

Dr. FERDINAND PRANTL:

Ordovické a silurské mechovky z Montagne Noire (Languedock).

Some Ordovician and Silurian Bryozoa from Montagne Noire (Languedock).

(Se 2 tabulkami a 4 obr. v textu.)

(Předloženo dne 15. I. 1939.)

Výskyt mechovek v jihofrancouzském ordoviku a siluru byl zjištěn již před delší dobou. Již někteří starší autoři (J. BERGERON, F. FRECH, M. KOENEN a j.), kteří se zabývali studiem fauny starších prvohor v Montagne Noire, upozorňovali na bohatá mechovková společenstva v určitých polohách zdejšího ordoviku. Jejich detailnějším studiem se však až dosud nezabýval nikdo.

Druhy popisované v této práci pocházejí vesměs z různých nalezišť na jižních svazích pohoří Montagne Noire; největším dílem byly nalezeny na lokalitě vých. od Grange du Pin (sev.-vých. od obce Gabian) a na Mont-Glauzy (2 km sev.-vých. od obce Gabian) v départementu Hérault, z části pocházejí z bezprostředního okolí obce Villeneuve-Minervois a z odkrytu při kôtě 523 (2 km sev.-vých. od obce Limouzis) v départementu Aude.

Na nalezišti Est de la Grange du Pin vyskytují se mechovky v pískovcích a křemencích, spočívajících v nadloží křemenců s *Calymmenella*

boisseli Berg., stáří svrchního caradoku, a v souvrství tence deskovitých vápenců s *Nicolella actoniae* (Sow.), náležejících asghillu. Naleziště v okolí Villeneuve-Minervois a na Mont-Glauzy náleží rovněž svrchnímu ordoviku. Zjištěné mechovky odpovídají v celku mechovkovému společenstvu z Est de la Grange du Pin. Naproti tomu naleziště při kôtě 523 u Limouzis (2 km sev.-vých. od obce, blíže jeskyně), kde byla mechovková fauna zjištěna v tmavých deskovitých krinoidových vápencích, náleží na jejím základě spíše vrchnímu siluru, ač dříve bylo označováno za spodno-kambrické. (*Georgien.*)

Až dosud v languedockém ordoviku (resp. v svrchním caradoku a asghillu Montagne Noire) byly zjištěny tyto druhy:

Graptodictya eremita n. sp., *Ptilodictya* sp., *Chasmatoporella metzi* Nekh., *Prasopora thoralis* n. sp., *Batostoma gabiani* n. sp., *Homotrypella miqueli* n. sp., *Dekayia crenulata* n. sp., *Hallopora formosa* n. sp., *H. meridiana* n. sp.

Z uvedeného je zřejmo, že zmíněné mechovkové společenstvo v languedockém svrchním ordoviku je charakterisováno velkou převahou *Trepomat* nad ostatními skupinami. Po stránce biostratigrafické a paleobiogeografické ukazuje pak na poměrně úzké vztahy k obdobnému mechovkovému společenstvu v svrchním ordoviku Karnických Alp.

V svrchním siluru z okolí Limouzis byla zjištěna až dosud pouze *Fistulipora aliena* n. sp. a *Semicoscinium* sp.

Ke konci pokládám za svou milou povinnost poděkovati co nejsrdečněji p. prof. Dr. M. THORALOVÍ z university v Montpellier za laskavé zapůjčení jím sbíraného studijního materiálu a za ochotné poskytnutí nutných geografických a stratigrafických údajů. Dále děkuji p. senátorovi prof. Dr. P. VINASSA DE REGNY z Pa d o v y za zapůjčení některé důležité a těžce přístupné odborné literatury a pp. KUSTODŮM v British Museum (Natural History) a v Geological Survey & Museum v Londýně za ochotné zpřístupnění srovnávacího materiálu. ČES. NÁRODNÍ RADĚ BADATELSKÉ jsem zavázán díkem za udělení podpory na překlad této práce do angličtiny.

