

# TANAODON, A NEW MOLLUSCAN GENUS FROM THE MIDDLE DEVONIAN OF CHINA

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In 1915 Prof. George D. Louderback of the University of California made extensive collections of fossils in the interior of China. Through the kindness of Professor Louderback I have had an opportunity to study the post-Cambrian and pre-Carboniferous collections made at that time. Recently having occasion to study *Megalomus* and related genera, in connection with an allied genus from Alaska, I prepared specimens of a Chinese Devonian form, which, while referable to the Megalodontidae, proves to be distinct from any genus hitherto described. The genus is here described under the name *Tanaodon* with *Tanaodon louderbacki*, new species, as the genotype. The generic name is given in reference to the long and well-developed teeth characteristic of the genus.

## TANAODON, new genus

*Tanaodon*, as represented by the individuals of the single species, is a pelecypod of medium size. The largest individual seen has a maximum length of 8 cm., a maximum height of 3.8 cm. and a maximum breadth of 3.8 cm. The shell is thick. In a medium sized individual the shell just posterior to the hinge plate has a thickness of 9 mm. The line marked by the angular shoulder on the exterior is the line of greatest thickness. From this line the shell thins toward the margins but at all times is heavy. The surface is marked by strong concentric growth lines. These become more pronounced with age and are particularly strong on the dorsal surface. The lunule is small and scarcely differentiated. There is a poorly defined escutcheon.

The shell is elongate subrhomboidal. The greatest dimension is in the line connecting the beak with the posterior margin. The line is marked by a strongly developed angular shoulder. In the type species the length is fully twice the height of the shell. The hinge

line is long and gently arcuate, being about two-thirds the length of the shell. The anterior margin is short, being about one-half the length of the hinge. The margin is nearly straight for about one-half its length and then curves backward to meet the ventral margin.

*Tanaodon* is referable to the family Megalodontidae. It seems most closely related to a new genus from the upper Silurian of Alaska, the two standing apart from either *Megalomus* or *Megalodon*. From the Alaskan genus *Tanaodon* differs in the larger anterior muscle, the smaller opisthodontic ligament, the great development of lateral teeth, and in its general form and contours. In its general form *Tanaodon* bears a close resemblance to the Cyrtodontidae.

The greatest dimension of the shell is in the diagonal line connecting the umbones with the posterior margin. This line is marked on the exterior by a pronounced angular shoulder. The hinge line is long and the anterior margin short, giving the shell a long narrow obliquely inclined outline, viewed from the side. The umbonal area is highly arched and the beaks prominent. They are incurved toward the anterior end of the shell. The umbonal ridge noted above is almost carinate in the anterior portion and persists as a strongly marked angular shoulder to the posterior margin. From this ridge the shell drops off abruptly to the dorsal margin and more gradually in the other directions.

The hinge plate is wide and massive. In the prepared specimen of the type species there are eight well-defined cardinal teeth. These are arranged fanwise, the tooth lying nearest the anterior margin being subparallel to it and the one farthest removed being subparallel to the dorsal margin. This group of cardinal teeth is followed by a series of posterior lateral teeth. In the type species the latter are three in number and are unusually long and massive. The passage from cardinal to lateral teeth is so gradual that a division into two groups must be an arbitrary one. The adjacent teeth of the two groups overlap and lie parallel, the tooth chosen as the first lateral having its inception far forward near the anterior margin.

There is a large, well-defined parivincular opisthodontic ligament which extends from the beak backward for about one-half the length of the hinge plate. The hinge plate is grooved for the reception of the ligament, giving the latter a lenticular cross-section. The posterior muscle scar has not been seen. The anterior muscle is large. The scar is situated directly beneath the group of cardinal teeth and lies on a built-up platform. The pallial line is simple so far as seen. No pedal scar seems to be present.

TANAODON LOUDERBACKI, new species

This, the type and only known species of the new genus *Tanaodon*, was collected by Prof. George D. Louderback in the Middle Devonian

deposits of the Tung Kou District, Szechwan, China. Seven specimens are available for study. The preservation is excellent. The specimens are as a rule somewhat crushed, but the ones chosen for illustration are relatively free from distortion.

The specimen used for measurement and description is the smallest in the lot. Its maximum length, measuring from the beaks to the posterior margin, is 7 cm. The maximum height is 3.25 cm. and the maximum breadth 3.4 cm. The largest specimen gives the following measurements: Length, 8.2 cm.; height, 3.6 cm.; and breadth (somewhat compressed), 3.7 cm.

The shell is thick, as in the other genera of the Megalodontidae. In a medium-sized individual the shell has a thickness of 9 mm. near the umbones and posterior to the hinge plate. The shell is heaviest along the line corresponding to the angular shoulder on the exterior. From this line of maximum thickness the shell thins gradually to the margins. The surface is marked by strongly developed irregular concentric growth lines. These are especially well developed on the dorsal surface and in the posterior portion of the shell. The lunule is small and inconspicuous. There is a poorly defined escutcheon, which consists merely of a somewhat flattened area without definite boundaries on the posterior side.

The shell is subrhomboidal in outline, and as indicated by the measurements and figures is long and low. The hinge line is about two-thirds the length of the shell and is gently arcuate. The anterior margin is short and forms an acute angle with the hinge. In the type specimen the anterior shell margin incurves abruptly just below the beaks, forming a narrow deep pit. This pit is lacking in other specimens. The posterior margin is sharply curved. The ventral margin is almost straight or slightly sinuous, curving upward at the ends to meet the anterior and posterior margins. The greatest dimension of the shell is the line running obliquely from the beaks to the posterior margin. The beaks are sharply differentiated and large. They come almost into contact in the anterior portion and curve forward. The umbonal ridge in the anterior portion of the shell is developed as a sharp keel. Posteriorly the ridge is more rounded but persists as a strongly developed angular shoulder. From this ridge the shell drops abruptly to the dorsal margin. To the posterior and ventral margins the shell curves gently, while to the anterior margin there is a steep pitch amounting to incurvature in some individuals.

