

PERMIAN CORALS FROM CHITRAL (NW - PAKISTAN)

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Riassunto. Nel presente lavoro sono descritte alcune specie di Rugosa e di Tabulata provenienti dal Permiano della regione del Baroghil, Chitral, NW Pakistan. Si tratta di *Pseudobuanguia chitralica*, *Yatsengia hanchowensis*, ? *Protomichelinia multitalbulata multitalbulata*, *Protomichelinia guizhouensis flexuosa*, *Protomichelinia siyangensis* and *Sinopora* ? cf. *syrinx*. Esse provengono da livelli diversi, dal Sakmariano all'Artinskiano, o forse anche più recenti.

Abstract. The present paper describes the species *Pseudobuanguia chitralica*, *Yatsengia hanchowensis*, ? *Protomichelinia multitalbulata multitalbulata*, *Protomichelinia guizhouensis flexuosa*, *Protomichelinia siyangensis* and *Sinopora* ? cf. *syrinx* from the Baroghil region of NW Pakistan. The fauna originates from different levels, from the Sakmarian to the Artinskian, or even a more younger.

Introduction.

In 1925 Reed described the first Permian corals from Chitral from a collection sampled by Hayden in 1914 (Hayden, 1915). The material came from a section north of the Yahrkun river, N of Baroghil Ailak and from moraine blocks around Baroghil Ailak. The fauna consisted of:

Lonsdaleia indica Waagen & Wentzel, 1886
(=*Pseudobuanguia chitralica* n. sp. in Smith, 1935);

Lonsdaleia (?) *salinaria* Waagen & Wentzel, 1886;

* *Orionastraea* cf. *philipsii* (McCoy, 1849);

* *Michelinia Mansuyi* n. sp. (= *Protomichelinia multitalbulata* Yabe & Hayasaka, 1915);

* *Pachypora* ? sp.

(Forms with * mark were only described, but not illustrated).

Reed assumed an Upper Carboniferous or Permian age. In a subsequent discussion, Bassler (1950) preferred a Permian age.

The present coral fauna was collected from the Permian rocks of the Baroghil pass area during the 1992 expedition, led by M. Gaetani, within the CEE project "Geology of Karakorum Range". Several stratigraphic sections have been measured by M. Gaetani, A. Nicora

and L. Angiolini. Corals were obtained from sections Baroghil E and Lashkargaz (Fig. 1). The present paper deals with the taxonomy and biogeography of the corals from the Lashkargaz Fm. and should be read in conjunction with the more general paper on the Permian of Karakorum (Gaetani et al., 1995).

Geological setting (M. Gaetani).

The Permian succession of the Baroghil area may be subdivided into four units, top to bottom:

4) *Ailak Dolomite*. Cyclothemical peritidal dolomites with local anoxic intercalations. Several hundreds of m. Late Permian to ? Triassic or even Early Jurassic.

3) *Gharil Formation*. Two fining upwards cycles of siliciclastic alluvial microconglomerates and red sandstones, fining upward into ironstone at the top. Eastwards mostly intrabasinal clastics in marine environment. 20 to 80 m. Post-Kubergandian.

2) *Lashkargaz Formation*. A thick and mixed terrigenous/calcareous succession. At the base fine terrigenous, with poor carbonate intercalations (Member 1), followed by packstone/wackestone banks or layers, with some marly or dolomitized intercalations (Member 2). Several siliciclastic horizons, mixed to subordinate crinoidal packstones, form Member 3, whereas the topmost part of the unit consists of crinoidal and fusulinid packstones, with mudstone or marine intercalations, capped by dolomites in Baroghil and cherty mudstones in Lashkargaz (Member 4). Thickness varies from 600 to 1000 m. Age determined with fusulinids, conodonts and brachiopods (identifications by E. Ya. Leven, A. Nicora, and L. Angiolini, respectively). Top of Member 1 and Member 2: Sakmarian; Member 4: from Artinskian to Kubergandian.

1) *Gircha Formation*. A thick succession of fining upward decametric cycles of quartzarenites and shales. More than 500 m in thickness. Age: uncertain due to