Praha, říjen 1938.

Národní museum v Praze, Geol.-paleont. oddělení.

The occurrence of Bryzoa in the Ordovician and in the Silurian of the Languedock has been known for a longer period. Already the earlier authors (J. BERGERON, M. KOENEN, F. FRECH, a. o.) who devoted themselves to the study of the Lower Paleozoic Fauna of Montagne Noire, drew attention to the study of the rich association of Bryozoa in certain ho-

rizonts of the Ordovician of the region. But so far nobody has occupied himself with its more detailed study.

Recently prof. M. THORAL of Montpellier succeeded to collect a rich material of Bryozoa from different localities of the southern slopes of Montagne Noire and thus we are now able to give a more detailed and complete sketch of the Bryozoa in the Ordovician of the Languedock.

A large part of the specimen described below were found by M. THORAL E. of Grange du Pin (NO. of the village of Gabian), and at Mont-Glauzy (3 km N. E. of the village Gabian) in the département Hérault. Part of them were found also at Villeneuve-Minervois and at côte 523 (2 km NE. of the village of Limouzis) in the département Aude.

According to M. THORAL'S kind communication the Bryozoa occur in the locality E. of Grange du Pin in the uppermost strata of the Ordovician of the region, i. e. in the sandstones overlying the Caradocian quartzites with *Calymenella boisseli* Berg., and in the thinbedded Asghillian limestones with *Nicolella actoniae* (Sow.). — The uppermost layers of the quartzites with *Calymmenella boisseli* Berg. contain too a rare bryozoan fauna. It is from these uppermost horizons of the Ordovician in the Languedock that the Bryozoa of Mont-Glauzy and of the Villeneuve-Minervois were derived.

Up till now the black-greyish thin-bedded limestones with the stems of the crinoids and with the Bryozoa at Limouzis have been assigned to the Lower Cambrian (*Georgian*), but in reality they belong to the Silurian.

The preservation of the Bryozoa from the Ordovician of Montagne Noire is not always very favourable. The zoaria collected on the weathered surface. Specimens extricated from the firm rock cannot be used in general for the study of the surface of the zoaria. Besides the specimen from Limouzis and Villeneuve-Minervois often show traces of a mechanical deformation by orogenic pressure. The inner structure of the zoaria is generally fossilized into a finely crystalline calcite with an admixture of ankerite. At best it is more or less obscured by recrystallized calcite or filled with an opaque, dark, argillaceous or limonitic substance.

Finally I consider it my pleasant duty to thank here Prof. M. THORAL of the University of Montpellier for kindly entrusting to me his bryozoan material from the Ordovician and the Silurian of Southern France and so making possible the present study. Further I am indebted to Senator Prof. P. VINASSA DE REGNY of Padua for lending me some important and rare literature, and to the CUSTODIANS of the British Museum (Nat. History) and of the Geological Survey and Museum in London for kindly putting at my disposal comparative material.

I. CRYPTOSTOMATA Vine.

PTILODICTYONIDAE Zittel 1880.

GRAPTODICTYA Ulrich 1882.

GRAPTODICTYA EREMITA n. sp.

(Pl. I., fig. 1.)

Holotype: the specimen shown here on pl. I., fig. 1. E. of Grange du Pin (Hérault). Asghillian. — National Museum in Prague.

Description: Zoarium cribose, forming a coarse irregular network. It is composed of flattened, bifoliate branches which often divide dichotomically and join again. The width of the branches varies between 2,5 and 2,7 mm. The fenestrulae are rather large and of irregular shape. Some are subcircular, others elliptic or subelliptic, elongated in the direction of the growth of the zoarium. The fenestrulae have generally a diameter of 4—4,4 mm, and only exceptionally a diameter of 4,85—5,15 mm is observed.

