

SOME TREMADOCIAN OSTRACODS FROM TAITZEH VALLEY, LIAOTUNG

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With 6 figures

Introduction

The ostracods dealt with in the present paper were found in the Taitzeho valley in 1950 by Messrs. Y. Wang, Y. H. Lu, K. C. Yang, A. T. Mu, and J. C. Sheng of the Institute of Palaeontology, Academia Sinica, and Messrs. S. W. Tang, C. C. Chiang and C. L. Chow of the Geological Survey of N. E. China. The specimens were derived from the beds consisting of the yellowish green shales and thin bedded limestones at the following localities of Penchi district: 1. Wee-Ning-Ying, east of Chien-Tun, 2. Tou-Fang-Kou, west of Ying-Tze-Tun, 3. Ho-Tee-Kou, 4. Tien-Shih-Fu. between Sin-Ta-Pu and Yao-Pu. Careful examination has shown that the material comprises four new species and one new variety.

The material at hand is by no means sufficient for the determination of geological age, for all species are new. The specimens are found however in association with many fossils of graptolites and trilobites, which suggest that the fossil-bearing strata belong to the Tremadocian age. As a result of careful study of the graptolites, Mr. Mu named the fossil beds the *Callograptus? taitzehoensis* zone.

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Superfamily Beyrichiacea

Family Primitiidae Ulrich and Bassler

Genus *Primitia* Jones and Holl

Primitia? nanmanensis Hou (sp. nov.)

Figures 1-2.

Diagnosis:—Carapace sub-elliptical or ovate in outline, and each valve marked by two large lobes and an accessory node.

Description:—Carapace elongated or elliptical. It measures 0.75 mm in length and 0.51 mm in height in the young stage, and 1.39 mm and 0.95 mm respectively in the mature stage. Hinge straight and being shorter than the greatest length of the shell. Cardinal angles obtuse. Ventral margin rounded and regularly curved at both ends (Cat. No. 7016). Height of the posterior part of the valve slightly greater than that of the anterior part. Valve moderately convex. Two distinct, large and mammary-like lobes are situated on each side of a well-defined V-shaped sulcus, which is about three-fourths of the height of the carapace. These two lobes meet at the ventral part. A small and slightly pointed node occurs in the middle or lower part of the inner side of the first large lobe (Cat. No. 7017, 7018). The size is about one-tenth of the large one.

Carapace of young individuals ovate. The length of the straight hinge is about one-third of the valve. Cardinal angles rounded. Valve moderately convex. Two flattened lobes are present on the valve. Between them is a shallow and short median sulcus. The small node is quite different in position as compared with that in the mature stage, it is distinctly shown on the lower part of the inner side of the first large lobe. Free margins with indistinct fringe or false edge are present in mature specimens (Cat. No. 7016, 7018), but are absent in the specimens of young stage.

Comparison:—Only a separate valve is preserved, the hingement and overlapping relationship are unknown. In regard to the shape and the external structure of the young specimen, our species strongly recalls *Primitia simplex* (Jones), but differs from it in having an accessory node, two distinct lobes and rounded dorsal extremities.

Horizon and Localities:—From the Yehli Formation, east of Chien-Tun¹, Wee-Ning-Ying², and Tou-Fang-Kou³, west of Ying-Tze-Tun⁴, Penchi, Liaotung Province. Holotype. (Cat. No. G. S. C. 7014, 7015).

1. 前屯. 2. 威寧營. 3. 豆腐溝. 4. 營子屯.

Family Hollinidae Swartz**Genus *Ctenobolbina* Ulrich*****Ctenobolbina nanmanensis* Hou (sp. nov.)**

Figure 3.

Diagnosis:—Carapace sub-elliptical in outline, widening anteriorly. Valves ornamented with three lobes, one accessory node and two sulci. Free margins with concave border.

Description:—Carapace sub-elliptical, slightly oblique and apparently widening anteriorly. Length 0.75 mm and height 0.51 mm. Anterior angle obtuse. Hinge line straight, about three-fourths of the length of the valve. Ventral margin rounded and bending regularly toward both ends.

