life in those strata: first, a footprint of Dinosaurian in the Jurassic of Shensi; and then a bone of Amphibian in the Triassic of Shansi.

1).—The footprint (Plate) has been found, isolated, on a hard sandstone slab, in the middle part of the cliff which borders the Ulan Muren valley, near Shên-mu (神木) (Northern Shensi).

The specimen is well preserved, with the exception of the hind border which was broken on the slab. It shows clearly the counterprint of three massive toes, the left in the picture (the right in the original impression) and the middle of which are the most distinct. Length maximum of the specimen, 30 centim.; breadth, 33 cm. Length and breadth maximum of the left toe, 16 and 6 cm.; of the middle toe, 19 and 9 cm.

Because of the absence of claws, and from the thickness of the toes, we may conclude that this trace was left in the Mesozoic mud by an herbivorous

1. C.C. Wang, Stratigraphy of N. Shensi, Bull. Geol. Soc. of China, Vol. 4, n.1, 1925, p. 23.
P. Teilhard de Chardin and E. Licent, The Geology of Ordos, Bull. Geol. Soc. of China, Vol. 3, n.1, 1924, p. 42.

ornithopod Dinosaurian, of the size of an *Iguanodon mantelli*. The likeness is striking between this footprint and those so commonly found in the Wealdian deposits of southern England.

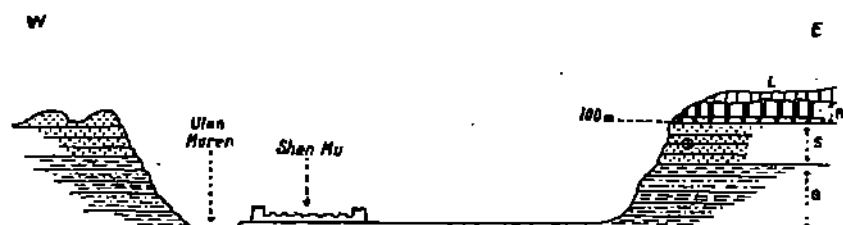


Fig. 1. Section of the Ulan-Muren valley in Shên-mu. G, Green series (Lower Jurassic); S, Shên-mu sandstone; R, Red Clay (Pontian), fossiliferous, with basal gravel; L, Loess. The cross points the place where the footprint was collected.

The geological age of the massive, coarse, sandstone from which the specimen has been collected is a little uncertain. This formation (fig. 1) overlies immediately the classical coal-bearing green series (regarded as Lower Jurassic) of Northern Shensi. But, whether it belongs still to the top of this series, or, on the contrary, is the base of the Upper-Jurassic sandstones so well represented in North-Western Shensi, we can not decide. Against the latter hypothesis are the lithological characters of the formation (grey and horizontally bedded, no red nor cross-bedded layers), and also the fact that between it and the underlying green series, no traces are seen of the characteristic "Ganoid limestone" just above mentioned. The Shên-mu sandstone is well extended and exposed around the town itself. But we could not trace it south-westward, in the direction where the so called Upper-Jurassic sandstones of Shensi are easily recognisable (1).

In any case, since all the Dinosaurian remains previously found in Shantung and Mongolia belong to the Lower Cretaceous, the footprint of Shên-mu is the most ancient trace of Reptile yet known in China (2). Curiously enough, no Dinosaurian footprint had been so far reported from Eastern Asia.

2).—The bone of Amphibian(?) was collected in South-Western Shansi, near Ta-ning (大事)

It represents probably one half part of an humerus, but is further undeterminable. Length of the piece, 10 centim. Breadth of the preserved

(1) C. C. Wang, General Geological Map of China, Tai-Yuan-Yu-Lin sheet.

(2) There remains of course the possibility that the beds carrying the footprint are Lower Cretaceous, and rest by overlapping, disconformably, on the Lower Jurassic.