The zoecial apertures on the surface of the branches are arranged in longitudinal, slightly alternating rows the number of which varies according to the width of the branches. (Generally there are twelve to fourteen rows of zoecial apertures.) This arrangement of the zoecial apertures that the zoecial apertures seem to be arranged also in diagonal rows crossing the longitudinal ones. In the longitudinal rows there are four to five apertures in 2 mm, in the diagonal ones five to six. The zoecial aperture are minute, circular or slightly elliptical, and their diameter ranges from 0,13 to 0,14 mm. The interspaces between the individual zoecial apertures are solid, generally with one or two fine, slightly elevated, papillose ridges. The mesopores are scarce, limited to a narrow border of the branches. This border is about 0,5 mm in width and finely papillosely striated.

In a transverse section of the zoarium we can see that the branches are subreticular. Their maximum thickness does not exceed 0,92—1,05 mm. The zoecia are subrhomboid to subpolygonal, 1,14 to 0,15 mm wide, with thin zoecial walls in the central part of the zoarium. In the marginal part the zoecial walls are on the contrary heavily thickened and filled with a fine laminated tissue. In longitudinal sections of the zoarium we can see furthermore that the zoecia are directed steeply obliquely upward to its surface.

Remarks and affinities. In the material from E. of Grange du Pin (Hérault) the basal part of the zoarium has not been conserved in any specimen. But the remaining characteristic structure of the zoarium leaves no doubt about this species belonging to the genus *Graptodictya* Ulr.

Graptodictya eremita n. sp. is very closely related to the species *Graptodictya obliqua* Bassler (BASSLER 1911 — p. 126, textfig. 51, pl. 8, fig. 4) from the Lyckholm limestone (F₁), Kurküll, Eesti. It has the same regular, coarse structure of the zoarium, the same proportions in the size of

the different zoarial elements, especially in the size of the fenestrules, and the same number of zoecia in 2 mm of the longitudinal rows. It differs from it mainly in the much finer striation between the zoecial apertures and at the narrow border of the branches, and in the much steeper position of the zoecia in the marginal part of the zoarium.

In my opinion the specimens of *Graptodictya* sp. reported by NEKHOROSHEV (11 — p. 11, pl. II, fig. 9—10) from the Lower Silurian (Hochwipfelschichten) of the Hohe Trieb in the Carnian Alps are probably conspecific with the species *Graptodictya eremita* n. sp. For the relative dimensions of the two forms are almost the same. The unfavourable conservation of NEKHOROSHEV'S specimens does not allow however their more detailed study nor a more detailed comparison of the two forms.

Occurrence: E. of Grange du Pin (Hérault).
Asghillian.

PTILODICTYA Lonsdale 1839.

PTILODICTYA sp.

(Pl. I., fig. 3.)

Material: Up till now I know only three small, heavily worn fragments in one piece of rock, which belong without doubt to one and the same zoarium. Asghillian. E. of Grange du Pin. (See fig. 3 on pl. I.)

Description: The fragments found are too unfavourably conserved for a specific determination. But they show the characteristic features of the genus *Ptilodictya* Lonsdale 1839. The fragments of the zoarium belong to a ribbon-like, dichotomically ramified zoarium. The largest of them is about 25 mm long and its maximum width is 2,8 mm. The zoecial apertures are arranged on the surface of the zoarium in twelve longitudinal, slightly alternating rows. Between the individual rows there are straight, slightly indicated, longitudinal ridges. Between the individual zoecia the longitudinal ridges are mutually connected by short transversal ridges so that the individual apertures are separated from each other by a rectangular network. In one row there are seven to eight apertures in 3 mm measured lengthwise.

Remarks and affinities: The specimen described in the above resembles most the form of NEKHOROSHEV (11 — p. 18, pl. II, fig. 7—8) from the Hochwipfelschichten of the Hohen Trieb in the Carnian Alps, which he called *Ptilodictya* sp. ex gr. *lanceolata* Goldfuss. It has the same relative dimensions of the zoarium and the same number and arrangement of the zoecial rows. The imperfect conservation of my material does not permit however a more detailed comparison.