Valve moderately convex, divided by two sulci into three lobes, all of which are connected ventrally with the sub-marginal ridge. Anterior lobe crecent-shaped having maximum width in the middle part. First sulcus longer and narrower than the second, slightly oblique or curved backward at the lower end. Second lobe about twice the width of the anterior lobe, and nearly at right angles to the cardinal edge. Second sulcus rather straight, nearly parallel and equal in length to the first. Posterior lobe rounded, about two-thirds the length of the median lobe. The accessory one is a small pointed node and is situated at the inner side of the posterior lobe. Its size is about one-fifth to one-sixth that of the posterior lobe. It does not reach the cardinal edge. Accessory furrow very short and narrow.

Border of valve connected by a smooth and slightly concave fringe forming the convex free margins.

Comparison:—This new species closely resembles *Ctenobolbina superciliata* Reed and *Tetradella turnbulli* Reed; but the rounded anterior angle, the curved and narrow first sulcus, the indistinct accessory small node, and the concave border are quite sufficient to distinguish the present specimens from both of them.

Horizon and Locality:—From the yellowish-green shale of the Yehli Formation Tou-Fang-Kou, west of Ying-Tze-Tun, Penchi, Liaotung. Holotype. (Cat. No. G. S. C. 7019).

***Ctenobolbina sinensis* Hou (sp. nov.)**

Figure 4.

Diagnosis:—Carapace ovate in outline. Dorsal margin truncated. Each valve provided with three lobes and two sulci. Free margins of the valve surrounded by slightly concave frill.

Description:—Carapace ovate, measuring 1.19 mm in length and 0.85 mm in height. Greatest length situated at the median line between both margins of the valve. Hinge line straight, being slightly shorter than the maximum length of the valve and forming the obtuse cardinal angles.

The first lobe is very low and indistinct, being curved backward and downward along the anterior margin and forming a low indistinct marginal ridge. The other two lobes are straight and long, with sharp and narrow ridges, which are connected below by a U-shaped base. The first sulcus is narrow and inclined backward toward the lower part of the second lobe. The second sulcus is much wider, and more straight than the first. The shell is thicker at the ventral part. It is surrounded by the fringe, which is slightly concave and much narrower in the dorsal part than it is in the ventral. The outer margin is rather convex; they are connected by the marginal ridge.

Comparison:—Only separate valves of this species are known. The hingement and overlapping relationship can not be determined. According to the external characters, this new species is related to both *Ctenobolbina nanmanensis* sp. nov. and *Ctenobolbina superciliata* Reed. It differs from the former in having (1) the very low and indistinct anterior lobe, (2) the wide and shallow second sulcus, and (3) the presence of the fringe. It differs from the later in having the rounded, concave fringe, low anterior lobe and isolated small node.

Horizon and Localities:—From the yellowish-green shale of the Yehli Formation, at two different localities: 1. Ho-Tee-Kou, 2. Tou-Fang-Kou, west of Ying-Tze-Tun, Penchi. Holotype. (Cat. No. G. S. C. 7020).

***Ctenobolbina sinensis* var. *wangi* Hou (sp. et var. nov.)**

Figure. 5.

Description:—Carapace ovate, attaining a length of 0.78 mm, and height of 0.58 mm. Maximum length at the medial line of both ends, widest part near the middle of the valve. Hinge line straight widening posteriorly and slightly shorter than the greatest length of the shell.

Valve marked by three narrow lobes, which are connected below by a sharp narrow marginal ridge. A small accessory node is present at the upper part of the inner side of the third lobe.

The first lobe is very narrow, about one-half of the second in width. It is curved backward and downward along the anterior margin, forming a marginal ridge. The other two lobes are sharp, narrow, straight and long. They are united below by a U-shaped ridge. The first sulcus is narrow and inclined backward to meet the lower part of the second lobe. The second sulcus is wider, and more straight than the first. The shell is thicker at the ventral part. The fringe is slightly concave with ill-preserved free margin. It is only present at the anterior portion.

