Rugosa complexes of Mamontovskiy and Safonovskiy horizons have been studied by the author during the researches conducted in 2005–2006. The studied collection was collected by the author during field researches in 2003–2004 in structure of the expedition of Kuznetsk Pedagogical Academy. Within the limits of the Altai–Sayanska folded area the deposits of Eifel and Early Givetian are more or less widespread only on territories of Salair, which, apparently, is explained by regional regress that had taken place during this time on its territory. Uniqueness for the Altai–Sayanska area of deposits of this age makes their all-round studying especially important and actual. Mineral fauna of deposits, allocated as Mamontovskiy and Safonovskiy horizons, is presented by brachiopods, ostracodes, trilobites, pearlides and corals rugosas. In the past it was studied and described by: E.Z. Bulvanker [1], Е.А Yolkin [2], V.A. Ivaniei and S.K. Cherepnina [3, 4], M.A. Rzhonitskaya [5], N.Ya. Spasskaya [6], Yu.V. Udodov, O.P. Mezentseva and N.V. Gumerova [7]. In 2006 the researches were continued by the author, rugosas of Mamontovskiy and Safonovskiy horizons were studied and monographically described. The cuts, were the described faunae was picked out, are cited in the given work.

Prokopievskiy cut is located on the western suburb of Prokopievskiy city, Kemerovo oblast in the left bank of the stream Egos. The studied deposits are opened by two small pits. The strike of layers at the studied site is close to meridian, the falling is practically vertical. The total capacity of the opened by the cut deposits is 60 m. On the detailed geological map with the scale 1:50000, these deposits are attributed to the Kerlegeshskiy horizon but, based on results of the studying of faunae of brachiopods and rugosas, they can be attributed to the Saphonovskiy horizon.

Description of the Prokopievskiy cut:
1. Blue-gray plate-like limestones with thin horizontal lamination contain an insignificant impurity of terrigenous material. The fauna is as follows: fine brachiopods, gastropods, pearlsides, teeth and scales of fishes and rugosas Grypophyllum gracile Wedekind and Dialythophyllum annulatum (Peetz).
2. Argilloaleurite limestones with prolayers of poorly argillaceous limestones similar to rocks of the previous interval in the ratio – 3:1. Pearlides, brachiopods, crinoids, and ostracods prevail in the fauna.
4. Grey thin-plate limestones. In structure of fossils are shells of brachiopods and bivalve mollusks; moreover: goniatites, tabulates, crinoids, and ostracods prevail in the fauna. Ya.M. Gutak has defined the kind Indospirifer pseudowilliamsi Rzonsnickaja from brachiopods.
5. Alternating prolayers of grey limestones and strongly schistic aleurolites with capacity up to 10...15 cm. The fauna it is presented by brachiopods and pearlsides.
6. Grey thick-plate limestones with remains of brachiopods, crinoids, tabulates, and pearlsides. Disphylhum pashiense (Soshkina), Heliophyllum aiense Soshkina, Grypophyllum gracile Wedekind, Calceola sandalina Lamark are defined from rugosas.
7. Dark grey thin-plate limestones with remains of tabulates and pearlsides.

The rugosa complexes of several cuts of the Mamontovskiy and Safonovskiy horizons of Salair have been selected and monographically described. Descriptions of deposits are given and their age is specified by the rugosa complexes. Monographic descriptions and photos of fauna are enclosed.
8. Dark grey plate-like limestones with prolayers of aleurites, where branchy and massive colonies of rugosas form small biogherms. Marisastrum lazutkini (Bulvanker), Disphyllum pashiense (Soshkina), Neostringophyllum sp. are defined.

9. Alternating prolayers of grey thick-plate agrillaceuso and aleurite limestones and green-grey schistic aleurite limestones with remains of tabulates, pearlsides, trilobites, and bivalve mollusks.

