

一九九一年(总第十一辑)

INVESTIGATIO ET STUDIUM NATURAE

考察与研究

上海自然博物馆

Museum Historiae Naturae Shanghaiense

上海科学技术文献出版社

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上海科学技术文献出版社出版发行

(上海市武康路2号)

全国新华书店经销

上海科技文献出版社昆山联营厂印刷

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开本 787×1092 1/16 印张 7.25 字数 180,000

1991年7月第1版 1991年7月第1次印刷

印数: 1—1,400

ISBN 7-80513-811-7/Q·12

定价: 6.50元

《科技新书目》245-317

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关于 *Plagiozamites drepanozamioides* Hu 的讨论

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关键词: 山西省, 下石盒子组, 植物化石, *Tingia elegans* Kon'no

内容提要: 本文通过山西太原东山相当原产地所采植物化石的详细研究, 分析了 *Plagiozamites drepanozamioides* Hu 不应为裸子植物苏铁类的化石, 而是飘叶目植物 *Tingia elegans* Kon'no.

在“山西下石盒子组植物化石新记”的一文中, 以山西省太原市东山和阳城县的早二叠世下石盒子组中采得的二件标本为基础, 原作者在文中描述了一个种, 并认为是新种。把这个种归放在 *Plagiozamites* 属中, 而以羽片的形态和脉序与中生代常见的 *Drepanozamites**极为相似, 故以 *P. drepanozamioides* 命名之。关于这种相似性, 并阐明说: “它说明这两个属存在有种系发育方面的联系, 即中生代的 *Drepanozamites* 是否由古生代的 *Plagiozamites* 进化而来似可进一步探讨之。

Drepanozamites 是一个由 Harris (1932, p. 83) 为 *Otozamites nilssoni* Nathorst 而创立的属, 并认为是一个裸子植物化石, 因为本文作者正从事中国的裸子植物化石的研究项目, 对属种的叙述, 特别是属的演化趋向问题颇感兴趣。在此提出我们的认识供商讨。

原作者用中文描述的特征简述引证在此供参考:

“一次羽状复叶, 长 6 厘米以上, 宽 2 厘米, 轴粗 3 毫米, 靠近顶部约 2 毫米, 轴上具细密的纵纹。羽片呈二行排列, 互生于羽轴的两侧, 镰刀形, 羽片长 1 厘米, 宽 0.4 厘米。基部呈半抱茎状, 其上侧边收缩, 下侧边下延于轴上, 顶端钝圆。小羽片**基部有多条叶脉以锐角自轴伸出, 下侧的叶脉伸出角度大, 几与下侧的叶缘平行伸向叶**的顶端; 上侧的叶脉则以较小的角度伸出, 分叉多次后, 即与上侧的叶缘**相交, 但所有的叶脉皆不与下侧的叶缘相交。叶**的前缘有锯齿, 每一羽片有脉 15 条左右***。”

由于笔者对研究这个种的形态特征和分类位置有兴趣, 所以在正模标本的采集地太原东山作标本采集。因为原作者没有指明产化石的确切地点, 唯一能做到的就是沿着这山谷不同的露头中寻找化石。在大柴沟采到了较好的 *Plagiozamites drepanozamioides* Hu 最好的一件显示在图版 1 的图 2—3 中, 虽然它们不能严格地看作是地模标本, 但在各方面都与胡的模式标本很相象的, 不过它们仍然是从模式地点附近, 差不多相当原采地采到的化

* 事实上, *Drepanozamites* 一属仅限于瑞典, 东格林兰和中国的晚三叠世和早侏罗世。

** 原文描述术语不一致, 按上述都应为羽片。

*** 看上去更象羽片边缘叶脉分叉后的数目, 而不是羽片基部叶脉的数目。

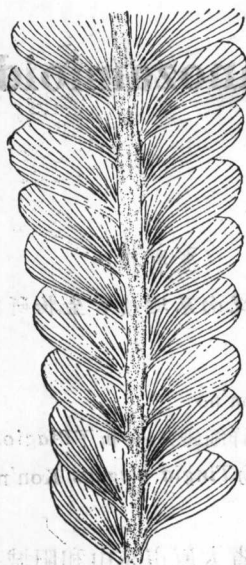


图1. 岩石被劈开时叶保存的原来形态和脉序

text-fig. 1. Show original shape of leaves and pattern of venation when the rock was broken up.

