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## ON A SUPPOSED NEW PSEUDOSUCHIAN FROM UPPER TRIASSIC SAURISCHIAN-BEARING RED BEDS OF LUFENG, YUNNAN, CHINA<sup>1</sup>

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### INTRODUCTION

The upper Triassic Red Beds of Lufeng, Yunnan Province, China, have yielded a rich saurischian fauna, associated with *Bienotherium yunnanense*, a form intermediate between reptiles and mammals, and closely related to *Tritylodon*. In addition, a single piece of fossil has been found which belongs to Reptilia other than Saurischia. This is the anterior part of a pair of lower jaws, rather small in size, apparently a pseudosuchian, as I have previously announced in a very brief way (Young, 1940). It will be more fully described in the present note.

I wish to express my sincere thanks to Dr. Edwin H. Colbert, Curator of Fossil

Amphibians and Reptiles of the American Museum of Natural History, for all the facilities given to me by himself and his colleagues, during my stay in this Museum. The drawings were prepared by Mr. John C. Germann, to whom I am also deeply indebted. To Dr. Barnum Brown and Dr. Charles C. Mook I wish also to express my indebtedness for discussions regarding this unique specimen, during the course of the present study. It is also my great pleasure to thank Mr. Albert E. Parr, Director of the American Museum of Natural History, for giving me an opportunity to publish the present note in this series.

### DESCRIPTION

#### PSEUDOSUCHIA

##### PLATYOGNATHUS, NEW GENUS

With the diagnosis of the type species, *Platyognathus hsui*.

##### *Platyognathus hsui*, new genus and species

**TYPE:** Cenozoic Research Laboratory No. V. 71. The anterior part of a pair of lower jaws, with 11 alveoli on the left side, 12 alveoli and one canine-like tooth with the tip damaged, on the right side.

**HORIZON AND LOCALITY:** Dark Red Beds of the upper Triassic age from Huangchiatien, about 1 kilometer north of Shawan, Lufeng, Yunnan Province, China.

Collected by C. C. Young and M. N. Bien in 1939. (Bien, 1940.)

**DIAGNOSIS:** Pseudosuchian of small size. Lower jaw short and flat in anterior part. Tip blunt and slightly expanded immediately behind the tip. Behind a weak constriction posterior to the canine-like tooth, the jaw expands considerably laterally. The teeth were thecodont, as judged by the size and position of the alveoli. Anterior teeth small, pointing anteriorly. At least two canine-like teeth directed obliquely and anteriorly. The cross section of the preserved tooth is irregularly octangular in outline. Posterior teeth subequal in size, being in vertical position with the axis of the jaw.

**DESCRIPTION:** Both jaws are firmly ossified. No trace of sutures can be seen either from the top or from below. In ventral view, a broad longitudinal groove repre-

<sup>1</sup>Published by permission of the Director of the National Geological Survey of China.

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sents the symphysis but is stopped by a nearly transverse shallow depressed groove. The bony part anterior to the groove may represent a prementary bone, but as there is no visible suture between them, I consider it only a prolonged part of the dentary. The anterior lateral part of the left side is partly damaged without, however, obscuring the essential outline of the jaw. The bone surface is finely granulated.

The jaw is low and flat, especially the

side of the tip, near the marginal border, and at the lateral sides below the tooth row, a number of small foramina are developed, for blood and nerve canals. The posterior edge of both jaws, which forms an acute angle of about 45 degrees, is marked by a broad and deep furrow for attachment of the cartilaginous splenial. Near the anterior margin of the jaws, looking from the top, a short (2 mm. long, only) but distinct ridge is developed at the

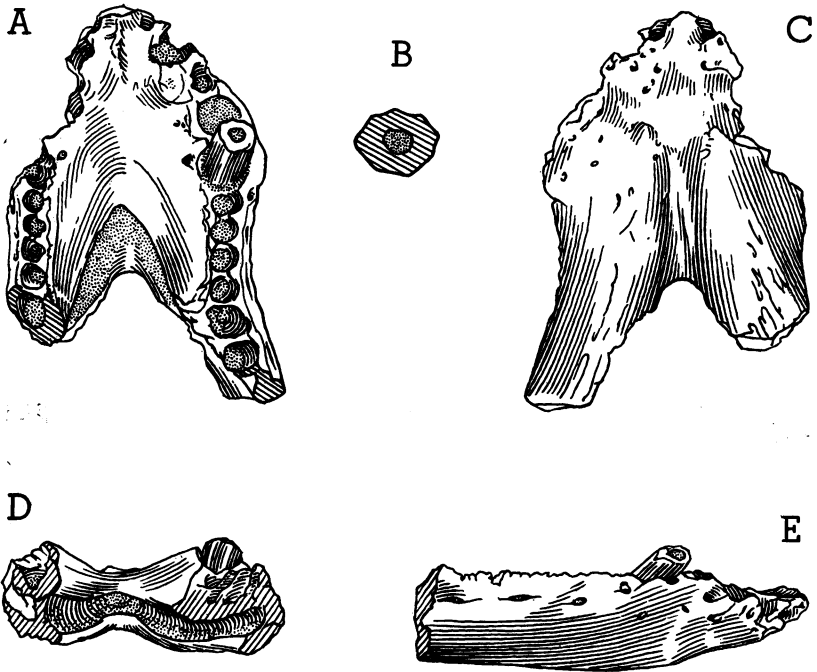


Fig. 1. *Platyognathus hsui*, new genus and species. Incomplete pair of lower jaws, shown from above (A), from below (C), from behind (D), and from the right side (E). Twice natural size. The cross section of the only preserved tooth (B), is shown four times natural size.

anterior part, and very much depressed in dorsoventral direction. At the anterior tip, it forms a rather blunt rounded outline. A slight expansion is observable at the part beside the larger canine-like teeth. Then there is a length of about 8 mm. posteriorly which is slightly, or even weakly, constricted, followed by a considerable expansion posteriorly and laterally, as clearly indicated by the right side which is the most completely preserved. Both at the ventral

median line. Posterior to that, the jaws form a broad and shallow trough.

