

安徽下石炭统发现的臀头虾类

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中国虾类化石的研究和报道一直很少,因此,我国虾类化石的发现,不仅具有古生物学方面的意义,而且也会引起世界古甲壳动物研究者的兴趣。

臀头虾类(Pygocephalomorphs)是甲壳纲真软甲亚纲(Eumalacostraca)的原始代表。它的主要特征是,在原足(protopod)上具有单节双叉型的胸节附肢(biramous thoracic appendage),尾部具有叉叶(furcal lobe)和中关节刺(median articulated spine);壳瓣两侧鳃盖发育,头胸部和腹部近等长或腹部变小(Brooks, 1969)。

臀头虾类是一类已经绝灭了原始虾类,仅发现于晚古生界,但以石炭、二叠系为多。臀头虾类分布比较广泛,在欧洲、美洲、非洲等都

有发现(Brooks, 1962; Schram, 1980, 1981),唯亚洲东部尚未有报道。因此,安徽巢县臀头虾类的发现,填补了长期以来区域地理分布上的

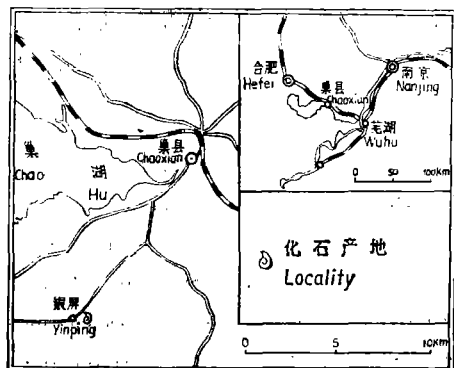


插图1 化石位置图

(Locality map of *Chaocaris* gen. nov.)

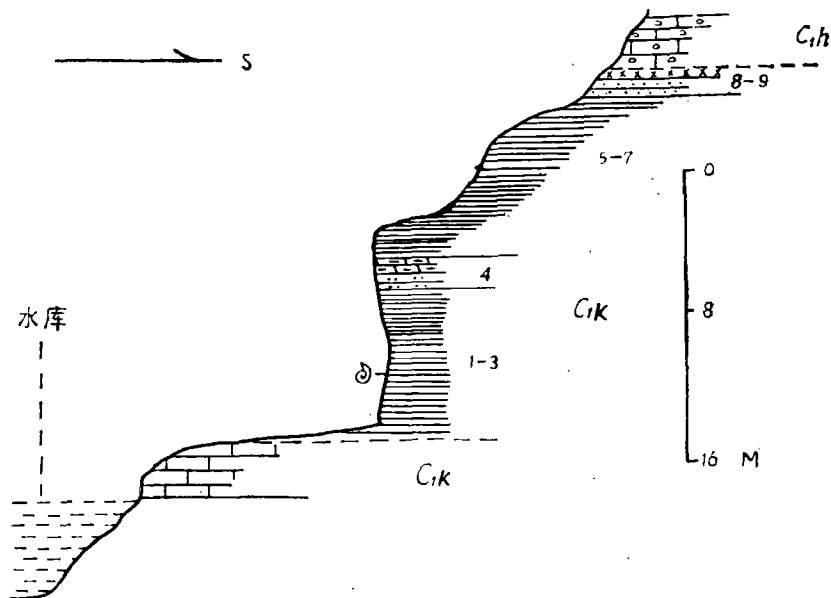


插图2 安徽巢县银屏王家村水库下石炭统高骊山组剖面示意图

(Section of the Kaolishan Formation near Wangjia village, Yinping, Chao xian, Anhui)

空白,对于进一步探讨这类动物古地理分布规律,也具有一定的价值。

本文所研究的中华巢虾 (*Chaocaris chinensis* gen. et sp. nov.), 采自安徽巢县银屏公社王家村水库附近,下石炭统高骊山组(插图 1), 仅有一块头胸甲标本,是 1977 年安徽省 332 地质队采集的。张文堂教授当时做过初步鉴定,归于 *Tealliocarids*。笔者曾得到安徽区测队夏广胜、徐家聪、周光新及张建胜等同志的热情帮助,于 1981 年 4 月及 5 月两次去化石产地采集,但遗憾的是,均无新的收获。王家村水库附近的高骊山组出露极佳,上下界线清楚(插图 2)。其分层情况可简述于下(据安徽省区测队资料):