10. Brown-grey aleurites replaced upwards along the cut by brown-grey coarse-grained sandstones. From brachiopods Ya.M. Gutak has defined the species Indospirifer pseudowilliamsi Rzonsnickaja, a supervising form of the Safonovskiy horizon. The following species of rugosas were defined by the author during the research: Dialythophyllum annulatum (Peetz), Heliophyllum aiense Soshkina, Grypophyllum gracile Wedekind, Calceola sandalina Lamarck, Marisastrum lazutkini (Bulvanker), Disphyllum pashiense (Soshkina), Neostringophyllum sp. Forms Dialythophyllum annulatum (Peetz) and Heliophyllum aiense Soshkina are zone kinds of the Saphonovskiy horizon. Grypophyllum gracile Wedekind and Calceola sandalina Lamarck are located in lower horizons. The first form is a transit form: it is widespread on territories of the Altai-Sayanska area, from Salairskiy horizon of the Emsian age and up to Saphonovskiy horizon of the Early Givetian. The second form is characteristic for Upper Shan-dinskiy horizon of the Late Emsian. On the other hand, the species Marisastrum lazutkini Bulvanker is known from Vassinskiy layers of the Early Frasnian age. The species Disphyllum pashiense (Soshkina), and the sort Neostringophyllum, which was not presented possible to define up to the kind, are located in Givetian and Frasnian deposits Ural Mountains, Kuzbass and Salair. Because of absence in the Bachatskiy cut of zonal kinds of rugosas of the Safonovskiy horizon, the affiliation of these deposits to it is based on presence of brachiopods of the kind Indospirifer pseudowilliamsi Rzonsnickaja. The complex of studied rugosas allows drawing a conclusion only about the Early Givetian age of these deposits.

The Bachatskiy cut is opened in the right bank of the river Bolshie Bachaty opposite of the village Mamontovo. Elements of rock deposition: strike 310, falling is close to vertical. The general capacity of the opened by the cut deposits is 114 m.

Description of the Bachatskiy cut:
1. Grey fine-grained sandstones.
2. Turf interval.
3. Dark grey limestones with remains of tabulate, crinoids, heliolitides, stromatoporates, brachiopods, and pearlsides.
4. Turf interval.
5. Grey thin-plate limestones containing remains of brachiopods, rugosas, pearlsides. From rugosas we have defined: Grypophyllum gracile Wedekind, Calceola sandalina Lamarck, Peneckiella sp. From brachiopods Ya.M. Gutak has defined the kind Indospirifer pseudowilliamsi Rzonsnickaja.
6. Turf interval.

7. Green-brown coarse-grained sandstones with impurity of the gravel material. Only Grypophyllum gracile Wedekind, Calceola sandalina Lamarck and Peneckiella sp are defined from rugosas. It has not been possible to define the latter form up to the species, but the sort Peneckiella Soshkina is widespread in Givetian and mainly in Frasnian deposits of Ural Mountains, Kuzbass and Salair. Because of absence in the Bachatskiy cut of zonal kinds of rugosas of the Safonovskiy horizon, the affiliation of these deposits to it is based on presence of brachiopods of the kind Indospirifer pseudowilliamsi Rzonsnickaja. The complex of studied rugosas allows drawing a conclusion only about the Early Givetian age of these deposits.

The Mamontovskiy horizon is broken down by previous researchers [2, 6, 8] on three packs: red-color conglomeratic-sandstone, calcareous and aleuro-pelitic, with the total capacity from 180 up to 300 m. Deposits of calcareous and aleuro-pelitic packs in the Guryevsk region have been studied by the author (Fig. 1).

Fig. 1. A fragment of the stratotypical cut of the Mamontovskiy horizon. Symbols: 1-9) types of deposits: 1) thin-plate, 2) thick-plate, 3) massive, 4) argillaceous, 5) sandy, 6) fragmental, 7) pelitolites, 8) aleurites, 9) fossils; 10) borders of packs, 12) research site, 13) turf interval

Explanation to Fig. 1:
Эйфельский – Eifel; Колонка – Column; Мамонтовский – Mamontovskiy; Мощность, м – Capacity, m; Ярус – Stage; Мал. Салаирка – Malaya Saliarka; Горизонт – Horizon; Гурьевск – Guryevsk; № пачки – pack number

Description of the cut of the Mamontovskiy horizon:
2. Thin-plate coral limestones with prolayers of aleurolites. Fossils are presented by corals, stromatoporates, gastropods, trilobites, brachiopods, and bivalves.