Comparison:—This new variety differs from *Otenobolbina sinensis* in having the narrower anterior lobe, the wider posterior end and the more flattened second sulcus.

Horizon and Localities:—Specimens were collected at three different localities: 1. Tou-Fang-Kou, west of Ying-Tze-Tun, 2. Ho-Tee-Kou, 3. TienShih Fu, between Sin-Ta-Pu and Yao-Pu Yehli Formation, U. Tremadocian. Holotype. (Cat. No. G. S. C. 7021).

***Otenobolbina taitzeoensis* Hou (sp. nov.)**

Figure 6.

Diagnosis:—Carapace semi-circular in outline, strongly convex, marked with U-shaped lobe ridge together with narrow and deep sulcus. Border slightly concave.

Description:—Carapace semi-circular. Length 0.82 mm, and height 0.54 mm. Valve strongly convex, with greatest height and greatest convexity at the middle. Hinge straight, slightly shorter than the maximum length of the valve. Anterior and posterior ends alike and rounded. Cardinal angles obtuse. Only a right valve is preserved. Hingement and overlap unknown.

Valve marked by three main lobes, with the last two connected below by a rounded U-shaped ventral marginal ridge. An accessory node observed

at the inner side of the third lobe. First lobe low, narrow and flattened, situated at the antero-marginal portion and slightly curved backward and downward. Second lobe vertical and straight, lying at the middle of the valve. It is wider than the first and its length measures as high as three-fourths of the valve. The third lobe is parallel to the second one and equal in size. The small accessory node is slightly elongated and convex, about one-thirtieth of the U-shaped ridge in size. The former sulcus is very shallow, slightly curved backward, and sometimes indistinct. The latter is deep and narrow; its length is equal to one-half the height of the carapace and is divided by an accessory node into two parts, forming a pointed accessory sulcus between them. Free margins with slightly concave border.

Comparison:—This species is closely allied to *Otenobolbina sinensis* sp. nov. and *Otenobolbina nanmanensis* sp. nov., but the present specimen is characterized by the strongly convexity of the carapace, the narrow and short second sulcus, and the indistinct, anterior lobe.

Horizon and Locality:—From the same horizon and locality as the preceding one. Holotype. (Cat. No. G. S. C. 7022).

Explanation of Plates

Figs. 1-2. *Primitia? nanmanensis* Hou, (sp. nov.)

1. Incomplete valve of mature form, X 35

2. Right valve, lateral view of young form. X 35

Loc. Wee-Ning-Ying east of Chien-Tun, and Tou-Fang-Kou, west of Ying-Tze-Tun, Penchi.

Holotype. Cat. No. G. S. C. 7014, 7015.

Fig. 3. *Otenobolbina nanmanensis* Hou, (sp. nov.)

Left valve, lateral view of holotype. X 35

Only a part of frill is present.

Loc. Tou-Fang-Kou, west of Ying-Tze-Tun, Penchi.

Cat. No. G. S. C. 7019.

Fig. 4. *Otenobolbina sinensis* Hou, (sp. nov.)

Right valve, lateral view of holotype. X 35

The frill of the dorsal margin is broken.

Loc. Same as the preceding.

Cat. No. G. S. C. 7020.

Fig. 5. *Otenobolbina sinensis* var. *wangi* Hou, (sp. et var. nov.)

Right valve, lateral view of holotype. X 35

Showing the partially broken median lobe; the frill is present on the anterior portion only.

Loc. 1. Tou-Fang-Kou, west of Ying-Tze-Tun; 2. Ho-Tee-Kou; 3. Tien-Shih-Fu between
Sin-Ta-Pu and Yao-Pu.

Cat. No. G. S. C. 7021.

Fig. 6. *Ctenobolbina taitzeensis* Hou, (sp. nov.)

Left valve, lateral view of holotype. X 35

Loc. Same as the preceding.

Cat. No. G. S. C. 7022.