上覆地层 下石炭统和州组 (C_{1k})

灰色中薄至中厚层砾状灰岩,含珊瑚化石 *Lithostrotion portlocki* Bronn, L. cf. *meconyanum* Edwards et Haime, *Aulina* sp., *Pseudoaulina* sp., *Hunanoclisia sinensis* Wu, *Dibunophyllum* sp., *Arachnolasma* sp., *Yuanophyllum kansuense* Yu, *Syringopora* sp., *Neoclisiaophyllum tentatum* Yu, N. cf. *triangulatum* Yu.

----- 假整合 -----

下石炭统 高骊山组 (C_{1k})

9. 豆状赤铁矿 0.75 米
8. 灰白色中薄层石英砂岩 0.75 米
7. 紫色钙质泥岩夹紫灰色泥灰岩、灰质泥岩,含腕足类 *Punctospirifer* sp., *Tomiproductus* sp., *Pugilis hunanensis* (Ozaki); 苔藓虫 *Dyscritella* sp. 1.76 米
6. 黄绿色钙质泥岩,含腕足类 *Lingula* sp. 2.01 米
5. 灰绿色厚层状钙质泥岩夹灰色钙质、炭质泥岩,似蠕虫状构造发育,含腕足类 *Lingula* sp.; 双壳类 *Palaeoneilo* sp., *P. cf. anthraconeiloides* (Chao), *Modiolus* sp. 4.32 米
4. 灰绿色钙质粉砂质泥岩夹灰黄色中层粉砂质泥灰岩,含植物茎干,顶部见铁锰结核薄层 5.23 米
3. 黄绿或灰绿色含钙质泥岩,含腕足类 *Lingula* sp.; 双壳类 *Phestia* sp., *Sanguinolites* sp., *Cypricardella* sp.; 臀头虾类 *Chaocaris chinensis* gen. et sp. nov. 2 米

2. 黄绿、灰色粉砂质泥岩,夹数层赤铁矿 1.05 米

1. 杂色泥岩或泥质粉砂岩,含腕足类 *Lingula*

sp.; 双壳类 *Edmondia* sp. 1.05 米

----- 假整合 -----

下伏地层 下石炭统 金陵组 (C_{1k})

灰紫色、灰黑色生物碎屑泥质灰岩及灰黑色中薄层斑点状灰岩,含珊瑚 *Pseudouralinia* sp., *Chia* sp., *Kwuichopora kwangsiensis* Lin, *K. tushanensis* var. *major* Lin, *Cystomichelimia* sp. >8.96 米

宁镇地区下石炭统化石丰富,通过对所含珊瑚、腕足类等的研究,高骊山组的时代为早石炭世,相当于西欧维宪期早期 (Viscan) (吴望始等, 1974; 杨敬之等, 1979)。

早石炭世是真软甲类 (*Eumalacostracans*) 迅速辐射散布的时期。据 Schram (1977) 对石炭系高级软甲类分布规律的研究,认为已知的化石产地都出现在当时的劳伦古陆热带地区 (*Laurentia tropics*), 具有明显的纬向及区域分布性。从石炭纪古地理图看,安徽巢县位于北纬 48° 左右位置,显然,它的出现,对于这类动物古地理分布规律的概念,应另作新的解释(插图 3)。