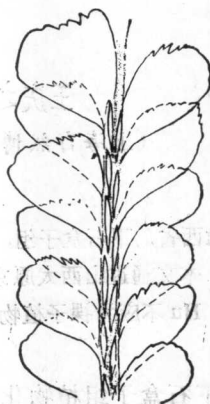


图2. 具四列叶的枝上叶的真实形态

text-fig. 2. Show true shape of leaves at a shoot with quadrifarious leaves.

石。

对这件标本仔细观察,呈现在原作者的特征简述中被称作“羽片”是强烈地重迭的(插图1)。用揭露的方法,笔者立即发现了羽片的真实形状是倒卵形的,而不是如原文中插图1f所显示的几乎为长方形的,进一步研究发现靠轴上有紧贴着的二行小叶(插图2)。在标本右侧的这些叶和左侧上部的二个叶表明的是没进行室内修理前,岩石顺层劈开时叶保存的原来形态。手头的这件标本清楚的为一个具四列叶的枝,而不是具二列羽片的蕨叶,整个的都与 *Tingia elegans* Kon'no 的描述一致, *T. elegans* 是 Kon'no 从朝鲜平壤附近的下古坊山统找到的(Kon'no, 1929, 142 页, 图版 25, 图 1-8),特别是与显示在图版 XXV, 图 2,6 的很相似。

Tingia 是具有独特形态的绝灭植物的一个属,是由具不同大小的四列叶的,象蕨叶的枝为特征的。其中,在轴的背部的二行叶较小,靠近轴腹侧的二行较大。它被认为是可疑的分类不明的植物,直到 Kon'no (1929, p. 120)发表了 *Tingiostachya* 的重大发现。至于 *Tingia* 属和 *Tingiostachya* 属将在另一专门的文章中讨论。为此 Zimmermann (1959, p. 244)将 *Tingia* 属目前与 Noeggerathiales 和 Discinitales 一起放在 Noeggerathiophyta 中,放置于有节植物门与蕨叶植物门之间。尽管被这样称为 *P. drepanozamioides* Hu 的隐花植物的特征,事实上是已经清楚知道的 *Tingia elegans* Kon'no。值得注意的是 *Drepanozamites* 属的系统分类位置。

正如上面所说的, *Drepanozamites* 是一个裸子植物已绝灭的属。Harris 1932 年时把它放入分类不明的种子植物。根据找到的表皮构造不同于本内苏铁,而后于 1937 年归到苏铁目*(Harris, 1937, p. 25, 28)。因此,这个属与苏铁类的亲缘关系看来是没有任何怀疑的,

* 这里的苏铁目指的是广义的,包括苏铁目和蕉羽叶目。



图版说明

1. 1a.原作者命名为 *Plagiozamites drepanozamioides* Hu的原图版1, 图1.1a.
2. 2a, 3. 3a *Tingia elegans* Kon'no
2. 2a.显示了叶的原来形状及脉序。2a为2.×3.
3. 3a.图2.的负面标本, 显示了经过揭露的叶的真实形状。3a为3.×3.

(Explanation of plate)

1. 1a. Plate 1, fig. 1.1a(1×3) of the original author and has been named *Plagiozamites drepanomoides* Hu.
2. 2a. 3. 3a, *Tingia elegans* Kon'no.
2. 2a(2×3). Show original shape of leaves and pattern of venation.
3. 3a(3×3) Opposite specimen of fig. 2, show by way of degagement, true shape of leaves.

