

## SOME SILURIAN CORALS FROM THE VICINITY OF BEIYIN OBO, INNER MONGOLIA

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The material dealt with in this paper was collected in 1955 by Mr. L. H. Wong and others of 241. Party of the Geological Bureau of North China, Ministry of Geology, at a locality about 20 km north-east of Beiyin Obo, Inner Mongolia. According to the collectors' field observation, all the corals occur in a limestone imbedded in a red sandstone series, striking east to west and dipping to north. The thickness of the red sandstone series is unknown, it is overlain by the Upper Carboniferous *Triticites* bed. The coral-horizon is estimated at about 2,500 meters below the *Triticites* bed. No detailed stratigraphical data are available. The corals described here comprise the following species:

*Entelophyllum* aff. *yassense* (Etheridge)

*Entelophyllum* sp.

*Amplexoides* sp.

*Pycnostylus* sp.

*Favosites gothlandicus* Lamark

*Syringopora* cf. *bifurcata* Lonsdale

*Heliolites interstinctus* (Linnaeus)

The genus *Entelophyllum* Wedekind has been hitherto known in the Niagaran of N. America, and in the Wenlock or Ludlow of Europe and Australia. The species *Entelophyllum yassense* (Etheridge) has been recorded in the Middle and Upper Silurian of Australia. In the character of the septa, our species *Entelophyllum* aff. *yassense* is closely related to the holotype *Entelophyllum yassense* (Etheridge); it resembles *Nanshanophyllum* Yü from the Silurian Chuannaukou series of the Chiu-chuan basin, Kansu Province too. The species *Favosites gothlandicus* Lamark is world-widely distributed, it occurs in the Upper and Middle Silurian of N. America, Great Britain, Gotland, Australia, North-west Korea and Mongolia. In China, it occurs commonly in the Lojoping series of Szechuan and Hupeh Provinces and also in the Malung series of Eastern Yunnan. *Heliolites interstinctus* (Linnaeus) has been known in the Wenlock to the Ludlow of England and Bohemia, in the Silurian of Arctic Russia and Australia, in the Niagaran of America, in the Upper Silurian of Mongolia and in the Devonian of Carnic Alps. In China, this species is very common in the Silurian Lojoping series of Szechuan. In 1947, Prof. C. C. Yü reported a specimen of this species from the probably Middle Devonian bed at Nantan of Kwangsi province. The other species described in the present paper such as *Syringopora* cf. *bifurcata* Lonsdale and *Amplexoides* sp. have also been discovered in China. The former occurs in association with *Favosites gothlandicus* Lamark in the Malung series of Yunnan, and the latter is a common fossil in the Lojoping series of Szechuan. Thus, the coral-bearing limestone of Beiyin Obo, Inner

Mongolia belongs either to the Middle or to the Upper Silurian. Most probably, it belongs to the Middle Silurian age. Since no information of the Silurian fossils in Beiyin Obo region have been hitherto known, a brief description of these corals seems desirable.

#### DESCRIPTION OF SPECIES

### Order Tetraseptata Grabau, 1922

### Family Kyphophyllidae, Wdkd., 1927

### Genus *Entelophyllum* Wedekind, 1927

### *Entelophyllum* aff. *yassense* (Etheridge)

(Pl. I, fig. 1)

1892. *Heliophyllum yassense* Etheridge, Rec. Geol. Surv. N. S. W., XI, p. 170, pl. XI, figs. 1—3.  
 1936. *Xylodes yassense* (Eth.), Jone, Mem. Queensl. Mus., vol. XI, p. 56, pl. VII, figs. 3, 4, 5.  
 1940. *Entelophyllum yassense* (Eth.), Hill, Pro. Linn., Soc. N. S. W. p. 412, pl. XIII, figs. 11, 12.

The present form is only represented by a part of the corallum, which is available for making only one transverse section, measuring 20 mm in diameter. The calyx is unknown. The external form seems to be a curved trochoid.

Septa numerous, thin alternated major and minor. The major ones are very long extending almost to the axis but leaving there a space about 2 mm in diameter with 48 in number. Minor septa short, unequal in length, with  $1/3$ — $1/2$  as long as major ones. Carinae well developed, original from a zig-zagging of the septa from which elbows arise. Secondary tissue absent. Dissepiments small and frequently herringbone shaped, forming a narrow area.