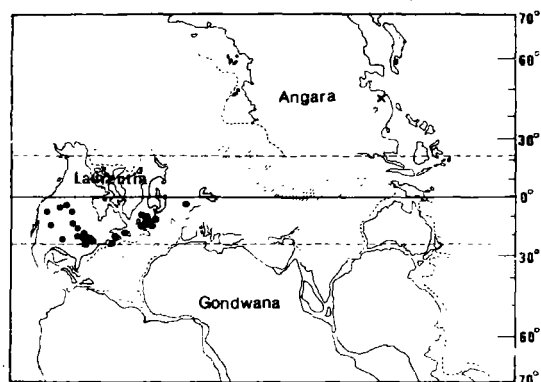


插图 3 石炭纪高级软甲化石分布图
(Distribution of the Carboniferous higher malacostracans (from Schram, 1977))

(图中除×号外,其余均引自 Schram (1977) 的原图)

绝大多数的臀头虾类,在颈沟之下发育有凸起的中背肋,但中华巢虾却有一对细的后中背肋,彼此被两条宽而平的中背槽分隔,槽间还有一条细的中背沟。这种特殊的中背肋构造,可能反映了生物地理环境的差别,它是否代表这一区域臀头虾类的特征,目前因资料太少,还

难以推断。

苏皖一带高骊山组常为海陆交替相地层,许多地点夹有煤线。王家村水库剖面,虽不含煤线,但找到一些植物茎干化石,所产的腕足类及双壳类,也都属于生活在滨海及近岸相的类型,如 *Lingula*, *Phestia*, *Sanguinolites*, *Cypricardella* 等。与中华巢虾保存在同一块岩石上的,都是上述的双壳类。由此可见,中华巢虾很可能是生活在近岸海水环境中的虾类。从其头胸甲布满瘤刺构造,前、后侧角犀利突出等形态特征,也反映了适宜于生活在这种近岸环境。

本文是在张文堂教授的指导下完成的。美国加利福尼亚州圣地亚哥自然历史博物馆 Frederick R. Schram 博士,在分类、古地理及对比等方面,提供了有益的意见,并认真修改了英文文稿,还提供了许多有关的参考资料。安徽区测队提供了剖面资料。文内的图片是由胡尚卿同志摄制的。插图是由欧阳巧明、任玉皋同志清绘的,在此一并表示衷心的感谢。

化石描述

真软甲亚纲 *Eumalacostraca* Grobben, 1892

糠虾目 *Mysidacea* Boas, 1883

臀头虾亚目 *Pygocephalomorpha*

Beurlen, 1930

铁利虾科? *Tealliocarididae*? Brooks,

1962

巢虾属(新属) *Chaocaris* gen. nov.

模式种 *Chaocaris chinensis* gen. et sp. nov.

安徽巢县银屏公社王家村水库附近,下石炭统高骊山组。

属征 头胸甲颈沟向前拱曲,与前侧角刺相连接;中背肋粗而凸起;颈沟之下具有一对细的后中背肋,被两条宽而平的中槽分隔开,槽之间为一条细浅的中沟;后中背肋向后延伸至后缘,在其端部形成短小的后缘刺;侧缘宽而圆滑,具有两条宽而平的侧缘脊;粗长的胃瘤隆突,使与中背肋之间的“胃区”深陷。

讨论及比较 *Tealliocarididae* 科只包括两个属,即 *Tealliocaris*, *Pseudogalathea*。这两个属的头胸甲形态区别比较大。Schram 最近认为, *Pseudogalathea* 与 *Pygocephalidae* 科的属更接近, *Tealliocarididae* 能否作为科一级的分类单元还有待商榷。中华巢虾的前、后侧角都向外如尖角状伸出,与 *Pseudogalathea* 非常相似,但它又具有特殊而复杂的后中背肋构造,这在已知的 8 个臀头虾类属中都是没有的。考虑到头胸甲的形态与 *Pseudogalathea* 十分接近,暂将其归于该科。当然,其确切的分类位置还有待腹节及尾节的发现。