很明显的与 *Tingia elegans* 是关系很远的。

正象在 *Plagiozamites drepanozamioides* Hu 研究中对于 *Plagiozamites* 和 *Drepanozamites* 之间的系统发育关系以及从 *Plagiozamites* 向 *Drepanozamites* 的演化趋势的论述, 不是在本研究课题中, 因为事实上这个种是一个 *Tingia*, 看来没有什么讨论的意义。

ON PLAGIOZAMITES DREPAZOZAMIOIDES HU

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Key words: Shanxi Province, Lower Shihhotse Formation, fossil plants:

The paper entitled "New record of fossil plants from the Lower Shohezi(sic) Formation* of Shanxi" (Hu, 1983) described a single species, based on two specimens obtained from the Early Permian Lower Shihhotse Formation of the East Hills of Taiyuan Municipality and Yangcheng County, Shanxi Province. The species was considered to be new to science and assigned to the genus *Plagiozamites*. According to Hu, it is characterized by its shape of pinnae and pattern of venation, closely allied to *Drepanozamites*, which was said to be common in Mesozoic**. A new specific name *Plagiozamites drepanozamioides* was thus proposed in allusion to its close resemblance to the latter. In this connexion, Hu stated that it reveals certain phylogenetic relations between these twogenera. Whether or not the Mesozoic *Drepanozamites* evolved from the Palaeozoic *Plagiozamites* merits further studies (l. c. p. 198).

Drepanozamites, a genus of fossil gymnosperms was originated by Harris (1932, p. 83) for *Otozamites nilssoni* Nathorst. While carrying out a project on fossil gymnosperms of China, the writers have been rather interested in Hu's statement, especially in the evolutionary trends of the genera.

The original diagnosis given by Hu is in Chinese. It may be translated and cited here for reference.

"Frond simply pinnate; more than 6cm in length, with a width of 2cm; axis 3mm broad, approximately 2mm in breadth near the apex, with fine and dense longitudinal striations. Pinnae biserial, alternately incerted on the flanks of the axis, falcate, 1cm long, 0c.4m broad. Base semi-amplexicaul, with the anterior edge contracted and the

* The Formation should be spelled as Lower Shihhotse Formation after Norin(1922, p. 7).

** The genus *Drepanozamites* is, in fact, confined to the Late Triassic and Early Jurassic of Sweden, East Greenland and China,

posterior one decurrent. Apex rounded. Several veins giving off at acute angles directly to the base of pinnules (sic)*, those at the posterior side, giving off at a wider angle, running almost parallel to the posterior edge and cutting the apex of leaves (sic)**; those at the anterior halves, giving off at narrow angles, branching repeatedly and cutting the anterior edge of leaves (sic.)** . Distal edge of leaves (sic.)** serrate. Veins in each pinna numbering about 15 (sic.)***.

To study the interesting morphological features of the species and its taxonomic consequences, the writers had been to the East Hills of Taiyuan from where the holotype of the species is derived. As the original author failed to show the fossil locality exactly, the only way that one can do is to try to find out fossils from various outcrops along valleys in the Hills. In Dachagou, there was nice collection, including fine examples of the species, *Plagiozamites drepanozamioides* Hu, the best ones being shown in pl. 1, figs. 2-3. They agree in every respect with the type-specimens illustrated by Hu when the species was being erected. Though all of the additional material cannot be regarded as topotypes strictly, they are nevertheless secured from localities near the type-locality or more or less equivalent to the latter.

A critical examination of the material has revealed that the "Pinnae" as termed by Hu in his diagnosis, are strongly overlapping (text-fig. 1). By way of degagement, the writers have found at once that they are really ob-ovate in shape, rather than more or less quadrate as shown in Hu's text-fig. 1f. Further investigation has shown two rows of small leaves appressed to the axis (text-fig. 2). The leaves on the right side and the two leaves on the upper left side of the specimen remain un-degaged (pl. 1, fig. 2, 2a), representing the original shape of leaves when the rock was broken up. It is clear that the material in hand is a shoot with quadrifarious leaves rather than a frond with bifarious pinnae. It agrees fairly well with *Tingia elegans* Kon'no figured by Kon'no from the Lower Kobosan Series in the vicinity of Pyongyang, Korea when the species was founded (Kon'no, 1929, p. 142, pl. 25, figs. 1-8), especially with those in figs. 2. and 6.

Tingia, a genus of extinct plants with peculiar aspects, is characterized by frond-like shoot with quadricarious leaves of different sizes: two rows in smaller size disposed on the dorsal side of axis and two rows in larger size on the more or less ventral side, and had been regarded as doubtful in affinity, *plantae inceetae sedis*, until the important discovery of *Tingiostachya* published by Kon'no (1929, p. 120). The genera *Tingia* and *Tingiostachya* will be dealt with in a separate paper. For the sake of bre-

* It should be referred to pinnae.