Occurrence: E. of Grange du Pin. (Hérault.)

Asghillian. Found together with *Chasmatoporella metzi* Nekh.

FENESTRELLINIDAE Bassler 1935.

SEMICOSCINIUM Prout 1859.

SEMICOSCINIUM sp.

Material: Up till now I know only one section of a zoarium, found by chance in a transparent section of limestone from Limouzis (Hérault), which shows the characteristic features of the genus *Semicoscinium* Prout,

Description: In the transparent section we see a transversal section of an infundibular zoarium. The transversal sections of the individual branches are oval, 0,31—0,33 mm wide. Each branch shows a pair of sections of the zoecial rows. The zoecial apertures are turned outward, to the obverse side of the zoarium. Between the zoecia there runs in each branch a straight, very thin median keel which rises high above the surface of the branch and is slightly inflated in club-shape at the distal end. The height of the branch together with the projecting keel ranges from 0,63 to 0,65 mm, of which 0,32—0,34 mm, therefore more than half the entire height belong to the free part of the keel. From the few sections discovered it seems that the dissepimenta are distinctly thinner branches. Their length amounts to 0,31—0,32 mm. The distance between the different sections of the branches in the zoarium is the same and it corresponds without doubt to the width of the fenestrules.

Remarks: It is not possible to determine from a transversal section of a zoarium the arrangement of the zoecia in the branches, the shape and size of the fenestrules, and the relative dimensions of the zoarial network. A more detailed comparison with the other representatives known of this genus is therefore impossible. Though the insufficient material permits only to state the occurrence of the genus *Semicoscinium* Prout in the locality at Limouzis (Hérault), I believe this find to be of the great stratigraphical and palaeographical importance.

The genus *Semicoscinium* Prout is wide-spread in the Devonian of the Old and the New World. Up till now it has not been found in the Carboniferous, and from the Upper Silurian only relatively very few representatives are known. Three only from the American Silurian (*S. acmeum* [Hall] 1876, *S. planum* Ulrich and Bassler 1913, *S. tenuiceps* [Hall] 1890); one from the Balticum (*S. balticum* Hennig 1906); from the Asiatic Silurian *S. lineatum* Nekhoroshev 1936 and two not further determinable finds from the Upper Silurian of the Altai and Uriankhai (NEKHOROSHEV). The occurrence of this genus in the Lower Paleozoic formations of Montagne Noire at Li-

limouzis, in limestones hitherto thought Cambrian, seems to indicate that *Semicoscinium* Prout has a wider stratigraphical range than accepted up till now. As at Limouzis primitive representatives of the genus *Fistulipora* McCoy 1850 and a not further determinable *Halloporid* *sp. ind.* have been ascertained together with *Semicoscinium* *sp.*, I am inclined to believe that the locality at Limouzis belongs to the Silurian. Amore detailed stratigraphical determination of the position of the limestones at Limouzis is impossible without a determination of the other fauna. On the other hand this find seems to confirm M. THORAL'S opinion that the limestones of Limouzis are younger than the Cambrian which up till now they were thought to represent.

Occurrence: Around the caves at Limouzis (Aude).
Silurian.



Fig. 1. — *Semicoscinium* *sp.*

Transverse section of the zoarium. cca 10 x. Limouzis (Aude). Silurian.

PHYLLOPORINIDAE Ulrich 1890.

CHASMATOPORELLA Nekhoroshev 1936.

CHASMATOPORELLA METZI Nekhoroshev 1936.

(Pl. I., fig. 2, 3.)

Lectotype, the specimen here discussed, illustrated by NEKHOROSHEV in 1936, pl. I., fig. 1. Hochwipfelschichten. Hohe Trieb, Carnian Alps.