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end, 4 cm.. The bone is highly mineralised, and almost dissolved in the matrix. The original layer is a hard conglomeratic sandy limestone which forms many thick beds along the valley used by the road leading from Ta-ning to Chi-hsien (吉縣)¹

The only value of this specimen is to prove that fossil bones may be found in the Triassic beds of Shansi, if only the limy parts of the sandstones are carefully investigated.

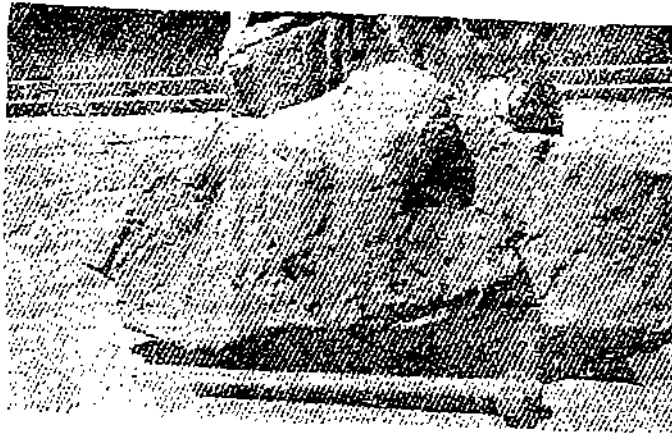
¹ C. C. Wang, *ibid.*

**Explanation of the
Plate.**

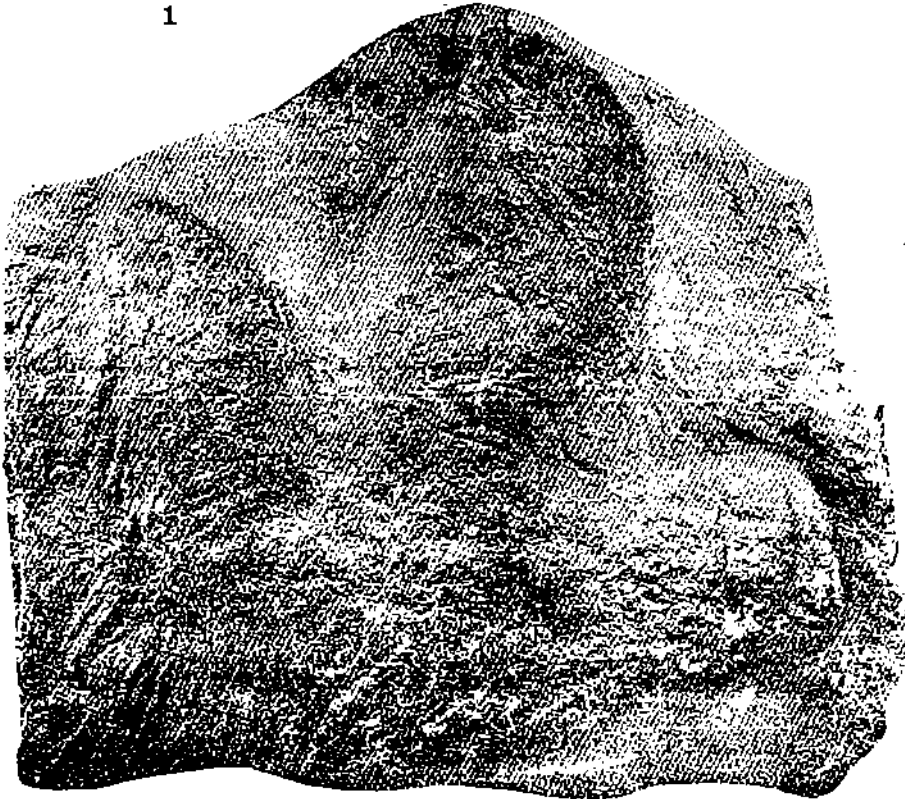
PLATE.

- Fig. 1. The Dinosaurian footprint of Shên-mu on the original slab.
Photog. by C. C. Young.
- Fig. 2. The same footprint, on a larger scale. Photog. by K. S. Hsu.

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