The teeth are represented by a single one, of which the tip is unfortunately broken. It is the second large tooth, having a diameter of about 2 mm. The transverse diameter slightly exceeds the anteroposterior one. The tooth is densely covered by enamel. The cross section of the tooth is clearly polygonal in outline, being roughly octangular, with the comparatively longer

measurements on the inner and posterior sides. It is directed distinctly anteriorwards.

Anterior to this tooth, five alveoli can be seen on the right side. The left side must have had the same number of teeth, although borders of some of the alveoli are partly damaged. The alveolus immediately in front of the described tooth is about the same size as the alveolus of this tooth. The others rapidly decrease in size anteriorly. The medial two are the smallest and visible only from the anterior aspect of the jaws. Judging from the position of the alveoli, all these teeth are directed more or less straight anteriorly. Posterior to this broken tooth, there are four alveoli ranging in a straight line and subequal in size. Then the tooth row starts to bend laterally, with two complete alveoli and the anterior part of the following one showing on the right side, and one on the left side. All the alveoli of the "post canine-like teeth" show the position of the teeth directed vertically upwards. Altogether, there are 12 alveoli and one tooth preserved on the right side, and 11 alveoli on the left side.

MEASUREMENTS

Maximum preserved length of jaw, from the tip to the posterior breakage on the right side . . . . .	27 mm.
Median symphyseal length (from above) . . . . .	14 mm.
Median symphyseal length (from below) . . . . .	18 mm.
Breadth of jaws, across the posterior side of the preserved tooth (from below) . . . . .	15.5 mm.
Posterior breadth of jaw (estimated), at the posterior breakage of the right jaw . . . . .	20 mm.
Height of right jaw behind the tooth . . . . .	5 mm.
Transverse diameter of the tooth . . . . .	2 mm.

**DETERMINATION AND SYSTEMATIC POSITION:** Although the specimen is fragmentary, the preserved part displays a series of important features. The flatness of the jaw, the anterior direction of the anterior canine teeth, the octangular outline in cross section of the canine-like tooth, the relatively short tip of the jaw, and the abrupt lateral bending of the jaw behind the tooth are the most important of these. In the shortness and flatness of the jaw, the present form excludes any further sug-

gestion of close relationship with most of the primitive Pseudosuchia of South Africa, such as *Notochamps* (Broom, 1904), *Sphenosuchus* (Broom, 1915, 1927), *Proteorosuchus* (Broom, 1915), *Erythrochamps* (van Hoepen, 1915), and *Pedeticosaurus* (van Hoepen, 1915). All of them are much larger in size and possess a long, compressed, and sharply pointed snout. The interesting specimen from the upper Triassic of Arizona, in North America, described by Dr. Barnum Brown as *Protosuchus richardsoni* (Brown, 1933), the type of which I have had the opportunity of examining, differs in the same features of the jaw, although in size it is closer to the Chinese form. The Pseudosuchia in the upper Triassic period are so poorly known that I fail to find any which could be closely compared with the present form. I propose to name the Chinese form *Platyognathus hsui*, new genus and species, in view of the important features described above. It represents the first and oldest known pseudosuchian found in China. The generic diagnosis has already been cited above. The species name is dedicated to Mr. T. Y. Hsu of the National Geological Survey of China, who contributed so much to the knowledge of the Triassic stratigraphy and marine invertebrate fossils of that period in China, and who recently lost his life while working in the field in Kweichow Province.

In many respects, especially the shape of the teeth and the rounded and short tip of the symphyseal part, as well as the sudden expansion in the posterior part of the jaw, and, above all, the depressed nature of the symphysis, the specimen does not appear closely connected with the problem of the origin of crocodiles. The skull of *Platyognathus* must have been triangular and short, with a rounded short snout, as can be deduced from the shape of the lower jaw. The forward bending of the anterior teeth, in combination with the flat shovel-like lower jaw, is very impressive.

Considering the peculiarities found on this specimen, it is probable that we may even be dealing with an entirely new family, the exact systematic position and relationships of which, within the scope of primitive crocodiles and pseudosuchians,

must await further collection of new specimens.

*Platyognathus hsui* is derived from the dark Red Beds of the lower Lufeng series of Lufeng. The associated forms so far known are: *Chelonia*, indet.; *Sinosaurus triassicus*; *Lukousaurus yini*, *Yunnanosaurus huangi*, *Lufengosaurus huenei*, *Lufengosaurus magnus* (all saurischians), and *Kumina minima* (probably an allied triconodont form), most of which are known

to be of uppermost Triassic age. Although there is a rich fossiliferous level at least 300 meters below the *Platyognathus* level, with the type of *Lufengosaurus huenei*, *L. magnus*, and *Bienotherium yunnanense*, the purple Red Beds of Bien, the upper level seems still to belong to the same faunistic unit, as proved by the same saurischians. So far, no *Bienotherium* has been found from the upper level.

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