

# 关于“南山系”中的两种珊瑚化石并讨论 “古浪灰岩”的时代问题

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二十余年前,侯德封教授与已故孙健初教授在甘肃古浪石峡(Shixia)及石城子(Shichengzi)的南山系中,发现两种珊瑚化石,经已故计荣森教授(1936)鉴定,结果认为:“这两个珊瑚标本均经高度变质,保存不佳,内部构造不够清楚,因此,种名甚至属名的确定是困难的。但根据珊瑚个体的一般形状、构造及其排列等,可以与熟知和常见的一些珊瑚进行比较。它们应属于蜂巢珊瑚科(Favositidae)的 *Favosites* sp. 及 *Pachypora* sp., 显然它们与石炭二迭纪的 *Michelinia*, *Syringopora* 及 *Chaetetes* 等均有区别。虽然根据这两块保存不好的标本,难以确定种名,但可以指示此含珊瑚化石的地层应属杜内世前(Pre-Dinantian),或者可能是泥盆纪。”

根据计氏的化石鉴定结果,孙健初(1936)将含这些珊瑚的灰岩层及其下的千枚岩及硬砂岩层命名为“古浪系”,定其时代为志留—泥盆纪——上部灰岩为泥盆纪,下部砂岩及千枚岩为志留纪。其后,李树勋(1948)又将上述含珊瑚的灰岩层称为“古浪灰岩”,并确认为泥盆纪。

解放后,由于在祁连山区进行了大规模的地质普查和勘探工作,“南山系”中发现了许多新的化石资料,但迄未发现可靠的海相泥盆纪化石;过去认为属于海相泥盆纪的地层,如玉门附近的旱峡群及奥勃鲁契夫(B. A. Обручев)认为发现海相泥盆纪化石的“南山砂岩”,以及宋叔和(1959)创立的“乱石堆灰岩”等,经对化石的詳細研究,都被确定为志留系。最近,宋叔和(1959)在“关于祁连山东部的南山系和皋兰系”一文内,提到甘肃省地质局某地质队的同志,曾经在“古浪灰岩”内采得腕足类、头足类及海百合茎化石,并认为有属于奥陶系的可能。我们也陆续收到一些地质队同志采自古浪附近“古浪灰岩”内的珊瑚化石,经笔者初步鉴定有: *Brachyphyllum*, *Streptelasma*, *Favistella* 等,以及若干单体四射珊瑚及少数床板珊瑚。上述这些珊瑚都是奥陶纪常见的种属。因此,计荣森所描述的“古浪灰岩”中的这两种床板珊瑚有重新研究的必要。经过对计氏的原文描述及附图的詳細观察结果,笔者发现计氏原定为蜂巢珊瑚 *Favosites* sp. 及厚孔珊瑚 *Pachypora* sp. 的标本,实系床板珊瑚中二种比较古老,而结构比较原始的珊瑚。计氏的 *Favosites* sp. 应为里享珊瑚(*Lichenaria*),计氏的 *Pachypora* sp. 应为阿姆塞士珊瑚(*Amsassia*),前者由于内部构造特点不够清楚,种名无法确定;后者则与苏联西伯利亚上奥陶统的 *Amsassia chaetetoides* Sokolov 比较近似。这两种床板珊瑚就现有资料来看,里享珊瑚仅限于中奥陶世,阿姆塞士珊瑚是苏联西伯利亚西部及哈萨克斯坦北部上奥陶统的标准化石。这些珊瑚化石在泥盆纪地层内从未见到过,除 *Amsassia* 属的二个中国种,其时代尚不够清楚以外,上述二属