** The term leaf refers to pinna too.

*** It seems more likely to refer them to the number of branchlets of veins at the edge of pinnae, rather than to the number of veins entering the base of pinnae.

vity, it should be noted here that the genus *Tingia* is now classed with Noeggerathiales and Discinitales in Noeggerathiophyta, a division proposed by Zimmermann (1959, p. 244), standing between Sphenophyta and Pterophyta.

While the cryptogamic nature of the so-called *Plagiozamites drepanozamioides* Hu which is, in fact, *Tingia elegans* Kon'no, has been clearly known, it would be of interest to note the systematic position of the genus *Drepanozamites*.

As stated above, *Drepanozamites* is a genus of extinct gymnosperms. It has been placed among seed plants *incertae sedis* by its founder (Harris, 1932, p. 83) in 1932. At that time, it had been considered to be different from Bennettitales on its cuticular structure and then classed among Cycadales* by him in 1937 (Harris, 1937, p. 25, 28). Whether one agrees with this or not, there seems no doubt on the cycadophycean affinity of the genus, and its remoteness to *Tingia elegans* is obvious.

The statement concerning the phylogenetic affinities in *Plagiozamites* and *Drepanozamites* and the evolutionary trends for the former to the latter, as held by Hu on his study of "*Plagiozamites drepanozamioides* Hu" is based on no solid ground, and seems to be meaningless, inasmuch as the species instituted by him is, in fact, a *Tingia*.

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* The term cycadales here is used in a wide sense, comprising Cycadales (s. s.) & Nilssoniales.

湖南志留纪腹足类口盖化石

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关键词: 志留纪, 腹足类, 多旋族, 口盖。

内容提要: 本文论述的三种不同形的志留纪腹足类口盖化石是地矿部湖南省区调队在该省龙山县采集的。就目前所知, 我国晚期中生代和早第三纪非海相腹足类口盖化石分布很广, 不仅类型多而且个体数量丰富。但古生代腹足类口盖不仅在世界而且在我国均很少见到。因此, 笔者认为湖南这些口盖的发现, 对志留纪腹足动物群及其古地理学的研究是有极重要意义的。

本文描述的口盖化石是地矿部湖南省区域地质调查队 1979 年采集的。标本产于湖南省龙山县向阳煤矿、比耳、昂洞一带。上述化石产地属扬子地层区, 黄陵八面山分区, 恩施咸丰小区。据参加该地区野外考察的专家介绍, 志留纪地层在该区出露零星, 层位难以详细确定。

文中所描述的口盖为三种不同的形, *Oriostoma* 口盖数量较多, 它们保存在生物碎屑灰岩中。构成生物碎屑灰岩的主要类群有、三叶虫的头部、尾部以及大量的活动颊, 腕足类, 腹足类和苔藓虫等大量碎片。三叶虫经伍鸿基鉴定, 主要有 *Chuangianoproetus* sp. 其时代为早一中志留世。多旋族形 2 的口盖仅发现一块, 保存在中细粒的泥质砂岩中, 与它一起保存的有 *Coronocepharus* sp. 的尾部, 以及数量较多、保存很差的介形类。

就目前所知, 腹足类口盖化石虽然时有报道, 但在古生代地层中却较为罕见, 已报道的有 *Ceratopea*, *Teichspira*, *Maclurites*, *Palliseria*, *Helicotoma*, *Oriostoma*, *Loxoplocus* (*Lophospira*), *Omphalocirrus*, *Liomphalus*, *Cyclonema* 等属的口盖化石 (Rohr & Boucout, 1985)。在我国, 晚期中生代, 尤其是第三纪陆相地层中, 口盖化石分布很广, 数量很多, 常富集成层, 有的可作为地层划分、对比的标志层, 但古生代口盖化石在我国很少见到。因此, 志留纪腹足类口盖化石在我国系属首次发现。这些口盖化石虽然不是十分丰富, 但它在我国的发现却具有十分重要的生物地理学意义。正如 E. L. Yochelson (1979) 指出的, 古生代多旋族钙质口盖在澳大利亚、奥地利等地区的广泛发现对生物地理学论题的记录是富有意义的。在研究古生代 *Oriostoma*, *Cyclonema*, *Liomphalus* 和 *Omphalocirrus* 等多旋族口盖化石内侧和外侧特征之后, Rohr & Boucout (1985) 认为 *Oriostoma* 口盖的饰纹与众不同, 就是在没有发现壳体的情况之下, 根据这类口盖也具有鉴别和对比地层的作用。因此, 这类口盖在我国志留系的发现, 无疑地, 它在地层的划分、对比上具有一定的意义。

