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TIBETODUS, A NEW PYCNODONT FISH FROM CHANGTU,

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A complete series of vomerine teeth of pycnodontoidea has been found from the vicinity of Changtu (Sikang). It represents the first record of vertebrate remains in the Tibetan highlands.

Order Pycnodontoidea

Family Gyrodontidae

Genus *Tibetodus*, new genus

Diagnosis as given for the type species *Tibetodus gyrodoides*

Species *Tibetodus gyrodoides*, new species.

Material: A vomer with the teeth nearly complete. Field No. C. 3340. Catalogue No. V. 718, the Laboratory of Vertebrate Palaeontology.

Horizon and locality: Exact locality unknown, said to be derived from the vicinity of Changtu, above the Jurassic coal Series. The matrix is darkgray sandstone.

Diagnosis: A rather large Gyrodontidae with five vertical rows of vomerine teeth. The lateral borders are converging anteriorly in a rather sharp angle but larger than that of *Gyrodus titanus*. Teeth of the middle row are larger than those of the lateral rows and seven in number. The size of the teeth of the first lateral

rows is intermediate of the middle and the second lateral rows. Outline of various teeth rather irregular. Middle part of the teeth distinctly depressed with mammillated apex and radiated wrinkles. The teeth number of the five rows is 8.9.7.9.8. The arrangement of the teeth rows is extremely regular.

Description: The specimen is intact. The teeth are arranged in regular manner but the vomer itself is not preserved. The crown of several teeth are lost, while most of the others are well preserved in black shiny appearance. The teeth were probably completely preserved. The number of them are: middle row 7, first lateral rows 9 on each side; the second lateral rows 8 on each side.

Every row of the teeth is situated nearly on the same line if we connected them through the center of each tooth. They are rather closely located, especially the anterior part, while in posterior part the distance between them varies from 1.5 mm to 0.5 mm. There is also a little distance between them transversally, some are even somewhat interlocking. The lateral borders of the teeth converge rather sharply anteriorly forming an angle of about 22 degrees (anterior breadth, 10.5 mm; posterior breadth, 21.5 mm). This character is rather close to *Pycnodus* and not so as in the case of *Gyrodus* (see Fig. 1 and table 1). Obliquely one can note three straight rows of teeth forming a Z-like outline (fig.2), which is not found in any of the pycnodonts available for comparison. In all the teeth those of middle row is most convex while those of the lateral one are rather low. If we connect the last teeth of the three middle rows first and then the others with the second lateral rows as shown in fig. 2 we can easily see that the last transversal row is nearly on the same line and curves progressively stronger anteriorly. The difference with the other genera in this respect is shown in fig. 4 for comparison. The last tooth of the middle row projects slightly backwards. Length of the middle row, 33.5 mm; first lateral rows, left 31 mm, right, 31 mm; second lateral rows, left, 29.7 mm; right, 29 mm.

The outline of the teeth is rather irregular, but there is a tendency of transversal elongation of the teeth of the middle row and thus forming a bean-shaped outline. Such feature is not found in the teeth of the lateral rows which form rather irregular shape from rounded elliptical to round triangular outline. In the teeth of the anterior part of second lateral rows, the antero-posterior elongation can be observed. In most of the teeth the depressed middle mammillated apex can be seen even in those strongly worn ones. While in the less worn ones, the posterior ones, the radiating wrinkles are distinctly preserved. For the dimen-

sions of the teeth see table 2. p. 98.

Comparison and discussion: There is no reasonable doubt that the Tibetan specimen belongs to the order Pycnodontoidea. According to Berg, this order is subdivided into three families, viz. Coccodontidae, Gyrodontidae and Pycnodontidae. Unfortunately the separation is based strictly on non-dental characteristics and thus it is difficult in referring our specimen to a family rank. Nevertheless, despite some similarities with the *Pycnodus* it seems that most of the characters fit well also with *Gyrodus*, such as the depressed pit etc. The Tibetan form is thus in some way intermediate between the two families. It would not be surprise in view of the widely separated geographical position that our form represents a new family. For present we refrain however from considering this problem seriously before new additional material is secured and prefer to put the present form under the family Gyrodontidae. That the Tibetan specimen represents a new genus and species is obvious as already diagnosed above. We like to name the specimen as *Tibetodus gyrodoides*, suggesting its geographical origin and the zoological affinity. Its comparison with a few other genera of the order is given in table 3. p. 98.

It is very significant that the present specimen indicates the first record of vertebrate remains in the Tibetan highlands. The particular order is also for the first time recorded in China as a whole. Since it shows characters comparable with both *Gyrodus* and *Pycnodus*, the geological age of the specimen may be regarded as upper Jurassic or lowest Cretaceous.