珊瑚均未延入奥陶紀以后的地层。因此,“古浪灰岩”的时代应为奥陶紀。

本文先后曾經穆恩之、王鈺及卢衍豪諸教授詳細审閱与修正,作者謹致以衷心的謝意。斯行健教授修正英文原稿并提示宝貴意見,亦于此志謝。

**床板珊瑚亚綱 Subclass Tabulata**

**具联接构造类 Tabulata Communicata**

**里享珊瑚目 Order Lichenariacea Sokolov, 1950, emend.  
Sokolov, 1955**

**里享珊瑚科 Family Lichenariidae Okulitch, 1936.  
emend. Sokolov, 1950**

**里享珊瑚属 Genus *Lichenaria* Winchell & Schuchert, 1895**

块状羣体珊瑚,外形球状或半球状。个体多角状,相邻个体紧相銜接。壁孔无。床板較少;壁刺无,或仅見于少数种內。

**属型:** *Lichenaria typa* Winchell & Schuchert, 1895

**討論:** 本属的主要特征是骨骼构造比較簡單而原始,体壁上无壁孔,壁刺一般不发育或极少发育,床板亦极为稀少。本属的种大多見于北美,部分产于苏联烏拉尔北部及北极区,少数見于澳大利亚。本属的地质历程限于中奥陶世。茲根据所知材料,将各地区已經描述过的种及其地质分布列述如下:

北美:

- |                                                            |   |                      |
|------------------------------------------------------------|---|----------------------|
| <i>L. globularis</i> Bassler                               | } | 中奥陶世 (Trenton 期)     |
| <i>L. grandis</i> Bassler                                  |   |                      |
| <i>L. minor</i> Ulrich 中奥陶世 (Black river-Trenton 期)        |   |                      |
| <i>L. typa</i> Winchell & Schuchert                        | } | 中奥陶世 (Black river 期) |
| <i>L. cobocouensis</i> Okulitch                            |   |                      |
| <i>L. carterensis</i> (Safford) 中奥陶世 (Chazy-Black river 期) |   |                      |
| <i>L. prima</i> Okulitch 中奥陶世 (Chazy 期)                    |   |                      |
| <i>L. simplex</i> Bassler 早奥陶世 (Beekmantown 期)             |   |                      |

苏联烏拉尔北部及北极区:

- |                                     |   |        |
|-------------------------------------|---|--------|
| <i>L. arctica</i> Sokolov           | } | 中奥陶世晚期 |
| <i>L. markini</i> Sokolov           |   |        |
| <i>L. cf. carterensis</i> (Safford) |   |        |
| <i>L. expressa</i> Sokolov          |   |        |
| <i>L. fragilis</i> Sokolov 早—中奥陶世   |   |        |

澳大利亚:

- ?*Lichenaria* sp. Hill 新南威尔士,中或晚奥陶世?  
*L. ramosa* Hill 塔斯曼尼亚,中奥陶世

由以上資料可以看到, *Lichenaria* 是一个古老而原始的床板珊瑚,与蜂巢珊瑚的差別很大。*Lichenaria* 属在中国其他地区尙无正式报导。

### 里享珊瑚 sp. *Lichenaria* sp.

1935, *Favosites* sp. 計榮森, 中国地质学会志, 14 卷, 1 期, 48 页, 图版 1, 图 2a—c。

块状群体珊瑚, 由角柱状个体组成, 横面呈五边形或六边形, 体径自 0.8 至 1.0 毫米。相邻个体紧相衔接, 群体中下段内的个体微向一方扭曲。体壁较直, 局部稍增厚。无壁刺及壁孔。床板极少, 在切面内不易辨认。

**讨论:** 上列描述基本摘自计氏原文。古浪标本的主要特征, 是各部骨骼构造十分简单, 个体内不发育任何联接构造, 这就不可能将其归入 *Favosites* 属, 后者以发育壁孔为其主要特征; 再者, 当前标本的个体内不发育壁刺, 床板极为稀少几乎不发育, 而 *Favosites* 属的床板是十分发达的, 壁刺可以在某些种内不存在, 但一般还是比较发育。从总的特征来看, 当前的标本, 无疑地应归属于 *Lichenaria*。由于标本保存状况不佳, 内部构造不够清楚, 目前尚无法确定种名, 也难以与其他已知的各个种进行比较。