多旋族和少旋族的口盖它们同属螺旋类型, 尽管它们的构成是极其复杂的, 但是这类口盖的生长过程是与足的增长有关, 是由收缩肌肌肉的迁移造成口盖以某种方式旋转, 使生长仅仅沿边缘部分出现 (半周缘生长)。多旋族的口盖增长缓慢, 它们的外形在所有的生长

阶段都是圆形(Linsley et. al., 1989),这种螺旋线的几何形态与阿基米德螺旋线相近似,而少旋族的口盖,其螺旋线的旋转或许能用某种数学模式予以表达。*Oriostoma* 口盖内侧的环沟,实际上是收缩肌肌肉留下的痕迹,由于环沟比较深,估计收缩肌肌肉的吸附能力可能比较强,从而形成较大的负压,使口盖内侧的中央区明显地隆起,而边缘则显著地下凹。

口盖化石描述

鸢口螺超科 Superfamily Oriostomatacea Wenz, 1938

鸢口螺科 Family Oriostomatidae Wenz, 1938

鸢口螺属 Genus *Oriostoma* Munier-Chalmas, 1876

鸢口螺?(未定种) *Oriostoma?* sp.

材料:此种口盖为5个标本所代表。

描述:口盖圆形,扣子状,直径大约为8.45—11.99mm。口盖内侧面保存清晰,边缘钝圆状,迅速斜向外缘,其内缘较陡。中央区较宽圆并逐渐斜向中部。内侧面光滑,并有多层壳质堆积,每层壳质覆盖在前一层之上(图版1,图1、4),但其中部似具旋环(图版1,图1)。图版1,图3的边缘清楚,中央区光滑,其中部略凸,根据这些特征来看,清楚地表明它是一个内侧面的外模。从口盖的横切面(图版1,图5)上观察,其内面的中部亦略呈凹陷,厚度约0.7mm。

比较:此种的归属目前尚未确定,但从圆形的外形,内侧面的特征来看,它与 *Oriostoma* Munier-Chalmas, 1876 属的口盖比较相近,尤其和澳大利亚,维多利亚州下泥盆统所产的 *Oriostoma northi* Etheridge Jr. (Yochelson & Linsley 1972, p. 8, pl. 1, fig. 6, pl.II, figs. 1-5)的口盖相似,但不同在于后者的内侧面倾斜显著,中部更凹陷和较大的个体。

多旋族1形 Multispiral section form 1

(图版I,图6)

材料:这个类型为一个碎片所代表。

描述:口盖宽卵形,长度2.50mm,外侧面具4—5个旋环,旋环反时针旋转,但其中部不清楚。旋环增长规则,呈一平面,旋沟比旋环细窄。

比较:从外侧看,这一形与澳大利亚维多利亚州下泥盆统的 *Cyclonema lilydalensis* Etheridge Jr. (Yochelson & Linsley, 1972, p. 5, pl. 1, figs. 1-5)有些相似,但与后者不同之处在于较窄的旋环和较宽的旋沟。