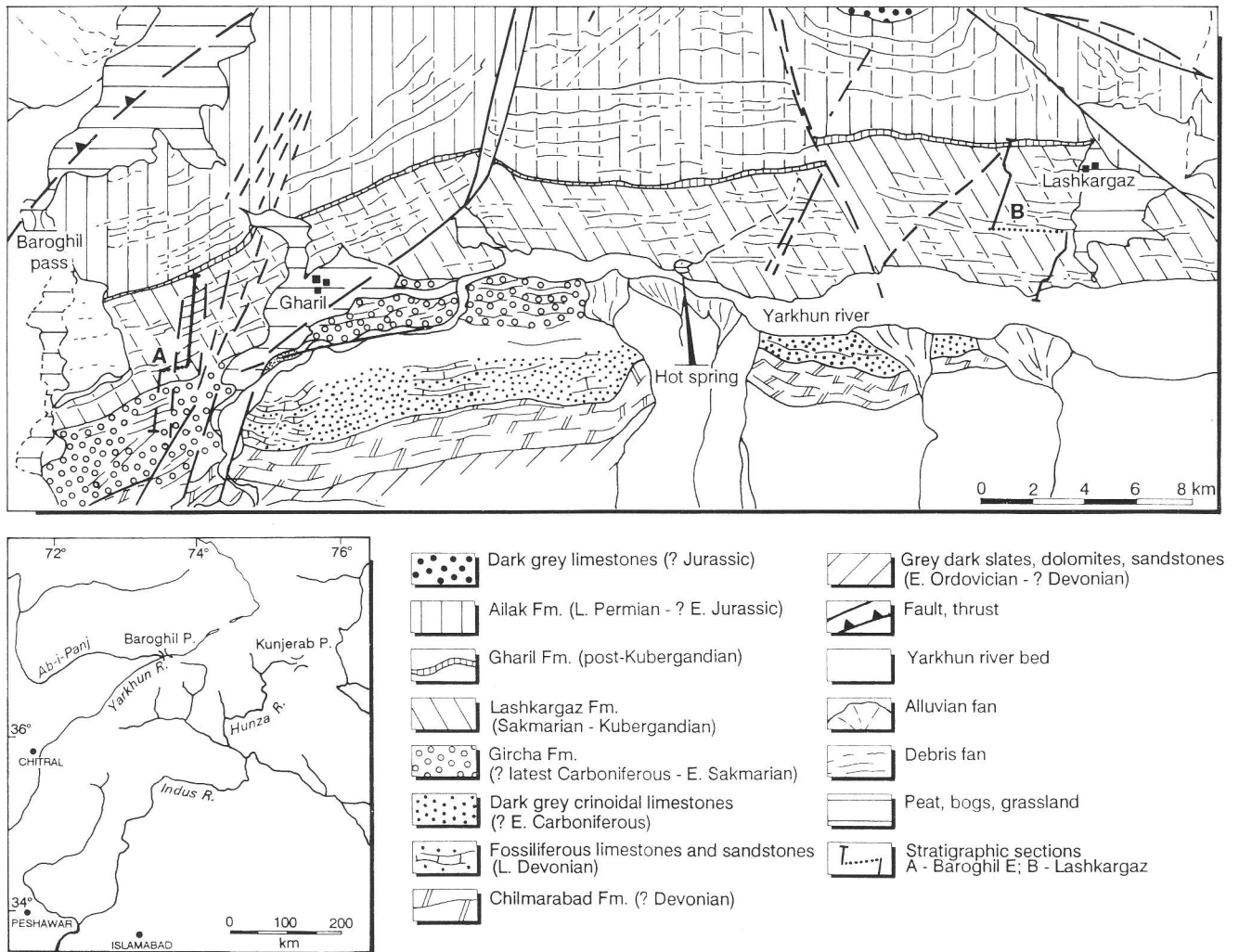


Fig. 1 - Geological map of the Baroghil area with location of the two measured sections. For further detail refer to Gaetani et al. (1995).

lack of fossils; pre-Late Sakmarian and post-Early Carboniferous by position.

The corals described here originate from Members 2, 3 and 4 of the Lashkargaz Fm. (Fig. 2). They are stored in the Museo di Paleontologia dell'Università di Milano (MPUM).

In Member 2 the following species have been collected.

Baroghil East:

? *Protomichelinia multitalbulata multitalbulata* (Yabe & Hayasaka), sample CK 89 (MPUM 7207, 7208).

Protomichelinia siyangensis (Reed), sample CK 89 (MPUM 7210).

Lashkargaz:

Yatsengia hangchowensis Huang, sample CK 315 (MPUM 7206).

Sinopora ? cf. *syrinx* (Etheridge), sample CK 315 (MPUM 7196).

In Member 3, Tabulata were collected only in the Baroghil East section:

Protomichelinia guizhouensis flexuosa Yang, sample CK 176 (MPUM 7209).

In Member 4, corals were collected only in the Baroghil E section:

Pseudohuangia chitralica (Smith), sample CK 202 (MPUM 7205) and sample CK 94 (MPUM 7204) (loose sample on the upper part of the section).

The most common "coral" genus is *Protomichelinia*. It occurs both in Member 2, 3 and 4, where it may be found in life position in specimens up to 20-30 cm high and 40 cm wide. They are fairly common and a few beds contain several specimens. Due to their weight, only a few were collected. Other Tabulate and Rugosa corals are mostly uncommon in the succession. The small branched *Sinopora* ? cf. *syrinx* was fairly abundant only at the level of sample CK 315 in Lashkargaz section.

Taxonomy

Subclass *Rugosa* Milne Edwards & Haime, 1850
Family *Waagenophyllidae* Wang, 1950

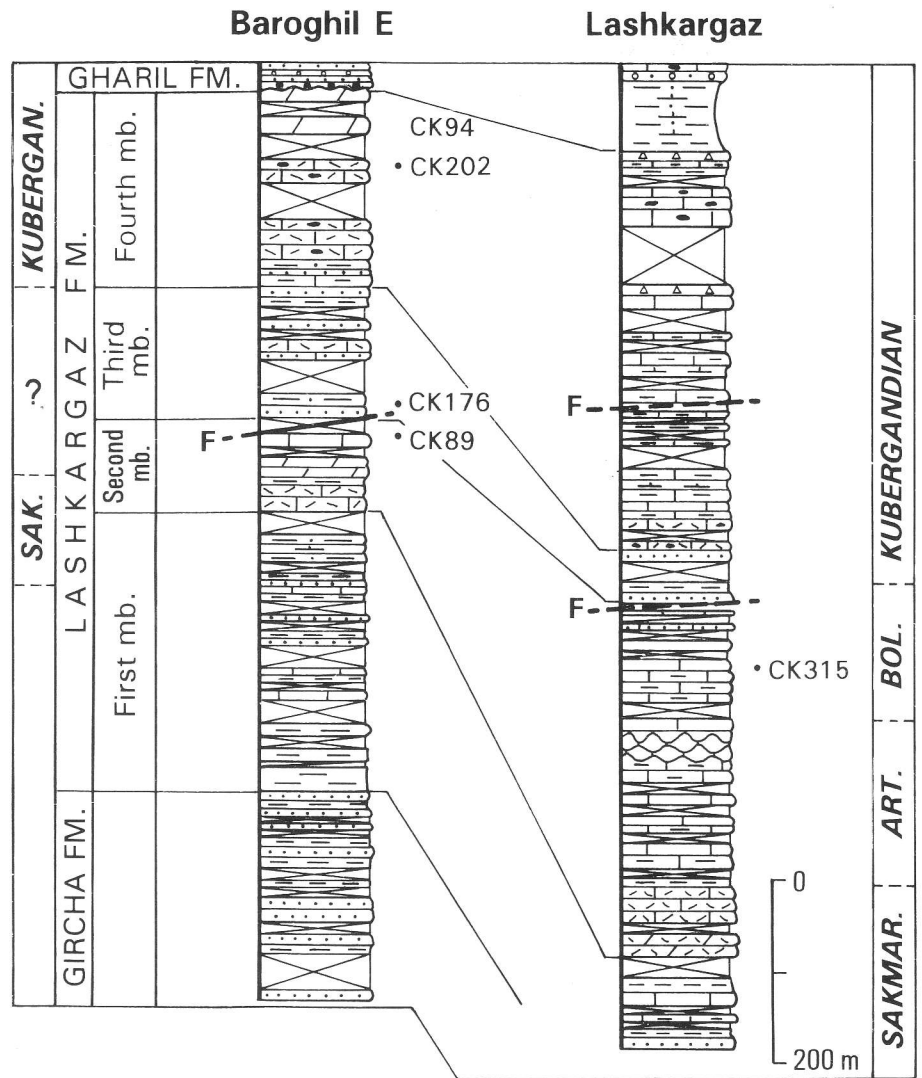


Fig. 2 - The two stratigraphic sections of the Lashkargaz Fm. where the samples here described were collected.

Subfamily *Waagenophyllinae* Wang, 1950

Genus *Pseudouangia* Minato & Kato, 1965

Type species: *Waagenophyllum chitralicum* Smith, 1935. Diagnosis: Minato & Kato, 1965, p. 89.