**产地及层位:** 甘肃古浪石城子, 奥陶系。

### 隐里享珊瑚科 Family *Cryptolichenariidae* Sokolov, 1959

块状群体, 外形呈瘤状或半球状。个体紧邻, 呈扩散状排列, 个体横面形状包括多边形、近乎多边形或椭圆形。群体的繁殖通过隔壁状凸起的轴端汇聚而成, 通常隔壁状凸起在个体内部呈对称状成对排列。床板完整, 水平状, 无联结构造。

本科也是床板珊瑚中比较古老而且结构比较原始的一类, 目前仅知限于奥陶纪, 包含二个属: 隐里享珊瑚(*Cryptolichenaria* Sokolov, 1955)(中奥陶统下部)及阿姆塞士珊瑚(*Amsassia* Sokolov & Mironova, 1959)(上奥陶统)。

### 阿姆塞士珊瑚属 Genus *Amsassia* Sokolov & Mironova, 1959

块状群体, 外形呈瘤状或半球状, 中等大小。个体细长, 横面形状呈多边形或椭圆形; 前者个体间紧相衔接, 后者呈扩散状排列, 相邻个体间留有形状不规则的孔隙。体壁薄或局部为灰质加厚, 致密均质, 无壁孔或其他联结构造。个体内一般具隔壁状凸起 1—2 个, 由体壁内凹而成, 通常呈对称状分布, 其中之一稍长于另一个。通过隔壁状凸起的轴端汇聚而产生新的个体。床板完整, 水平状, 极少。

**属型:** *Amsassia raduguini* Mironova, 1959

**讨论:** 本属的主要特点是群体营分裂生殖, 个体内发育隔壁状凸起, 床板稀疏, 无任何联结构造。在某些形态上本属与刺毛类(*Chaetetid*)有些接近, 但是, 本属的体壁属隐晶质型非由羽楯构成; 本属与里享珊瑚不同之处, 在于后者具有真正的隔壁组织, 群体营中间分芽型繁殖。本属与 *Cryptolichenaria* 及四珊瑚(*Tetradium*)等, 就群体繁殖方式而言均为分裂生殖型, 三者是比较接近的; 但是, *Tetradium* 的个体具有 4 个隔壁凸起, 母体被分裂成 4 个部分, 而本属仅有 2 个; 又 *Cryptolichenaria* 虽然亦具有 2 个隔壁凸起, 但幼体是产生于母体的角棱上, 与本属的母体被均分为二的情况有所不同。

本属目前已知的种如下:

1. *A. raduguini* Mironova
2. *A. princeps* Mironova

3. *A. chaetetoidea* Sokolov
4. *A. amsasi* (Radugini)
5. *A. soluta* Yu.
6. *A. abnormis* Yu.

上列 1—4 各种分别产于苏联西伯利亚西部及哈萨克斯坦北部的上奥陶统内,层位稳定,数量较多,是标准化石。5—6 二种是笔者最近研究祁连山早古生代珊瑚化石的过程中创立的新种,化石产地位于甘肃玉门西骧脏沟,层位及时代不够清楚,同层共生的有另一种珊瑚 *Billingsaria? gansuensis* (Yu)。根据这二属珊瑚来看,含化石层似属奥陶系。但是,在骧脏沟其他化石层内采到的珊瑚均属中志留世,而且北祁连山西段,过去从未在奥陶纪地层内采到过珊瑚化石。因此这二种似乎也有可能产于中志留纪地层,值得今后注意。

**时代及分布:** 晚奥陶世—志留纪(?); 中国、苏联。

### 阿姆塞士珊瑚 cf. 拟刺毛虫种 *Amsassia* cf. *chaetetoidea* Sokolov

1935, *Pachypora* sp., 计荣森, 中国地质学会志, 14 卷, 1 期, 48 页, 图版 1, 图 1a—c。

群体外形不明, 个体呈扩散状排列, 横面多边形。体壁稍加厚, 内腔略呈浑圆形, 个体间排列比较紧密, 相邻个体的体壁几近衔接, 在纵切面内, 部分个体间又留有一定的间隔。个体的体径为 1.0—1.6 毫米。隔壁状凸起不明显。床板稀少, 微下凹。