多旋族2形 Multispiral section form 2

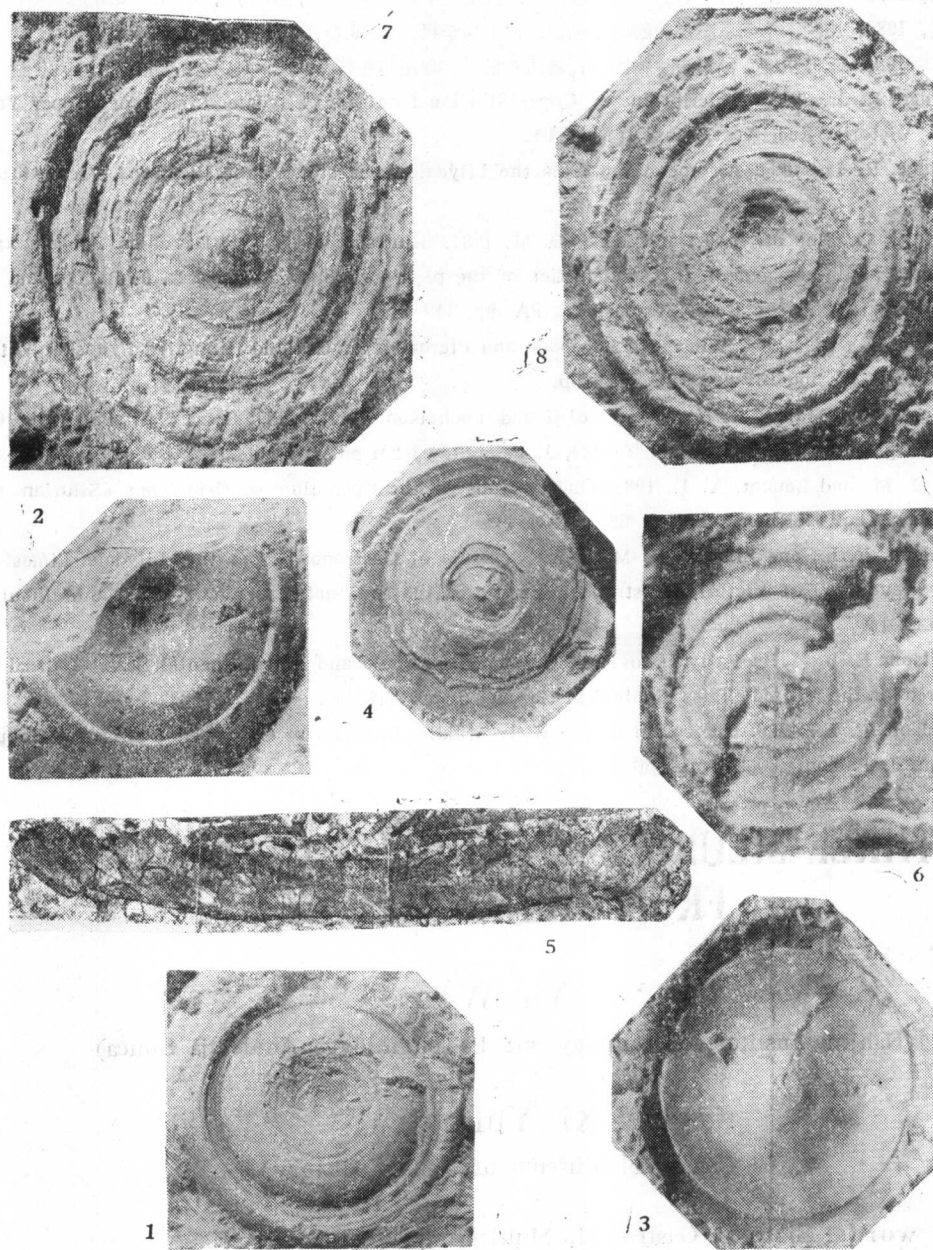
(图版1,图7—8)

材料:只有一个标本和它的外模代表这个类型。

描述:口盖近卵形,长度约16mm,宽度13mm。外侧面稍凹,尤以近中部为甚,并具有5条顺时针旋转的旋环。旋环宽且大,旋沟细窄。

比较:虽然此标本与 *Multispira* section form 1 是产于同一岩层中,但它与后者明显的不同在于近卵形的外形和顺时针旋转的旋环。

图版 I



图版说明

本文所描述的标本均保存在上海自然博物馆。

- 1-5, *Oriostoma?* sp. 1. 内视, $\times 5$. 登记号: 3867 2. 内视, $\times 5$; 3. 内视的外模, $\times 5$. 登记号: 3868
 4. 内视的外模, $\times 5$. 登记号: 3869 5 口盖的弦切面, $\times 5$, 向上方的一侧表示外侧; 向下方的一侧表示内侧. 登记号: 3870 6, *Multispiral* section form 1 6. 外侧面 $\times 20$. 登记号: 3871 7-8, *Multispiral* section form 2 7. 外侧面, $\times 5$. 8. 外侧面的外模, $\times 5$. 登记号: 3872

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THREE SILURIAN GASTROPOD OPERCULA FROM HUNAN, CHINA

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Key words: Silurian, Gastropod, Multispiral, Opercula.