3. Strongly schistic aleurolites (mute).


5. Strongly schistic aleurolites.

The total capacity of the opened by the cut deposits is 9.9 m.

Among rugosas of the Mamontovskiy horizon the following forms are described: Neostringophyllum mamontovensis (Zhelt.), Neospongophyllum variabile Wdkd., Grypophyllum gracile Wdkd., G. gurjevskisensis Zhelt., Dendrostella rhenana (Frech). All complex of rugosas specifies the affiliation of containing it deposits to the Mamontovskiy horizon of the Eifel stage of the Middle Devonian.

Thus, as a result of researches of the cited complexes of rugosas and brachiopods the age of several deposits of the East part of Salair has been specified. It is possible to consider attribute deposits of the Prokopyevskiy and Bachatskiy cuts to the Safonovskiy horizon of the Lower Givetian, and deposits of calcareous and aleuropelitic packs, studied in the area of Guryevsk city to the Mamontovskiy horizon of the Eifel stage of the Middle Devonian.

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Class Kodonophyllida

Family Heliophyllidae Nicholson

Sort Heliophyllum Hall

*Heliophyllum aiense* Soshkina, 1949

**Material.** 3 specimens, from which 10 sections were made, Fig. 2.

![Fig. 2. Heliophyllum aiense Soshkina. Section of the coral: a) cross-section, b) longitudinal](image)

**Diagnosis.** Single cylindrical coral. Diameter of adult individuals varies from 20 to 24 mm. There are 60–62 septums of two orders, thickened and carinated karinirovannih in the peripheral zone and thin at the center. Septums of the 1st order reach the center, septums of the 2nd order are 2/3 of their lengths. The bottoms are wide, split, frequent: 10 bottoms for 5 mm. Disseptions are fine, tumid, and compose 5–9 rows.

**Ontogenesis. Reproduction is** parisidal. A specimen divided from the inside on 5 parisidal buds is presented in the collection.

**Spread and age.** Upper Givetian deposits of Ural Mountains and Mountainous Altai, the Mazalovsko-Kitayskiy horizon; Salair – Safonovskiy layers.

**Location.** Western suburb of Prokopevsk city, the left bank of the stream Egos. Safonovskiy horizon of the Lower Givetian substage.

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Class Neostringophyllida

Family Neostringophyllidae Wedekind

Sort *Neostringophyllum* Wed., emend Soshkina

*Neostringophyllum mamontovensis* (Zhelt.), 2006

**Holotype:** # 2303. It is stored in geological museum of territorial funds of Kemerovo oblast (Novokuznetsk). Salair, village Tor Chumysh, Safonovskiy horizon. Middle Devonian substage.

**Material:** 11 copies in cross-section and longitudinal sections are studied, Fig. 3.

![Fig. 3. Neostringophyllum mamontovensis (Zhelt). Section of the coral: a) longitudinal, b) cross-section](image)

**Diagnosis:** Single coral with the diameter 13...15 mm. Cup of the goblet-like shape. A wide band is observed on periphery (up to one half of the radius). Total number of septums is 48–52. An arrangement of septums is radial. Septums are thin near the axis and get thicker towards the periphery. Locks and bubbles of flaking can be sometimes visible on them. Greater septums are long, reach reach the axis and twist. The axial ends of greater septums are claviformly thickened. Septums of the first order are geniculately twisted in the middle part. Small septums reach as long as half of the length of greater ones. Often they rest against the geniculately curve of the the first order. At early stages the arrangement of septums is distinctly crest-like, and most important, the septum is greater than others in length and width. The bottoms are incomplete, strongly split, bubble-like. Disseptions are elongated, extended, inclined to the axis, often closed by stereoplasma. Compose 3–5 rows.