发现于苏格兰下石炭统水泥石群 (Cementstone Group) 钙质砂岩层 (Calciferous sandstone Measure) 的 *Pseudogalathea* Peach, 1882 (Schram, 1979, pp. 80—84, figs. 35, 36) 与本属的区别是,前者的头胸甲的前侧角及后侧角都向外尖突,尤其是后侧角呈粗刺状向后伸出,头胸甲的中背肋构造简单,从额剑向后一直延伸至后缘,一对纵侧脊如中背肋一样粗强,侧缘及后缘均加厚呈宽边状。新属与 *Tealliocaris* Peach, 1908 (Schram, 1979, Brooks, 1969) 也有些相似,所不同的是后者头胸甲的前侧角不向外突出,后侧角呈突出,但并不形成刺状,后中背肋构造简单,而且颈沟向两侧延伸与侧缘相遇。

Pseudotealliocaris (Brooks, 1962) 的头胸甲的前侧角也突出呈刺状,具有两对纵侧脊,但它与 *Chaocaris* 容易区别,前者无后侧角刺及后缘刺,颈沟之下为一条简单的突起的中背肋。

分布时代 安徽;早石炭世维宪期。

中华巢虾(新属、新种) *Chaocaris chinensis* gen. et sp. nov.

(图版 I, 图 1—3; 插图 4)

头胸甲近卵形,长 5.3 毫米,宽 4.7 毫米;前侧角钝,顶端呈短刺状突出;后侧角刺比前侧角刺发育,末端十分犀利;颈沟凹陷甚深,不伸达侧缘,而是在颈沟中点距侧缘的 2/3 处急转向前延伸,直达前侧角,向前延伸部分的颈沟逐渐

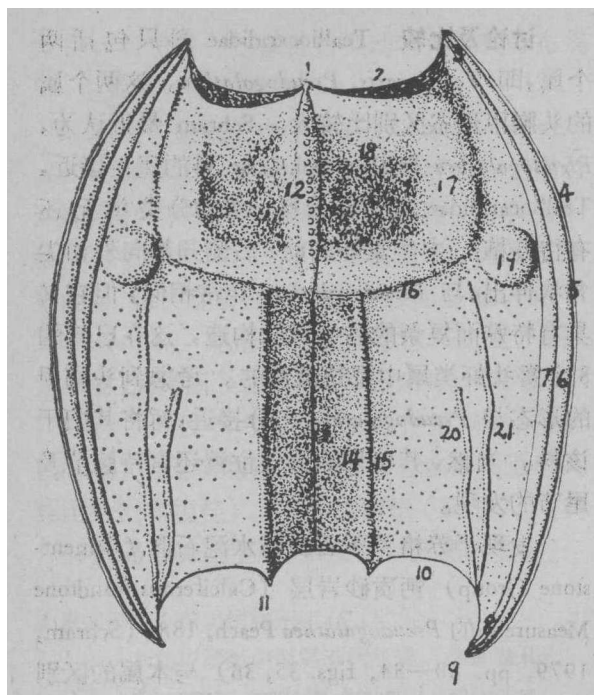


插图 4 中华巢虾头胸甲形态构造图
(Reconstruction of the carapace of *Chaocaris chinensis* gen. et. sp. nov.)

1. 额剑 (rostrum); 2. 前缘 (anterior margin); 3. 前侧角 (antero-lateral corner); 4. 侧缘 (lateral margin); 5. 衬边 (doubleure); 6, 7. 侧缘脊 (lateral marginal ridge); 8. 后侧角 (postero-lateral corner); 9. 后侧刺 (postero-lateral process); 10. 后缘 (posterior margin); 11. 后缘刺 (posterior marginal spine); 12. 中背肋 (mid-dorsal keel); 13. 中背沟 (mid-dorsal groove); 14. 中背槽 (mid-dorsal furrow); 15. 后中背肋 (posterior mid-dorsal keel); 16. 颈沟 (cervical groove); 17. 胃瘤 (gastric node); 18. “胃区” (“gastric area”); 19. 颈瘤 (cervical node); 20, 21. 纵侧脊 (longitudinal lateral ridge)