***Pseudouangia chitralica* (Smith, 1935)**

Fig. 3 a, b

- 1925 *Lonsdaleia indica* - Reed, p. 14, pl. 1, fig. 24-27.
- 1935 *Waagenophyllum chitralicum* Smith, p. 37, pl. 8, fig. 7.
- non 1950 *Waagenophyllum chitralicum* - Douglas, p. 11, pl. 1, fig. 2, 2 a-c.
- 1950 *Heritschia chitralica* - Bassler, p. 247.
- non 1955 *Heritschia chitralica* - Flügel, p. 307, pl. 35, fig. 11.
- 1965 *Pseudouangia chitralica* - Minato & Kato, p. 90 (partim).

Material. Two specimens, Baroghil E section, sample CK 94 (MPUM 7204) and sample CK 202 (MPUM 7205), Lashkargaz Fm., Member 4.

Description. Fasciculate corallum, cylindrical or subcylindrical corallites, closely packed with narrow interspaces; diameter 5.5-9 mm; number of septa 21-27 x 2. Minor septa attain half to two-thirds the length of

the major septa. Septa attenuate and mostly straight. An interior stereozone commonly present, septobasal columella (Schouppé & Stacul, 1961), approximately 1.5-2.5 mm in diameter. Median plate may be inconspicuous, radial plates partly twisted. Dissepimentarium 1.5 mm wide, consisting of 2-3 rows of mostly globose dissepiments, elongated dissepiments only sporadically developed. Clinotabulae and transverse tabula sparse. Columella composed of cystose, steeply inclined tabellae forming a tent-like structure.

Remarks. The differences between the specimens described here and that described by Reed (1925) and Smith (1935) from the same region are unimportant. They only show the variability of the species. The specimens described by Douglas (1950) from SW Iran and Flügel (1955) from Southern Anatolia belong to *Pseudouangia muricata* (Douglas, 1936).

Occurrence. The species has been found only in Chitral.

Family *Yatsengiidae* Hill, 1956
(emend. Flügel, 1990)

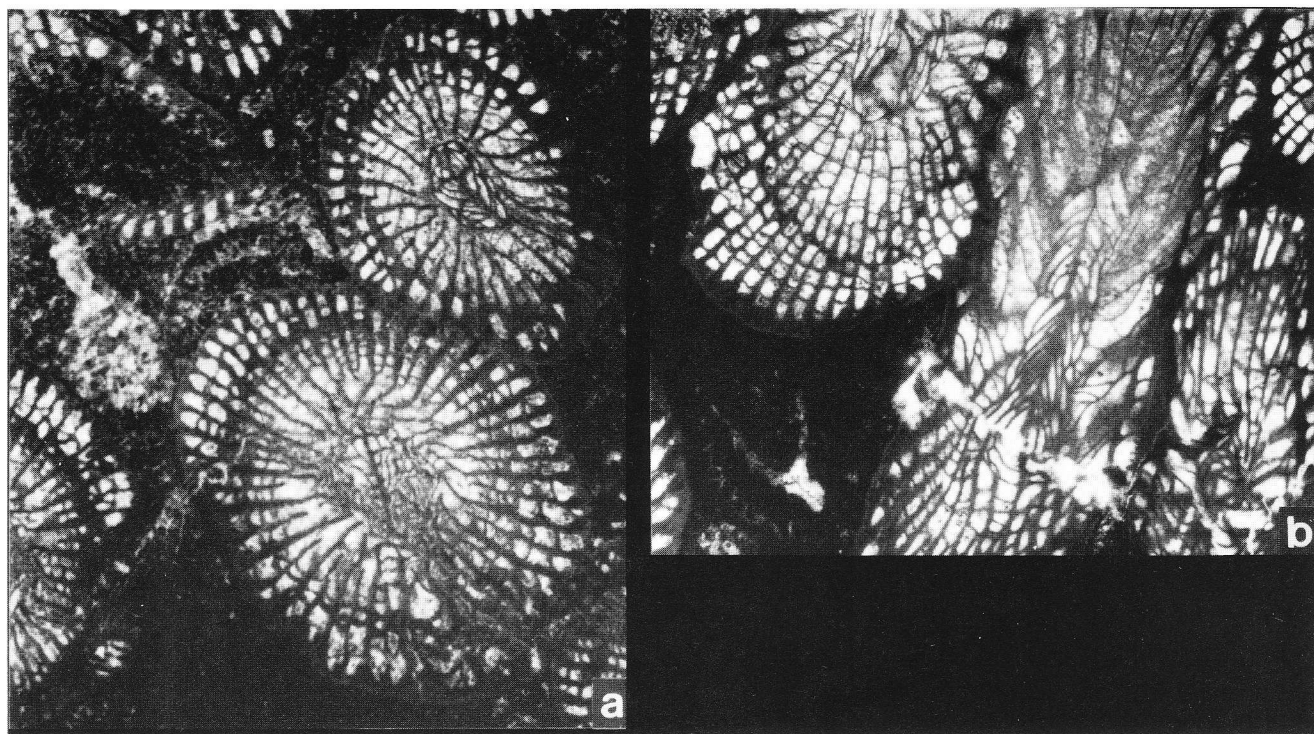


Fig. 3 - a) *Pseudobuangia chitralica* (Smith, 1935). Transversal section. (Specimen MPUM 7205, sample CK 202); x 5.5. b) *Pseudobuangia chitralica* (Smith, 1935). Longitudinal section. (Specimen MPUM 7205, sample CK 202); x 5.5.

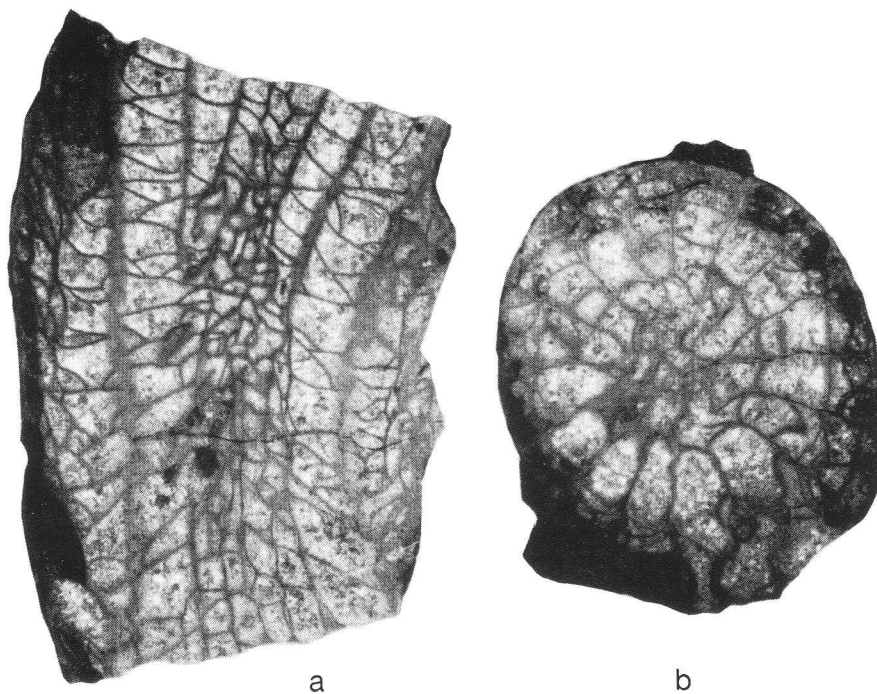


Fig. 4 - a) *Yatsengia hangchowensis* Huang, 1932. Longitudinal section. (Specimen MPUM 7206, sample CK 315); x 7.2. b) *Yatsengia hangchowensis* Huang, 1932. Transversal section. (Specimen MPUM 7206, sample CK 315); x 7.2.