The hinge plate is wide and heavy. Along the dorsal margin it is gently arcuate, following the contour of the shell margin. In the specimen prepared to show the internal structures there are eight well-developed cardinal teeth. The tooth nearest the dorsal side might with almost equal propriety be classed as a lateral, as there is

a gradual and almost perfect gradation between cardinals and laterals in this species. The teeth are long and heavy, having a fanlike arrangement which makes the anterior tooth lie subparallel to the anterior margin, while the tooth farthest removed lies parallel to the laterals and the dorsal margin. There are three very long heavy lateral teeth. The first has its inception near the anterior end of the cardinals. The second overlaps the first, while the third, beginning still nearer the posterior end of the shell does not reach as far as the second. Above the group of heavy laterals is a short incipient tooth showing as an obscure ridge. In its anterior half the hinge plate is deeply grooved for the reception of the ligament.

The posterior muscle scar has not been seen. The anterior muscle scar lies on a platform just below the group of cardinal teeth. The scar is large, measuring 8 mm. across in a specimen of average size. The scar proper is somewhat depressed, being bounded on the dorsal, ventral, and anterior margins by a ridge. There appears to be no pedal scar. The pallial line is probably simple.

As noted above, this species was found in the Middle Devonian of the Tung Kou District, Szechwan, China, by Professor Louderback. The type specimens are in the collections of the United States National Museum.

*Cotypes*.—Cat. No. 71070, U.S.N.M.

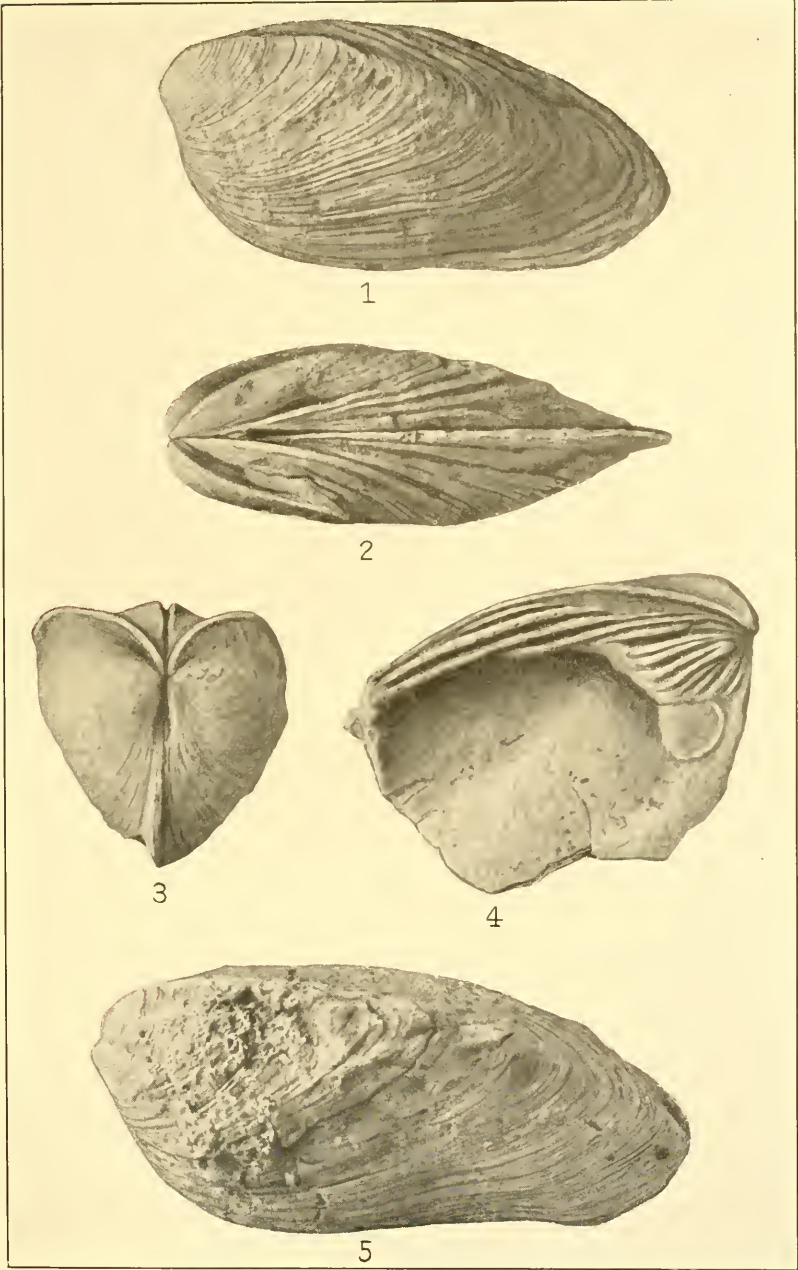
#### EXPLANATION OF PLATE

*Tanaodon louderbacki*, new species

Figs. 1, 2. Left valve and dorsal view of an individual of medium size. 3, 5. Anterior view and left valve of a large individual. 4. Interior view of left valve of another specimen, showing the hinge plate, teeth, and anterior muscle scar.







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FOR EXPLANATION OF PLATE SEE PAGE 4