Remarks: In the character of septa and in the absence of secondary tissue, our specimen is closely allied to *E. yassense* (Eth.), but the nature of increase and tabulae are unknown. It differs slightly from the typical specimen of this species in the well developed carinae. It resembles also *E. pseudodianthus* (Weissermel), a subgenotype of *Stereoxylodes* Wang in the pronounced carinae, but differs from the latter in the absence of the more dilated septa forming a stereozone in the peripheral area. With respect to the character of the septa, the present form can be compared with *Nanshanophyllum typicum* Yü from the Channoukou series of Chiu-chuan basin, Kansu, but the septa of the latter species are more dilated as a whole. We may consider that the present form can be regarded as a transitional form between *E. yassense* (Etheridge) and *Stereoxylodes pseudodianthus* (Weissermel). The writer prefers to follow the safer course and describes the specimen as *E. aff. yassense*. It is highly possible that it may represent a new variety of the species.

### *Entelophyllum* sp.

(Pl. I, fig. 2)

The present form is represented by a small broken specimen, which is only available for making a portion of transverse section.

The diameter of section is about 20 mm. Septa numerous, thin, extending to the centre. Carinae well developed, being lateral outgrowth from the zig-zagged septa, irregularly arranged on either side of the septa.

The character of dissepiments and tabulae is not preserved, but the presence of the well developed carinate septa is sufficient to refer this form to the genus.

**Family Zaphrentidae Edwards et Haime, 1851**

**Genus *Pycnostylus* Whiteaves, 1884**

***Pycnostylus* sp.**

(Pl. I, figs. 6, 7)

The corallum is compound. Corallites cylindrical, oval in section, about 6.5 mm in diameter. The epitheca shows fine growth annulation and very faintly longitudinal striations. Septa are very short to form spines and are frequently obscure. The tabulae are complete, slightly convex, 4—6 in a space of 5 mm.

Remarks: the present form is represented by a recrystallized specimen, thus the septa are not well preserved. Precise comparison of it with other known species of this genus can not be made.

The generic relation of *Pycnostylus* and *Fletcheria* has been discussed by many authors. Lang and Smith tend to consider *Pycnostylus* as a synonym of *Fletcheria*, but Soshkina and Hill think that *Pycnostylus* is an independent genus. The writer agrees with Soshkina and Hill and considers that the present form is better referred to *Pycnostylus* than to the other genera according to the structure of epitheca.

**Genus *Amplexoides* Wang, 1947**

***Amplexoides* sp.**

(Pl. I, fig. 5)

This present form is known by a fragmentary specimen, which is only available for making one transverse section.

Corallum simple, elliptical in section which seems to be compressed, with 13 mm in larger diameter. Only major septa are present, with 29 in numbering; they extend toward the centre, but never reach it leaving there a wide space. All the septa are thickened, tapering at their ends, but never form a peripheral zone as in *Zelophyllum*. Dissepiments absent.

**Subclass Tabulata**

**Order Favositicea Wdkd., 1937, emend. Sokolov, 1950**

**Suborder Favositina Sokolov, 1950**

**Family Favositidae Dana, 1846 emend. E. & H., 1850, emend. Sokolov, 1950**

**Genus *Favosites* Lamark, 1816**

***Favosites gothlandicus* Lamark**

(Pl. I, figs. 3,4)

1816. *F. gothlandicus* Lamark, *Historire naturelle des animaux sans Vartbres*, vol. II, p. 206.

1855. *F. gothlandica* Edwards et Haime, *British fossil corals*, p. 256, pl. LX, figs. 1, 1a.

1879. *F. gothlandica* Nichololson, Tabulate corals, p. 46, pl. I, figs. 1, 1a.  
 1915. *F. gothlandicus* Yabe and Hayasaka, Palaeozoic corals from Japan, Korea and China, p. 66.  
 1920. *F. gothlandicus* Yabe and Hayasaka, Palaeontology of Southern China, p. 85, pl. IX, fig. 6.  
 1926. *F. cf. gothlandica* Grabau, Silurian fauna of Eastern Yunnan, p. 21, pl. I, figs. 1a, b; 2a, b.  
 1934. *F. cf. gothlandicus* Ozaki, Gotlandian deposits of Northwest Korea, p. 69, pl. XII, figs. 1—6.

Corallum massive, probably also hemispherical. Corallites contiguous, prismatic, four- to six-sided, but with the six-sided ones predominating in number. The corallites frequently preserved a fairly uniform diameter, but this is by no means invariably the case. The diameter ranges from 2.8 to 5 mm. The walls are rather thin (about 0.13 mm). Mural pores are not present, as a result of recrystallization. Septa are represented by a few feeble spines. Tabulae complete, thin, usually horizontal, but may be slightly convex, 4—6 in a space of 5 mm.