Remarks. Hill (1956) erected the taxon as a subfamily of Lithostrotionidae. Flügel, 1990, p. 105, emended the position of the subfamily (sensu Hill, 1981, p. 23), moving it to the rank of family.

Genus *Yatsengia* Huang, 1932

Type species: *Waagenophyllum (Yatsengia) asiatica* Huang, 1932. Diagnosis: Hill, 1981, p. F 392.

Yatsengia hangchowensis Huang, 1932

Fig. 4 a, b

- 1932 *Yatsengia hangchowensis* Huang, p. 32, pl. 9, fig. 3a-c.
- 1964 *Yatsengia hangchowensis* - Gräf, p. 390.
- 1966 *Yatsengia hangchowensis* - Pyzhjanov, p. 238, pl. 6, fig. 4a-c.
- 1972 *Yatsengia hangchowensis* - Flügel, p. 83, pl. 3, fig. 3.
- 1981 *Yatsengia hangchowensis* - Yu, Lin & Huang, p. 27, pl. 2, fig. 3 a,b.
- 1982 *Yatsengia hangchowensis* - Wang et al., p. 149, pl. 49, fig. 4.
- 1990 *Yatsengia hangchowensis* - Flügel, p. 105, pl. 4, fig. 1,2.

Material. Lashkargaz section, sample CK 315 (MPUM 7206), Lashkargaz Fm., Member 2.

Description. Fasciculate corallum, composed of loosely aggregated cylindrical or subcylindrical corallites. Diameter of corallites 4-18 mm, major septa 13-19 in number. Septa radially arranged and attenuated. C- and K-septa shorter than other septa. Minor septa absent or short and restricted to the narrow dissepimentarium. Wall thin.

Tabularium wide. Columella loosely constructed of tabellae and septal lamellae. Diameter 1-1.5 mm. Median plate not distinct. In longitudinal sections dissepiments are small and generally arranged in 1-3 rows. Tabulae incomplete, gently ascending to the columella.

Remarks. More than 30 species of the genus are known. There are differences in the diameter, the number of septa, the diameter and structure of the columella, and the form of the septa.

	Diameter (mm)	Major Septa
<i>Y. aberrans</i> Fontaine	4 - 5	14 - 16
<i>Y. abnormis</i> Zhao	2.8 - 5.3	15 - 18
<i>Y. asiatica</i> (Huang)	3.7 - 7	14 - 15
<i>Y. cambodgiensis</i> (Mansuy)	4 - 6	14 - 16
<i>Y. crassithecata</i> Wu & Zhao	5 - 6	14 - 17
<i>Y. dayonensis</i> Xu	7.5 - 9	16 - 17
<i>Y. elegans</i> Wang	8 - 11	16 - 18
<i>Y. elituensis</i> Guo	7 - 10	17 - 20
<i>Y. fletcheri</i> Wilson (?)	12 - 15	24 - 27
<i>Y. gigantea</i> Yu & Huang	8 - 12	18
<i>Y. hangchowensis</i> Huang	3 - 8	12 - 21
<i>Y. hupeiensis</i> Yabe & Hayasaka	4 - 6	13 - 16
<i>Y. ibukiensis</i> Minato	3.5 - 7.5	13 - 20
<i>Y. kabayamensis</i> Minato	4.5 - 8.7	12 - 17
<i>Y. kenneyi</i> Wilson (?)	7.5 - 9.5	17 - 20
<i>Y. kiangsuensis kiangsuensis</i> Yoh	4.5	13
<i>Y. k. atetsuensis</i> Yamagiwa	5 - 6	14 - 16
<i>Y. mabutii</i> Minato	3.5 - 4.5	13 - 14
<i>Y. nondissepimenta</i> Yan & Chen	3.5 - 5.5	15
<i>Y. pachytheca</i> Pyzhanov	3 - 9	14 - 18
<i>Y. retiformis</i> Yu & Huang	10	19
<i>Y. scheetzi</i> Wilson (?)	7 - 11	18 - 26
<i>Y. simplex</i> Zhao & Chen	3 - 6	14
<i>Y. singularis</i> Yu & Huang	6 - 8	16
<i>Y. sisophonensis</i> Fontaine	4 - 8	16
<i>Y. stereoseptata</i> Fan	6 - 7	15
<i>Y. sugranica</i> Pyzhanov	3 - 8	10 - 18
<i>Y. tuanshanensis</i> Chan & Yan	4.5 - 5.5	14

Tab. 1 - The species of *Yatsengia* Huang, 1932. It is to be noted that *Y. fletcheri* and *Y. scheetzi* were placed by Stevens & Rycersky (1989) in their new genus *Wilsonastraea*.

The diameter of the specimen studied here is comparable to that of *Y. hangchowensis*, *Y. ibukiensis* and *Y. pachytheca*. The rudimentary development or almost complete absence of the minor septa is the main difference between the specimen studied here and the last two species. This characteristic is comparable with *Y. hangchowensis*.

Occurrence. The species is known from the Lower Permian of S China, the Pamir Mts. and East - Iran.

Subclass *Tabulata* Milne-Edwards & Haime, 1850

Family *Micheliniiidae* Waagen & Wentzel, 1886

Subfamily *Michelininiinae* Waagen & Wentzel, 1886

Genus *Protomichelinia* Yabe & Hayasaka, 1915

1915 *Michelinia* (*Michelinopora*) - Yabe & Hayasaka, p. 59.

1915 *Michelinia* (*Protomichelinia*) - Yabe & Hayasaka, p. 61.

Type species: *Michelinia* (*Protomichelinia*) *microstoma* Yabe & Hayasaka, 1915. Diagnosis: Hill, 1981, p. F 567.