The present paper deals with three Silurian gastropod opercula, which were collected by the Regional Geological Team of Hunan Geological Bureau in 1979 from Longshan County, Hunan Province. So far as the present knowledge goes, the Late Mesozoic and Early Tertiary non-marine gastropod opercula have been found from many places of our country, abundant both in form and in individual. But the Paleozoic gastropod opercula are rarely known not only in the world, but in our country. There-

fore, the writers consider that the discovery of these opercula in Hunan is of vital significance to the studies of Silurian faunas and their paleogeography.

Relatively, the gastropod opercula are not very rich in the collection, but the materials are found to be well preserved in the bioclastic limestone and fine argillaceous sandstone, including three forms, namely, *Oriostoma* sp., Multispiral section form 1 and form 2. These opercula are associated with trilobites, fragments of brachiopods, gastropods and ostracods. The trilobites was determined by Wu Hong-ji as *Chuangianoprotus* sp. and *Coronocephalus* sp., who consider the fossil-bearing bed in Longshan County to be Early-Middle Silurian in age.

Description of Opercula

Superfamily Oriostomatacea Wenz, 1938

Family Oriostomatidae Wenz, 1938

Genus *Oriostoma* Munier-Chalmas, 1876

Oriostoma? sp.

(pl. 1, figs. 1-5)

Material: This form is represented by five specimens.

Description: Outline circular, button in shape, 8.45-11.99mm in diameter. Inner surface of opercula is rather distinct and bordered by an obtusely rounded rim. Rim rather wide, inclined rapidly outward and steeply sloped down to the inner side. Central area slightly broadly rounded and gradually inclined toward the centre. Inner surface smooth, being built of laminae deposited, each lamina completely covering the previous one (pl. 1, figs. 1, 4), but the central part seem to be spirally curved (pl. 1, fig. 1).

A not well present specimen is figured in pl. 1, fig. 3. It has a distinct rim, very smooth central area and slightly convex centre. These features clearly indicate that the specimen may be an outer mould of the inner surface. From the transverse section of operculum shown in pl. 1, fig. 5. The inner surface slightly inclined inward, about 0.7 mm in thickness.

Comparison: The genera reference of this form is uncertain. In the circular outline and the features of inner surface, this form it bears an affinity to the *Oriostoma* Munier-Chalmas, 1876. It also bears a considerable resemblance to that of *Oriostoma northi* Etheridge Jr. (Yochelson and Linsley, 1972, p. 8, pl. 1, fig. 6, pl. II, figs. 1-5) from the Lower Devonian of Victoria, Australia, but the latter differs in more strongly inclined inner surface, in the more deeper central depression and in the larger size.

Multispiral section form 1

(pl. 1, fig. 6)

Material: This form is represented by a single fragment.

Description: Outline wide ovate, 2.50mm in length. Outer surface having four to

five spiral cords coiling in a counter-clockwise direction, central part indistinct. The last four spiral cords expanding regularly in size and arranged in one plane, spiral groove narrower than spiral cords.

Comparison: In view of outer surface, this form is comparatively close to the operculum of *Cyclonema lilydalensis* Etheridge Jr, (Yochelson and Linsley, 1972, p.5, pl. 1, figs. 1-5), but differs from the latter in the narrow spiral cords, wide spiral groove and the smaller size.

Multispiral section form 2

(pl. 1, fig. 7-8)

Material: This form is represented by only a single specimen together with an outer mould.

Description: Outline subovate, approximately 16 mm in length and 13mm in diameter. outer surface slightly concave, especially near the centre, with five spiral cords coiling in a clockwise direction. Spiral cords rather wide and large, separated by narrower spiral grooves.

Comparison: Although this form occurs in the same formation with the form 1, but it can be distinguished from the latter in the subovate shape and in the clockwise direction of the spiral cords.