**Comparison:** This species differs from the other species by claviformed thickenings of the axial ends of great septums, and by elongated, extended disseptions, partially closed by stereoplasma.
Spread: Salair, Mamontovskiy and Safonovskiy horizons of the Early Givetian substage of the Middle Devonian.

Location: The river Kara-Chumysh, village Verkhniy Chumysh, settlement Izora, the river Ur, village Verkhniy Teresh. Safonovskiy horizon, the Lower Jivet substage.

Family Stringophyllidae Wedekind
Sort Grypophyllum Wedekind
Grypophyllum gracile Wedekind, 1925

Material. 4 specimen are studied, from which 15 sections were made, Fig. 4.

Fig. 4. Grypophyllum gracile Wedekind. Section of the coral: a) cross-section, b) longitudinal

Diagnosis. A small single coral with the average diameter of 12 mm. Quantity of septums two orders is 42. Septums are thin, lamellar, thickened towards the axis. Great septums are long, reach the center; small are short, thick, reach up to 1/3...1/5 of the length of the first ones, can be absent. The bottoms are full, horizontal, make 1/3 from diameter of the coral. 11 bottoms for 5 mm. Large lonsdaleoidal dissepiments are spread in 3–5 rows.

Spread and age. The species is described in Germany, Ural Mountains, and Altai-Sayanskaya areas. Grypophyllum gracile Wedekind begins to appear in the Salairkinskaya layers of the Emsian age, proceeds to the Shandinskiy, and then the Eifel century – to the Mamontovskiy; it is widespread enough in Kerlegeshskiy and Safonovskiy layers of the Early Givetian.

Location: Suburbs of Guryevsk city, the right bank of the river Talovaya. Mamontovskiy of the Eifel stage.

Class Columnariida Rominger
Family Marisastridae Rozkowska
Sort Marisastrum Rozkowska
Marisastrum lazutkini (Bulvanker), 1953

Material. 2 copies are studied, from which 7 sections are made, Fig. 6.

Fig. 6. Marisastrum lazutkini (Bulvanker). Section of the coral: a) cross-section, b) longitudinal

Diagnosis. A colony of massive corralites 10...11 mm in diagonal. Septums of two orders in of quantity 32–40 are present. Septums are carinated, thin on periphery up to the middle, fusiformly thickened. Great septums do not reach the center. Small ones reach up to 2/3 of the length of the great ones. The bottoms are horizontal, 11 to 15 on 5 mm. Dissepiments are steeply sloped to the axis, 3–5 rows.

Spread and age. Altai-Sayanskaya area, Yzylinskiy layers of the Late Jivet and vassinskiy layers of the Early Frasnian.

Location. Western suburb of Prokopyevsk city, the left bank of the stream Egos. Sagonovskiy horizon of the Lower Jivet substage.
Family *Disphyllidae* Hill  
Sort *Disphyllum Fromentel*  
*Disphyllum pashiense* (Soshkina), 1939

**Material.** 2 copies are studied, from which 6 sections are made, Fig. 7.

**Diagnosis.** A colony of branchy corallites 13 mm in diameter on average. Septums are sphenoidally thickened, two orders in quantity of 48–52. Great septums are long, can reach the axis. Small septums reach 1/2...1/3 the lengths of the great ones. The bottoms are horizontal, rare (4 bottoms on 5 mm). Dissepiments are fine, вздутые, compose 2–3 rows.

**Spread and age.** In Ural Mountains and Altai-Sayan areas this form is widespread in Givetian and Frasnian deposits. It is found in Kuzbass in Zarubinsky, Izylinskii layers of the Late Givetian and Vassinskiy layers of the Early Frasnian.

**Location:** Western suburb of Prokopyevsk city, the left bank of the stream Egos. Safonovskiy horizon of the Early Jivet substage.

**Fig. 7.** *Disphyllum pashiense* (Soshkina). Section of the coral: a) cross-section, b) longitudinal

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**REFERENCES**


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