Remarks. More than 30 species of this genus have been described. Most are recognized only in China and the descriptions are only in Chinese. The important characteristics for a determination are the diameter of the corallites and the number of tabulae over a length of 5 mm. Additional characteristics are the spines, pores, and the thickness of the wall. On the basis of diameter and number of tabulae four species groups can be distinguished. The species of the first group have a diameter ranging from less than one to three millimeters. Most species have more than ten tabulae in a length of 5 mm. The small diameter and the high number of tabulae (+/- 15) is similar to that in *Favosites*. The type species of *Protomichelinia* belongs to this group. The second group has a diameter of between two and five millimeters. There are rarely more than ten tabulae in 5 mm. Most species of *Protomichelinia* belong to this group. The third group reaches a diameter of between three and seven millimeters. There is a minimum of four and a maximum of nine tabulae. Only four species with a diameter of 4 to 11 mm belong the last group. Tab. 2 lists the species of these four groups:

Group 1 (diameter 0.8-3 mm, 14-15 tabulae in 5 mm)

	Diameter (mm)	Tabulae
<i>P. simplex</i> Zhao & Chen	0.8 - 2.5	10 - 12
<i>P. crassithecata</i> Zhao & Chen	0.8 - 1.7	9 - 10
<i>P. elegans</i> Lin	1.2 - 1.9	18
<i>P. variabilis</i> Yang	1.4 - 2.2	14 - 15
<i>P. favositooides</i> Girty	1.5 - 2.0	12
<i>P. denticulata</i> Yang	2.0 - 2.8	7 - 12
<i>P. microstoma microstoma</i> Yabe & Hayasaka	2.0 - 3.0	8 - 12
<i>P. m. pingebhuaensis</i> Yang	2.5 - 3.0	6 - 7
<i>P. multisepta</i> (Huang)	3.0	4 - 5

Group 2 (diameter 2-5 mm, tabulae 2-15)

<i>P. siyangensis</i> (Reed)	2.0 - 4.0	5 - 7
<i>P. guizhouensis flexuosa</i> Yang	2.0 - 3.8	7 - 10
<i>P. guizhouensis guizhouensis</i> Lin	2.4 - 3.5	5 - 7
<i>P. multitabulata m.</i> (Yabe & Hayasaka)	2.5 - 4.5	9 - 13

<i>P. mansuyi</i> (Reed)	2.5 - 4.5	12 - 15
<i>P. jiangyouensis</i> Zhao	2.5 - 4.5	6
<i>P. panxianensis</i> Yang	2.6 - 3.6	5 - 7
<i>P. siyangensis minor</i> Yang	2.8 - 3.6	7 - 8
<i>P. abichi</i> (Waagen & Wentzel)	3.5 - 5.0	2 - 3
<i>P. multitab. puanensis</i> Yang	3.0 - 4.0	5 - 8
<i>P. laosensis</i> (Mansuy)	3.0 - 4.0	5 - 6
<i>P. subabnormis</i> Zhao	3.0 - 4.0	5 - 7
<i>P. concinnaeformis</i> (Gorsky)	3.5 - 5.0	15
<i>P. subcrassitibeca</i> Zhao	3.5 - 4.5	5 - 6
<i>P. sinensis</i> Lin	3.8 - 5.0	7 - 9

Group 3 (diameter 3-7 mm, tabulae 4-9)

<i>P. grandispinosa</i> (Huang)	3.0 - 6.0	
<i>P. placenta</i> (Waagen & Wentzel)	3.0 - 7.0	
<i>P. gangiliigera</i> Zhao & Cheng	3.5 - 5.5	5 - 7
<i>P. xinbengensis</i> Lin	4.0 - 6.0	4 - 6
<i>P. longyiensis</i> Yang	5.0 - 7.0	4 - 6
<i>P. irregularis</i> Yang	6.0 - 7.0	4 - 9

Group 4 (diameter 4-11 mm, tabulae 3-9)

<i>P. globosa</i> Tschudinova	4.0 - 9.0	?
<i>P. multitab. irregularis</i> Kim	- 6.0	4 - 9
<i>P. abnormis</i> (Huang)	6.0 - 8.0	4
<i>P. dafangensis</i> Yang	8.0 - 11.0	3 - 6

Tab. 2 - Species of *Protomichelinia* Yabe & Hayasaka, 1915.

? *Protomichelinia multitabulata multitabulata*

(Yabe & Hayasaka, 1915)

Pl. 1, fig. 1,2

- 1915 *Michelina* (*Michelinipora*) *multitabulata* Yabe & Hayasaka, p. 59.
 1925 *Michelina* *Mansuyi* Reed, p. 12, pl. 1, fig. 16-21.
 1955 *Michelina* (*Protomichelinia*) *multitabulata* - Minato, p. 182, pl. 27, fig. 1,2; pl. 31, fig. 2.
 1962 *Protomichelinia multitabulata* - Lin, p. 221, pl. 1, fig. 1a, b, 3a, b.
 1981 *Protomichelinia multitabulata* - Zhao, p. 267, pl. 12, fig. 3a, b.

Material. Two specimens, Baroghil E section, sample CK 89 (MPUM 7207, 7208), Lashkargaz Fm., Member 2.

Description. The massive, conical corallum of specimen 89/3 is 130 mm in both height and diameter. The dome-shaped specimen 89/2 is 120 x 100 mm in diameter and 15 mm high. In cross section the corallites are polygonal, mostly 5- to 7- sided. The diameter of the larger corallites is 2.5-4 mm, of the smaller, mostly 3- to 4- sided, 2.0-3.0 mm. The thickness of the wall in the two specimens is different. The wall of specimen 89/3 is 0.15-0.2 mm thick, whereas the width of the wall of specimen 89/2 is 0.3-0.4 mm. The diameter of pores is 0.2-0.25 mm. The number of complete coral-

lites in 100 mm² is 7-9. Spines are absent. In longitudinal sections the tabulae are horizontal or slightly bent, mostly complete. The number in a length of 5 mm is 7-9.

Remarks. The diameter and the number of tabulae correspond to *Protomichelinia multitabulata multitabulata*; however, no spines or septal ridges, which are characteristic for *P. multitabulata*, were observed.

Occurrence. The species is known from the Lower Permian of Japan and China.

Protomichelinia guizhouensis flexuosa Yang, 1978

Pl. 1, fig. 3,4

1978 *Protomichelinia guizhouensis flexuosa* Yang, p. 194, pl. 65, fig. 2.

Material. Baroghil E section, sample CK 176 (MPUM 7209), Lashkargaz Fm., Member 3.

Description. The massive corallum consists of polygonal, mostly 5 to 7-sided corallites. The diameter of the 5-sided corallites is 2.5 x 2.0 mm, of the 7-sided, 4.0 x 3.0 mm; and of the 3-sided, 2.0 x 1.0 mm. The thickness of the wall is 0.3 to 0.5 mm. The walls have a dark middle line. The diameter of the round pores is 0.25 mm. Spines are absent. 11-13 complete corallites occur in 100 mm². In longitudinal sections 9-11 tabulae occur in a length of 5 mm. They are complete, thin, horizontal or slightly bent.