变浅; 额剑未保存, 但可见及残留的基部与中背肋相连; 颈瘤大而圆, 位于侧缘与颈沟之间, 左侧的比右侧的保存得清楚; 额剑两侧的前缘向内凹陷, 并有加厚现象, 可能是触角、眼区所在的位置; 前中背肋粗而凸起, 呈中间粗两端细的披针形, 其后端止于颈沟中点处, 肋之中轴部位

发育有一列较粗的瘤状构造; 沿颈沟内侧有一对长瘤状物, 其与中背肋之间为凹陷区, 可能是“胃区”所处的部位; 颈沟中点之下是一条细浅的中背沟, 沿其两侧为宽而斜的中背槽, 槽之边缘各为凸起的中背肋, 肋上有一排凸起的小瘤构造; 一对后中背肋向后延伸, 与后缘相交, 末端伸出一对如刺芽状的后缘刺, 发育得相当清楚; 两对纵侧脊都比较细, 向后均延伸至后侧角处, 内纵侧脊短, 仅为外纵侧脊长度的 $2/3$, 外纵侧脊自颈沟处开始发育; 侧缘宽, 边缘无锯齿状构造, 有两条宽而平的侧缘脊; 衬边极窄; 头胸甲上具有许多密集细孔状装饰。

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A NEW PYGOCEPHALOMORPH GENUS (EUMALACOSTRACA) OF LOWER CARBONIFEROUS FROM ANHUI

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Pygocephalomorphs are known to be widely distributed in Europe, America and Africa, but really they are reported for the first time in this country. *Chaocaris chinensis* gen. et sp. nov. described in the present paper was collected from Lower Carboniferous Kaolishan Formation of Chao xian, Anhui Province (Text-fig. 1). The discovery of Pygocephalomorphs in China not only filled the blank in the study of this sort of fossils in China, but also is of great significance in the discussion of the eumalacostracan paleogeography and evolution.

The stratigraphical sequence of the Kaolishan Formation of Chao xian, Anhui, is briefly outlined in descending order as follows (Text-fig. 2)

Lower Carboniferous Hochow Formation (C_{1h})

Grey conglomeratic limestones, containing corals: *Lithostrotion portlocki* Bronn, *L. cf. mecoyanum* Edwards et Haime, *Aulina* sp., *Pseudoaulina* sp., *Hunanoclisia sinensis* Wu, *Dibunophyllum* sp., *Arachnolasma* sp., *Yuanophyllum kansuense* Yu, *Syringopora* sp., *Neoclisiaophyllum tentatum* Yu, *N. cf. triangulatum* Yu

----- Disconformity -----

Lower Carboniferous Kaolishan Formation (C_{1k})

9. hematite 0.75 m
8. greyish white quartzose sandstone 0.75m
7. purple calciferous mudstone intercalated with purplish grey marl, containing brachiopods: *Punctospirifer* sp., *Tomiproductus* sp. *Pugilis hunanensis* (Ozaki) 1.76m
6. yellowish green calciferous mudstone,

containing brachiopods: *Lingula* sp. 2.01 m

5. greyish green mudstone intercalated with grey carbonaceous mudstone, containing brachiopods: *Lingula* sp.; bivalves: *Palaeoneilo* sp., *P. cf. anthraconeiloides* (Chao), *Modiolus* sp. 4.32 m

4. greyish green calciferous mudstone, intercalated with yellowish grey marl 5.23 m

3. yellowish green or greyish green calciferous mudstone, containing brachiopods: *Lingula* sp.; bivalves: *Phestia* sp., *Sanguinolites* sp., *Cypricardella* sp.; eumalacostracans: *Chaocaris chinensis* gen. et sp. nov.

2 m

2. yellowish green and grey mudstone intercalated with some hematite 1.05 m

1. Variegated mudstone or siltstone, containing brachiopods: *Lingula* sp. 1.50m
----- Disconformity -----

Lower Carboniferous Kinling Formation

Greyish purple and greyish black limestone, containing corals: *Pseudouralinia* sp., *Chia* sp., *Kuichowpora kwangsiensis* Lin, *K. tushanensis* var. *major* Lin, *Cystomiche- limia* sp.