**讨论:** 古浪的标本虽然稍经变质, 但珊瑚体的性状特征尚可辨认。需要指出的是, 过去 (1937 年以前) 许多古生物学家定为 *Pachypora* 的珊瑚, 现在均已改为 *Thamnopora*。其主要特征是发育枝状群体, 个体内发育壁孔, 盂部与群体表面垂直相交, 体壁由枝体的轴部向外逐渐增厚。真正的 *Pachypora*, 仅产于哥特兰德 (Gotland) 的志留系内, 目前在其他地区尚未见到; 与 *Thamnopora* 不同之处, 在于个体的体壁全部为层状灰质层所加厚, 个体的盂部与群体表面斜交。

当前的标本, 个体呈扩散状排列, 群体不属枝状类型, 个体内不发育任何壁孔构造, 个体的体壁虽然稍微厚些, 但绝无灰质增厚现象, 显然, 其结构是比较原始的, 与 *Thamnopora* 或 *Pachypora* 等属毫无共同之处。根据总的特征来看, 计氏定为 *Pachypora* sp. 的这块标本应当归入 *Amsassia*, 与苏联的 *A. chaetetoidea* 种比较接近 (见 Б. С. Соколов 与 Н. В. Миронова, 1959, стр. 1152—1153, рис. 4a—б)。二者的个体形状相似, 体径大小相若, 且体壁均较厚。但是, 古浪的标本保存不够完好, 原文描述中还缺乏一些必要的数字。因此, 尚无法确切地定为苏联的种, 只能在种名之前加以“cf.”的符号, 表示近似的意义。

**产地及层位:** 甘肃古浪石峡, 奥陶系。

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## ON THE CORALS FROM THE “NANSHAN SERIES”, WITH REFERENCE TO THE AGE OF THE “GULANG LIMESTONE”

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### (Summary)

More than twenty years ago, T. F. Hou and C. C. Sun collected two Tabulate coral specimens from the “Nanshan Series” in the Gulang district, Western Gansu. The specimens were described by Y. S. Chi in 1935. He arrived at the following conclusion: “These two coral specimens are highly metamorphosed and very poorly preserved, the sections of their internal structures are not so conspicuous, hence the specific and even generic identification is a matter of uncertainty. But from the general size, structure and arrangement of the corallites of these two aseptate (tabulate) corals, we may compare them with the well known and wide-distributed forms. They are determined as *Favosites* sp. and *Pachypora* sp. of the family Favositidae. It is evident that they belong to neither *Michelinia* nor *Syringopora* and *Chaetetes* of Permo-Carboniferous age. Although the definite specific names can't be determined by using these poor specimens, yet it may probably refer the rock to Pre-Dinantian, and perhaps to the Devonian.”

The name “Gulang Series” was instituted by C. C. Sun in 1936 for a vast metamorphic rocks, consisting mainly of graywakes and phyllites, with intercalation of siliceous limestone bed at the upper part. The fossil-bearing siliceous limestone was assigned to the Devonian by Sun, mainly based on the preliminary determination of Chi. The lower part of the “Gulang Series” was assigned by Sun to the Silurian. In 1948, S. H. Li restricted the name “Gulang Limestone” to the upper coral-bearing bed in the “Nanshan Series” in his important paper dealing with the stratigraphy and orogeny of Nanshan. He referred it to the Devonian.