Remarks. The width of the wall of the specimen is the main difference from the species described by Yang (1978).

Occurrence. *P. guizhouensis flexuosa* Yang occurs in the Lower Permian of South China.

Protomichelinia siyangensis (Reed, 1927)

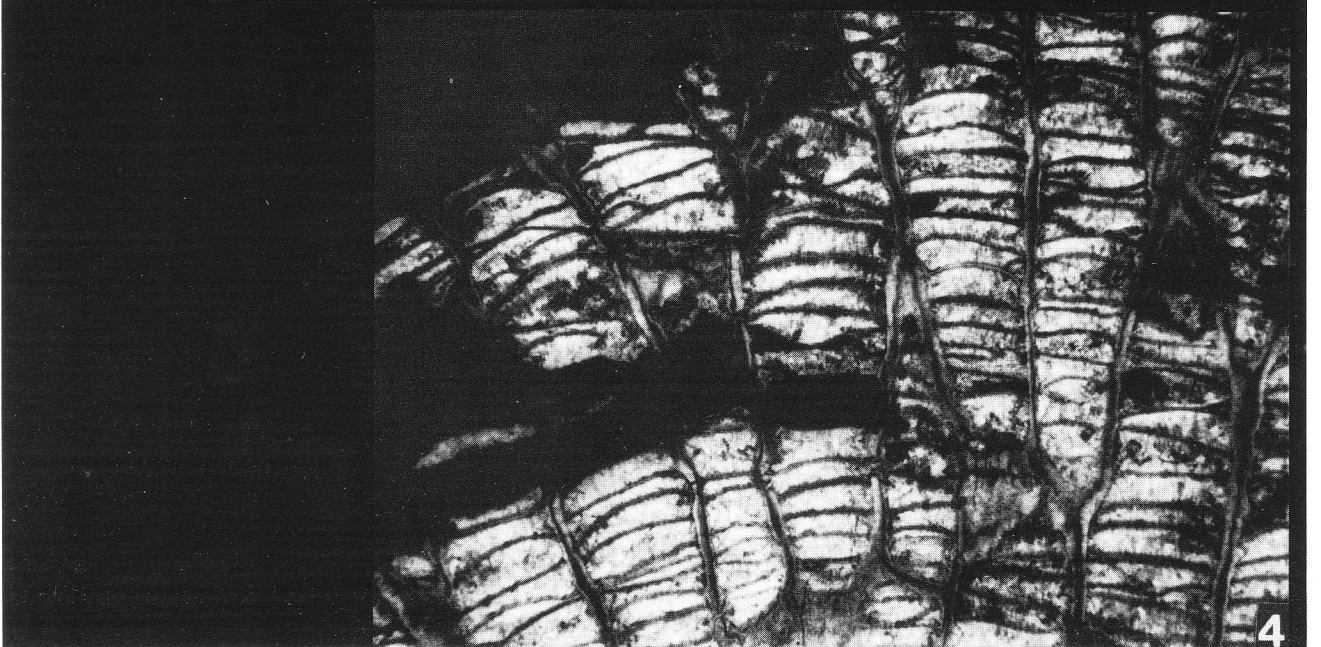
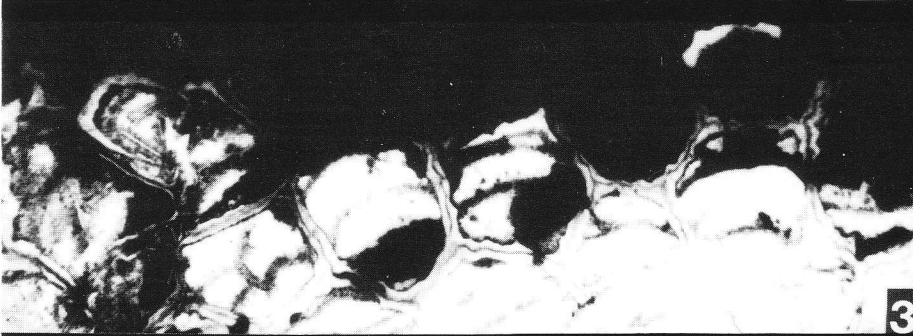
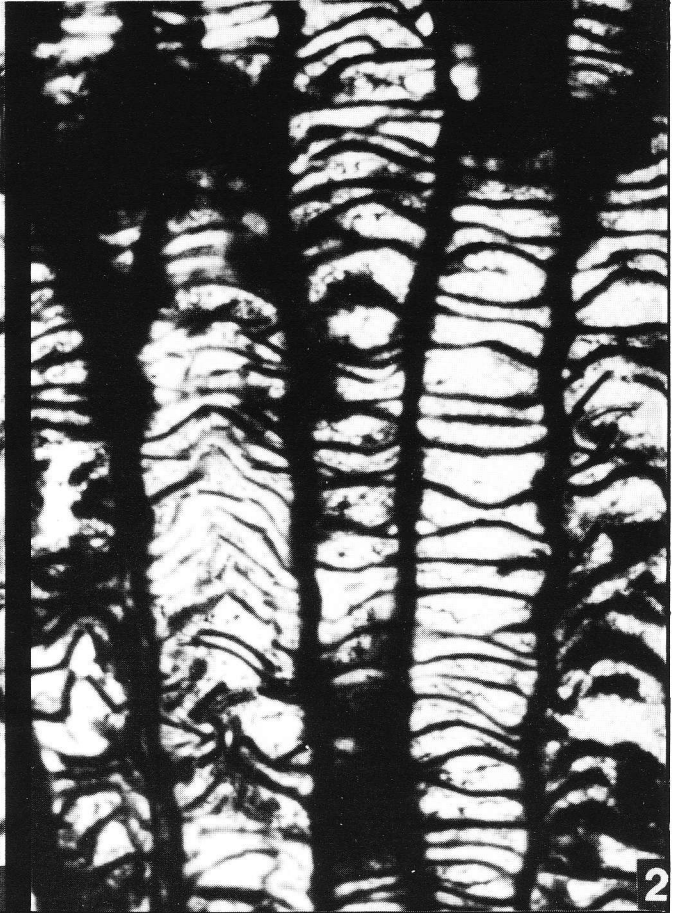
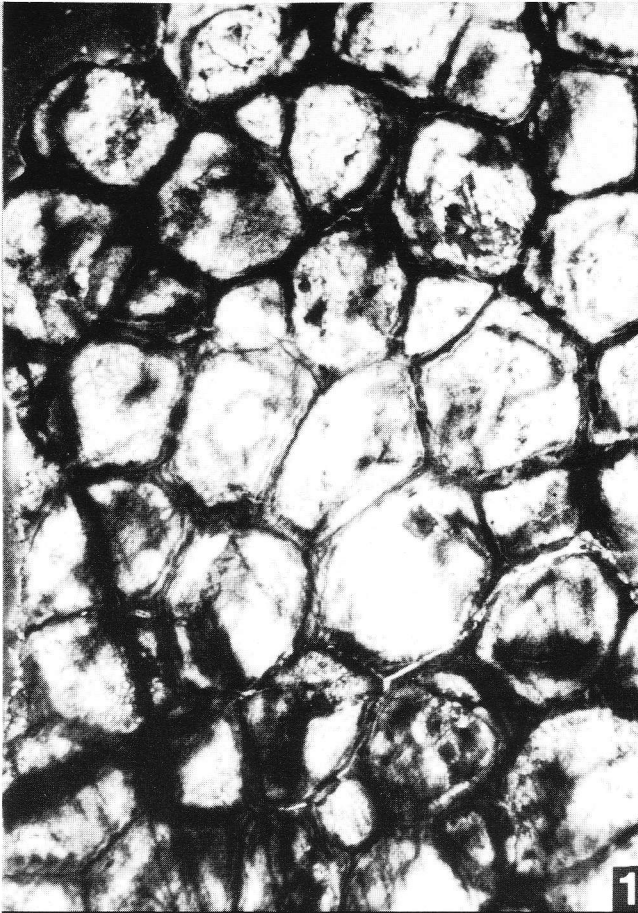
Pl. 2, fig. 1,2