The Kaolishan Formation is nearly of Visean in age, based on fossil corals, brachiopods and fusulinids of the Kinling and Hochou Formations. This formation is composed of marine sediments intercalated with thin coal-seam at places in Jiangsu and Anhui Provinces. *Chaocaris* is associated with brachiopods *Lingula* sp., biva-

Ives *Phestia* sp., *Sanguinolites* sp., *Cypricardella* sp., adapting to nearshore habitat. So far as the present knowledge goes, the Carboniferous higher malacostracans had a tropical Laurentian distribution, so it was thought that these were endemic to the late Paleozoic equatorial island continent of Laurentia (Schram, 1977) (Text-fig. 3). Therefore the discovery of *Chaocaris* in China would force us to reconsider the biogeographic range of the Paleozoic malacostracans.

I am very grateful to Dr. Frederick R. Schram for his helpful comments on the manuscript.

Subclass Eumalacostraca Grobben, 1892

Order Mysidacea Boas, 1883

Suborder Pygocephalomorpha Beurlen, 1930

Family? Teallicaridae Brooks, 1962

Genus *Chaocaris* gen. nov.

Type species: *Chaocaris chinensis* gen. et sp. nov., Wangjia village, Chao xian, Anhui Province; Lower Carboniferous Kaolishan Formation.

Diagnosis: cervical groove semicircular; anterior mid-dorsal keel strong and convex; paired posterior mid-dorsal keels separated by a wide mid-dorsal furrow, ending into small posterior marginal spines; four fine longitudinal lateral ridges extending to postero-lateral corner; lateral margin broad and round, with two wide and flat marginal ridges.

Discussion: This genus bears a close similarity to *Pseudogalathea* in the shape of antero-lateral corner and postero-lateral corner, but the latter is distinguished from the former by the carapace having a pair of strongly longitudinal lateral ridges, simple median keel extending from rostrum to posterior margin, and thi-

ckened lateral margin and posterior margin. *Teallicaris* is different from the present genus in the shape of antero-lateral corner and postero-lateral corner and in the cervical groove connected with the lateral margin.

Distribution: China, Early Carboniferous (Visean age).

Chaocaris chinensis gen. et sp. nov.

(Pl. I, figs. 1—3; Text-fig. 4)

Description: carapace oval in outline, 5.3 mm in length, 4.7 mm in width; antero-lateral corner with short processes; postero-lateral corner pointed and curved medially; cervical groove semicircular, deeply concave, extending anteriorly to antero-lateral corner; only base of rostrum visible, connected with mid-dorsal keel; anterior mid-dorsal keel strong and convex, with a tuberculate structure, contracted terminally, and connected with median point of cervical groove; paired posterior mid-dorsal keels, separated by a wide mid-dorsal furrow; gastric nodes oval and convex; "gastric area" deeply concave; cervical node large and round, located between cervical groove and lateral margins; 4 longitudinal lateral ridges fine and short, extending to postero-lateral corner, inner longitudinal lateral ridges being about 2/3 the length of the outer ones; anterior margin concave and thickened; posterior margin slightly concave, at the terminus of the paired posterior mid-dorsal keels with small posterior marginal spines; lateral margin broad and smooth, without serrations, with two wide and flat lateral marginal ridges on each side; double extremely narrow; carapace sculptured with crowded punctations.

Material: one carapace, holotype Cat. no. 76173.

Horizon and locality: same as the preceding.

图 版 说 明

化石保存在中国科学院南京地质古生物研究所标本室。

图 版 I

1—3. *Chaocaris chinensis* gen. et sp. nov.

1. 头胸甲背视, ×10, 全模 (Holotype), 采集号: p47-

H5-13, 登记号: 76173a.

2. 同一标本的外模, ×10, 登记号: 76173b.