Remarks: The main character of the species, as redefined by Jone, is the thin wall and the very few or absence of septa. Based on this character, our specimen is better referred to this species than to any others, although it differs from many specimens of this species from different localities described by many authors in having larger diameter. It closely resembles *F. favosiformis* Sokolov from Llandovery of Russia, which is characterized by having larger diameter and rarer tabulae, but differs from the latter in rather denser and convex tabulae. In the diameter of corallites and convex tabulae, our form can be compared with *F. favosus* (Goldfuss) from the Niagaran of N. American, but in the latter form, the septa are absent, and the tabulae are denser.

### Order Syringoporacea Sokolov, 1947

#### Family Syringoporidae Fromentel, 1861, emend. Sokolov, 1950

#### Genus *Syringopora* Goldfuss, 1826

#### *Syringopora cf. bifurcata* Lonsdale

(Pl. I, figs. 8,9)

1839. *S. bifurcata* Lonsdale, In Murchison, Silur. Syst., p. 685, pl. XV, fig. 11.  
 1854. *S. bifurcata* Edwards et Haime, British fossil corals, p. 271, pl. LXIV, figs. 3, 3a, 3b.  
 1926. *S. bifurcata* Grabau, Palaeont Sinica, ser. B, vol. III, Fasc. II, p. 25, pl. I, figs. 8, 9; pl. II, figs. 1a, b.  
 1934. *S. bifurcata* Ozaki, The Journal of the Shangsi science Institute, ser. II. vol. I, p. 75, pl. XV, figs. 8—10.  
 1937. *S. bifurcata* Tchernychev, Труды Монгольский Комиссии АН СССР, № 3, вып. 6, p. 16.  
 1956. *S. cf. bifurcata* Tsin, Acta Palaeont. Sinica, vol. 4, No. 4, p. 628, pl. II, fig. 2.

Corallum is composite consisting of many parallel, cylindrical corallites. Their vesceral chamber communicate directly by means of a few connecting process. Their diameters vary from 0.8 mm to 1.2 mm, but are generally uniform in size. Epithelial wall is thick (about 0.25 mm). Separating space varies from 1.5 mm to 3 mm. Infundibuli are very delicate, and concentrical. In longitudinal section, the infundibuli may be seen to bend downward.

Remarks: The present form slightly differs from the other described specimens of the species. Its tubes are on the average somewhat smaller than specimens of the species from British, Korea and Mongolia. It is rather larger than *S. cf. bifurcata* from the Malung Limestone of Yilung, Malung district, E. Yunnan.

### Heliolitida Lindstrom

#### Family Heliolitidae Lindstrom, 1873

#### Genus *Heliolites* Dana, 1846

#### *Heliolites interstinctus* (Linnaeus)

(Pl. I, figs. 10,11,12)

1767. *Madreporites interstinctus* Linnaeus, Syst. Nat., ed. 12, p. 1726.

1850—1854. *H. interstinctus* Edwards et Haime, British fossil corals, p. 249, pl. LVII, figs. 9, 9a—d.

1883. *H. interstinctus* Lindstrom, In Richthofens China, Band IV, p. 54, pl. V, fig. 7.

1899. *H. interstinctus* Lindstrom, K. Sv. Vet.-Akad. Handl. Bd. 32, No. 1, p. 41, pl. I, figs. 1—36, pl. II, figs. 1, 2.

1940. *H. interstinctus* Hill, Pro. Roy. Soc. Queensland, vol. LI, No. 12, p. 203, pl. IX, fig. 2.

1947. *H. interstinctus* Yü, Bull. Geol. Soc. China, vol. XXVII, p. 131, pl. I, figs. 3a, b.

The corallum is hemispherical and slightly crystalline. The tubularia are 1.1 mm to 0.9 mm in diameter, commonly 1 mm, with spaces varying from 1.43 to 0.27 mm between the tubularia. The walls of tubularia are thicker than those of tubuli, being 0.05 mm in thickness. The septa are not frequently present, only in some cases they are represented by septal spines. It is probably due to recrystallization. The tabulae are usually horizontal, about 6 in a space of 3 mm. The tubuli are polygonal in section, usually 5—6 sided and nearly equal in size, measuring about 0.33—0.27 mm in diameter. The sola are horizontal, slightly convex, about 14 in a space of 3 mm.

Remarks: The interior of tubularia assumes a fluted appearance with spines, which is the main character of *H. interstinctus*. Although our form is represented by a slightly crystalline specimen, the presence of wrinkled septa in some individual and other character indicate that it undoubtedly belongs to this species.

It differs from the specimen described by Yü from the probably Middle Devonien of Nantan, Kwangsi, in having smaller tubularia, shorter septa and denser sola. In 1937, Tschernychev described *H. exgr. interstinctus* from Tuva in which the septa are long, extending almost to the axis, and the tabulae are very irregular. These characteristic features are not met. with in the present form.