- 1927 *Michelina siyangensis* Reed, p. 83, pl. 7, fig. 4,5.
 1932 *Michelina siyangensis* - Huang, p. 94, pl. 12, fig. 1-6.
 1936 *Michelina siyangensis* - Douglas, p. 26, pl. 3, fig. 10, 10a.
 1939 *Michelina siyangensis* - Heritsch, p.171, pl. 2, fig. 3.
 1962 *Protomichelinia siyangensis* - Lin, p. 210, pl. 1, fig. 2a, b; pl. 5, fig. 2a, b, 3a, b.
 1978 *Protomichelinia siyangensis* - Yang, p. 195, pl. 64, fig. 2.
 1981 *Protomichelinia siyangensis* - Zhao, p. 268, pl. 11, fig. 5a, b; pl. 12, fig. 7a, b.

Material. Baroghil E section, sample CK 89 (MPUM 7210), Lashkargaz Fm., Member 2.

PLATE 1

- Fig. 1 - ? *Protomichelinia multitabulata multitabulata* (Yabe & Hayasaka, 1915). Transversal section. (Specimen MPUM 7208, sample CK 89); x 4.4.
 Fig. 2 - ? *Protomichelinia multitabulata multitabulata* (Yabe & Hayasaka, 1915). Longitudinal section. (Specimen MPUM 7208, sample CK 89); x 4.4.
 Fig. 3 - *Protomichelinia guizhouensis flexuosa* Yang, 1978. Transversal section. (Specimen MPUM 7209, sample CK 176); x 4.4.
 Fig. 4 - *Protomichelinia guizhouensis flexuosa* Yang, 1978. Longitudinal section. (Specimen MPUM 7209, sample CK 176); x 4.4.



Description. The massive corallum has the form of a loaf of bread with a height of about 60 mm and a diameter of more than 100 mm. The polygonal corallites are 5-6-sided with a diameter of 4.0-4.5 mm, and 4-sided with a diameter of 2-3 mm. The diameter of the rounded pores is 0.25 mm and the thickness of the wall is 0.1-0.15 mm. Spines are short and scarce. The number of complete corallites in 100 mm² is 5-7. The number of tabulae in a length of 5 mm is 5-7.

Remarks. The diameter, number of septa, the sparse occurrence of spines, and the size of the pores are identical to that in *P. siyangensis*.

Occurrence. The species is known from the Lower Permian of South China, SW Iran and S Turkey (Taurus Mts.).

Family *Sinoporidae* Sokolov, 1955

Genus *Sinopora* Sokolov, 1955

? 1927 *Multithecopora* Yoh, p. 291.

1955 *Sinopora* Sokolov, p. 225.

1970 *Multithecopora* - Oekentorp & Kaever, p. 285.

1975 *Sinopora* - Minato & Kato, p. 53.

1981 *Sinopora* - Hill, p. F 644.

Type species: *Monilopora dendroidea* Yoh, 1932. Diagnosis: Hill, 1981, p. F 644.

Remarks. Oekentorp & Kaever (1970) discussed the question of the synonymy of *Multithecopora* Yoh and *Sinopora* Sokolov. Both genera are syringoporoid, with thick walls and sparse or absent septa and tabulae. The first named genus is characterised by the sparse existence of transverse connecting tubes between the corallites, whereas *Sinopora* lacks such tubes. Oekentorp & Kaever (1970) supposed that the existence of connecting tubes is a variable characteristic and therefore the genera are synonymous. On the other side, Minato & Kato (1975) and Hill (1981) considered both genera to be valid.

Sinopora ? cf. *syrinx* (Etheridge, 1900)

Pl. 2, fig. 3,4

1900 *Syringopora syrinx* Etheridge, p.6, pl. 1, fig. 6-9; pl. 2, fig. 11.

1970 *Multithecopora syrinx* - Oekentorp & Kaever, p. 292, pl. 2, fig. 8; pl. 3, fig. 11; pl. 4, fig. 14, 19; pl. 5, fig. 20, 24; text-fig. 3 (cum sym.).

Material. Lashkargaz section, sample CK 315 (MPUM 7196), Lashkargaz Fm., Member 2.

Description. Dendroid corallum, composed of dichotomous branched corallites. Density of the corallites 6-7 in 100 mm². Bifurcation angle 25-30 degrees. Connecting tubes absent. Round or subcircular corallites, 1.8-2.6 mm in diameter, average approximately 2.25 mm. Thickness of the wall 0.2-0.6 mm. Length of the corallites 10-14 mm. Septal spines and tabulae scarce.

Remarks. The characters indicative for the species of *Sinopora* are the diameter and the thickness of the wall. The Permian species are listed below (Tab. 3):

	Diameter (mm)	Thickness of the wall (mm)
<i>S. dendroidea</i> (Yoh)	1.8 - 2.1	0.4 - 0.5
<i>S. maxima</i> King	1.8 - 2.0	0.4 - 0.5
<i>S. changshuensis</i> Yang	2.1 - 2.4	0.5 - 0.7
<i>S. asiatica</i> (Mansuy)	1.0 - 1.3	0.3 - 0.5
<i>S. minatoi</i> (Rowett)	1.3 - 2.0	0.4 - 0.8
<i>S. choieana</i> Minato & Kato	1.5 - 1.8	0.4 - 0.6
<i>S. syrinx</i> (Etheridge)	1.4 - 2.5	0.5
<i>S. yohi</i> Chin	- 2	0.6 - 0.8
<i>S. omaniensis</i> (Oekentorp)	1.8 - 2.5	0.7 - 0.9
<i>S. huanglungensis</i> Leed & Chu	1.6 - 2.1	0.4 - 0.7

Tab. 3 - The Permian species of *Sinopora* Sokolov, 1955.