During the course of field prospecting in recent years in the Qilianshan area, we have collected many fossils in different localities which show a close relationship to the Ordovician and Silurian forms. No typical Devonian fossils have been found. In a recent paper dealing with the “Nanshan Series” and “Kaolan Series” of eastern Qilianshan, S. H. Sung stated that several fossils of Brachiopoda, Cephalopoda, and stems of Crinoid collected from the “Gulang limestone” were considered to be Ordovician in age. Recently the writer has received also a number of fossil corals

from the "Gulang limestone" in the Gulang district. These fossils mainly are Ordovician forms, namely, *Streptelasma*, *Brachyphyllum*, *Favistella*, etc. It is therefore doubtful whether the two coral fossils assigned by Chi to the Devonian really belong to that age. A close examination of Chi's original description and illustration leads the writer to believe that the specimens described by him as *Favosites* sp. and *Pachypora* sp. may more correctly be determined as *Lichenaria* sp. and *Amsassia* cf. *chaetetoidea* Sokolov, respectively. These tabulate coral genera are hitherto mainly known in the Ordovician, and are distinguished morphologically by their more primitive structures. From what has been stated above, it is evident that the "Gulang limestone" of the Qilianshan area is Ordovician in age.

The writer wishes to express his sincere thanks to Prof. H. C. Sze for critical reading of the manuscript.

## REDESCRIPTION OF SPECIES

### Subclass Tabulata

#### Series Tabulata Communicata

#### Order Lichenariacea Sokolov, 1950 emend. Sokolov, 1955

#### Family Lichenariidae Okulitch, 1936 emend. Sokolov, 1950

#### Genus *Lichenaria* Winchell & Schuchert, 1895

#### *Lichenaria* sp.

1935, *Favosites* sp., Chi, Bull. Geol. Soc. China, Vol. 14, No. 1, p. 48, Pl. I, figs. 2a—c.

Corallum massive, composed of prismatic corallites, compactly contacted and slightly contorted at the lower middle part. Corallites mostly pentagonal or hexagonal in shape, ranging from 0.8—1.0 mm in average. Wall straight, partly dilated. Septal spine and mural pores invisible. Tabulae rare, imperfectly preserved.

**Remarks:** This specimen originally referred to *Favosites* sp. by Chi belongs evidently to the genus *Lichenaria* in view of the absence of mural pores and the weak development of tabulae and septal spines. It is difficult to determine specifically due to the poor preservation.

*Lichenaria* is a primitive genus of Tabulate coral known in the Middle Ordovician of U.S.S.R. and North America and in the Ordovician of Australia.

**Locality and Horizon:** Shichengzi, Gulang district; Ordovician.

#### Family Cryptolichenariidae Sokolov, 1959

#### Genus *Amsassia* Sokolov & Mironova, 1959

#### *Amsassia* cf. *chaetetoidea* Sokolov

1935 *Pachypora* sp., Chi, Bull. Geol. Soc. China, Vol. 14, No. 1, p. 48, Pl. I, figs. 1a—f.

The external form of corallum is unknown. The corallites are closely packed and almost diverging radially from the base. They are polygonal in shape, ranging from about 1.0—1.6 mm in diameter, and are separated from one another by rather closed space of irregular shape as shown both on the transversal and longitudinal sections. The wall of corallites is more dilated, causing the internal chamber of corallites more rounded in outline. The "septal-like projection" is not precisely visible. The tabulae are rare and are slightly down-curved at their middle part.

**Remarks:** It seems to the present writer that, judging from the original illustrations, the specimen described by Chi as *Pachypora* sp. may well belong to the genus *Amsassia*, strongly recalling the Soviet species *A. chaetoides*, in regard to its general shape, its average diameter of the corallites and its slightly dilated wall of corallites. (See Б. С. Соколов и Н. В. Миронова 1959, ДАН СССР, т. 129, No. 5, стр. 1152—1153, рис. 4а—б.) The material is, however, insufficient for a definite specific determination.

The genus *Amsassia* is an index coral of the Upper Ordovician in North Kazakhstan and Western Siberia, U.S.S.R. Two new species of this genus has recently been reported by the present writer from the Yumen district, western Gansu. The age of the horizon of the Yumen district has not yet been definitely settled; it may belong to the Ordovician or to the Silurian.

**Locality and Horizon:** Shixia, Gulang district, Ordovician.