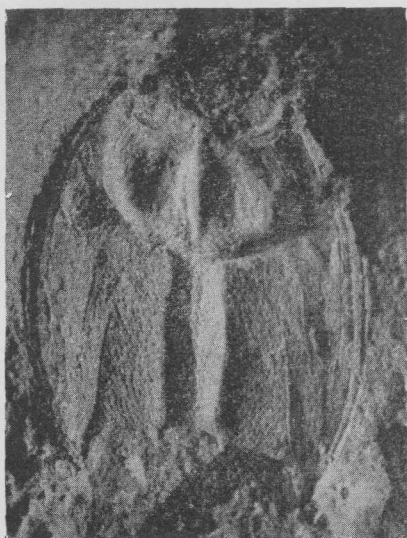
3. 同一标本的外模, ×21.3.

安徽巢县银屏公社王家村水库, 下石炭统高骊山组。

沈炎彬：安徽下石炭统发现的臀头虾类

图版 I

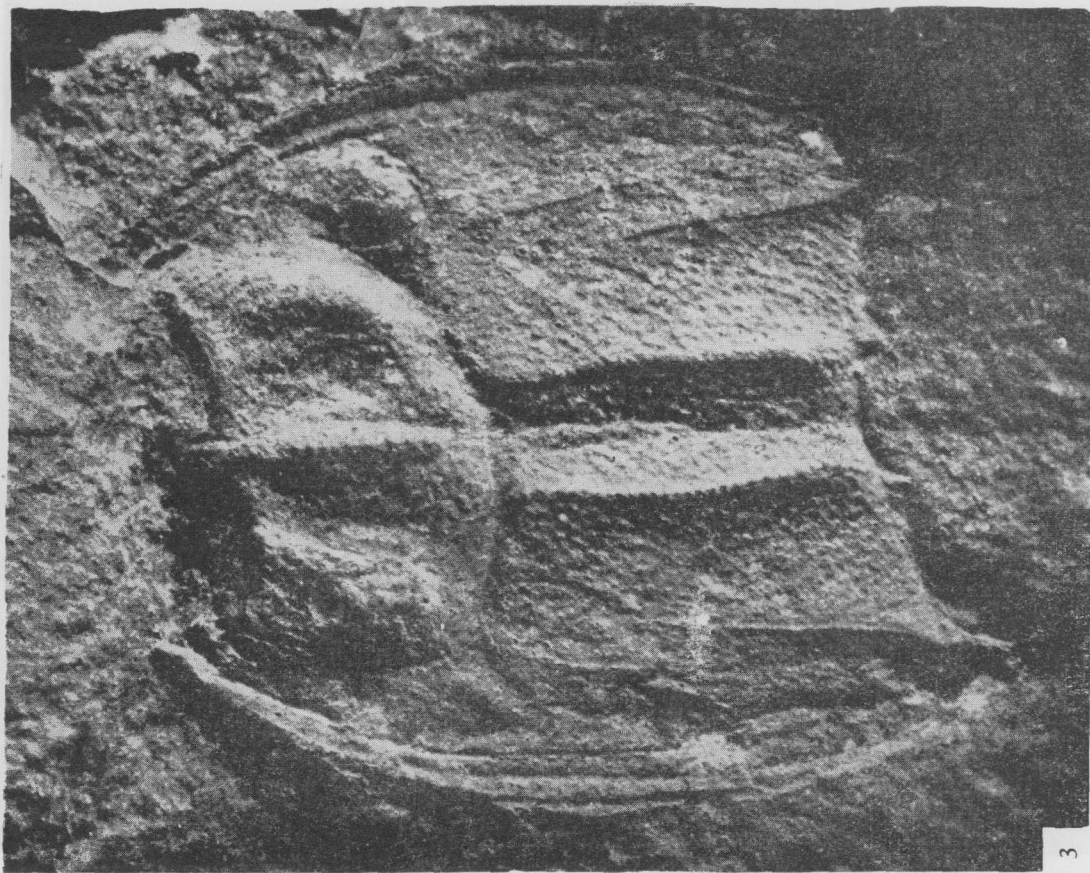
(A New Pygocephalomorph Genus (*Eumalacostraca*) of Lower Carboniferous from Anhui)



1



2



3