It is probable that some of these species are synonymous. The corallites of the specimens from Chitral are 1.8-2.6 mm in diameter and the thickness of their wall is 0.2-0.6 mm. Both characters are common to *S. syrinx*. However, tabulae are abundant in this species and scarce in the specimen described here.

Occurrence. *S. syrinx* is known from the Carboniferous of Australia, the Donetz Basin in Russia and the Lower Permian of SE Afghanistan.

Conclusions.

The coral fauna of the Lashkargaz Formation consists of *Pseudohuangia chitralica* (Smith), *Yatsengia hangchowensis* Huang, *Protomichelinia siyangensis* (Reed), ? *Protomichelinia multitalbulata multitalbulata* (Yabe & Hayasaka), *Protomichelinia guizhouensis flexuosa* Yang and *Sinopora* ? cf. *syrinx* (Etheridge). Another small solitary corallite could not be identified. It shows only two orders of septa and a thin dissepimentarium. Fossula and columella are absent.

Corals and fusulinids demonstrate an Early Permian (Sakmarian) age for Member 2. There are no data to constrain the age of the Member 3 in the Baroghil E section. Corals are not age diagnostic for Member 4, which is Kubergandian according to fusulinids and conodonts. The described fauna is small and mostly consists of tabulate corals. This fact makes the paleoecological and paleogeographical interpretation difficult.

The fauna is characterized by the dominance of species from the Qiangtang terrane (Sun Dong-li, 1993) of Tibet and from South China. Only *Yatsengia hangchowensis* and *Protomichelinia siyangensis* are known outside Tibet or China, being present also in Turkey, Iran and the Pamir Mts. There are significant differences with the Permian "*Lytvolasma*" fauna of the Lower Jamal Formation of Iran (Flügel, 1972), the Northern Karakorum (Flügel, 1990; Flügel & Gaetani, 1991) and SW Anatolia (Flügel, 1993).

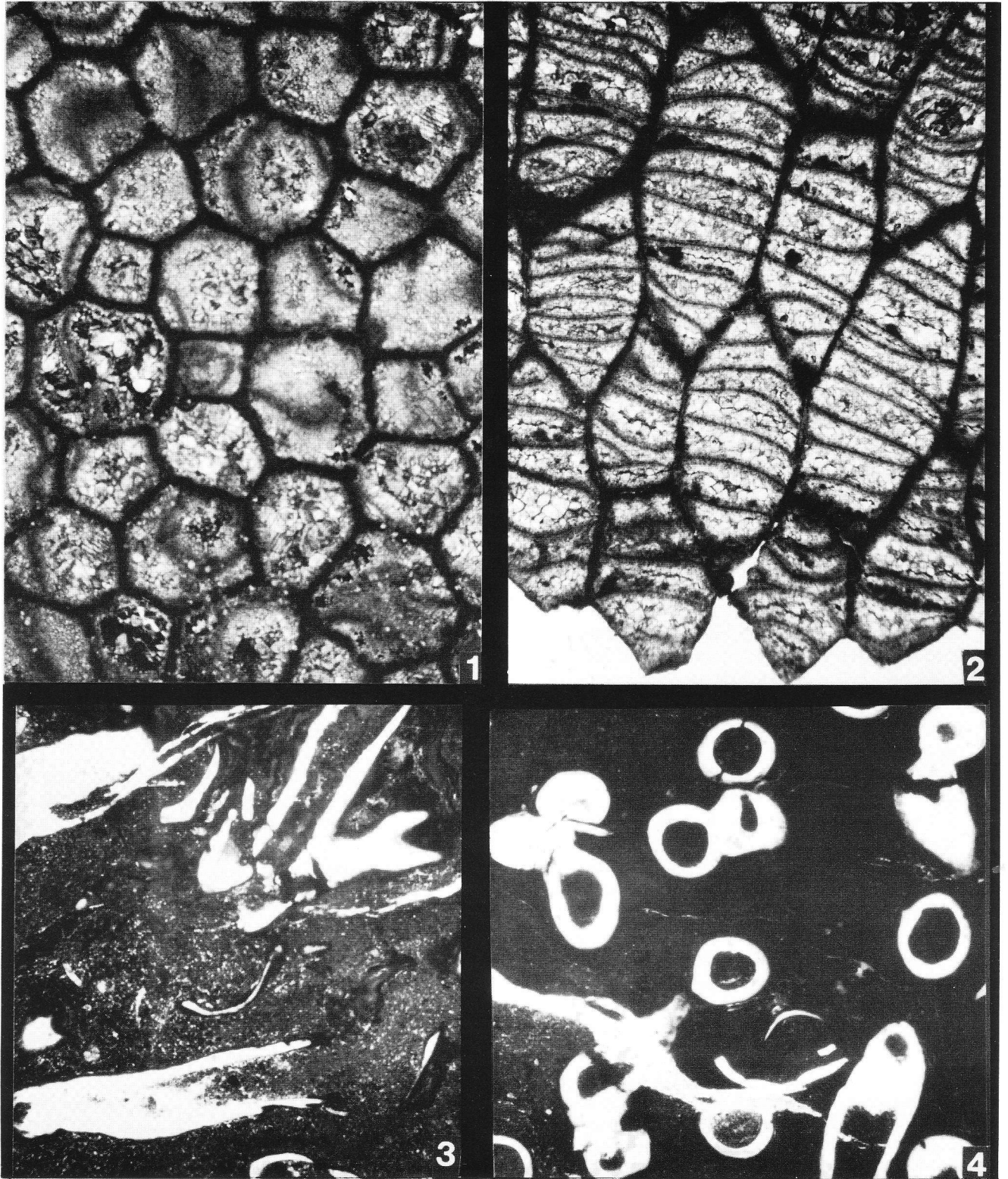


PLATE 2

- Fig. 1 - *Protomichelinia siyangensis* (Reed, 1927). Transversal section. (Specimen MPUM 7210, sample CK 89); x 4.9.
 Fig. 2 - *Protomichelinia siyangensis* (Reed, 1927). Longitudinal section. (Specimen MPUM 7210, sample CK 89); x 4.9.
 Fig. 3 - *Sinopora* ? cf. *syrinx* (Etheridge, 1900). Longitudinal section. (Specimen MPUM 7196, sample CK 315); x 5.9.
 Fig. 4 - *Sinopora* ? cf. *syrinx* (Etheridge, 1900). Transversal section. (Specimen MPUM 7196, sample CK 315); x 5.9.

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