Description: Zoarium reticulated, rather coarse, with large fenestrated and comparatively thin branches. The zoarium is composed of more or less parallel or radially arranged branches, with frequent ramifications. The newly formed branches soon unite with neighbouring branches and soon divide again. Thus there results the reticulated structure of the zoarium, due to the repeated division and reunion of the branches. It has neither dissepimenta nor true anastomoses, and it is homological to the zoarial structure of the genus *Subretepora* d'Orbigny 1849 (syn. *Chasmatopora* Eichwald 1890). The division of the branches is effected in such a manner that after the division one of the newly formed branches continues more or less in the original direction whereas the other turns under an angle of 35° to 65° to unite obliquely with a neighbouring branch. The width of the branches averages

0,60 to 0,65 mm; exceptionally we find sometimes in the proximal part of the zoarium also higher values up to 0,75 mm. Generally there occur nine to ten branches in 10 mm of the zoarium also higher values up to 0,75 mm. Generally there occur nine to ten branches in 10 mm of the width of the zoarium.

The shape and size of the fenestrules formed by the repeated division and fusion of the branches, vary greatly. The fenestrules are always elongated in the direction of the growth of the zoarium, irregularly suboval to sub-ovoid, much longer (5,6—6,8 mm) than broad (1,1—2,74 mm). Now and then there occur also much smaller fenestrules of a subtrigonal shape. Generally there are 5—5,5 fenestrules in 10 mm of the width of the zoarium, but only 1,5—2,5 fenestrules in 10 mm of the length of the zoarium. The obverse and reverse side of the zoarium differ distinctly in their aspect and this is due to the peculiarity of the inner structure.

On the reverse side the branches are slightly flattened. Their surface is either quite smooth or ornamented with very fine, oblique, plicate striae. In some branches the median keel shining through from within is marked by a lighter longitudinal line. On the sides of the branches there open into the fenestrules the utropoidally arranged, obliquely situated, slightly projecting zoecial aperture of the upper row of zoecia, and thus the edge of the branches has sometimes a serrate appearance. The diameter of the apertures ranges from 0,20 to 0,25 mm.

The obverse side of the branches has two rows of zoecial apertures in the usual fenesteloidal arrangement. The zoecial rows are slightly alternating and they are separated from each other by a narrow (0,22 mm), deep, longitudinal furrow. The zoecial apertures are slightly oval, elongated in the direction of the branch, with a diameter of 0,19—0,22 mm. The distance between the individual peristomes in one row ranges from 0,20 to 0,30 mm. Then there are nine to ten zoecial rows in five mm of the length of the row.

The inner structure could be observed only in longitudinal transparent sections could be observed only in longitudinal transparent sections of the zoarium, of course only where bad preservation in the strongly limonitic limestones did not prevent this. The zoecia of the lower row with their apertures on the obverse side of the zoarium are 0,15—0,16 mm wide near the proximal end and 0,38—0,44 mm long, of a rectangular shape. The zoecia of the upper row are separated from those of the lower row by a horizontal lamella. They are coniform, arched, slightly flattened. They have no true peristome at the aperture, only slightly projecting aperture.

Remarks and affinities: I refer the reader to the generic diagnosis of the genus *Chasmatoporella* Nekhoroshev 1936 (NEKHOROSHEV 1936 — p. 7), whose genotype is the species *Chasmatoporella metzi* Nekh. because of its having but one meaning. The genus *Chasmatoporella* Nekhoroshev is well characterized and distinguished from the other representatives of the family *Phylloporinidae* Ulrich by the subreteporoidal structure of its

zoarium, by the two layers of zoecia in each branch, of which the lower ones have the usual fenesteloid character, only with the difference that no vestibula are developed. The zoecia of the upper row have a different, subreteporoidal shape and utroporoidal apertures on the sides of the branches into the fenestrules.

Because of his bad material NEKHOROSHEV (11 — p. 8) was unable to determine the ornamentation of the branches on the reverse side of the zoarium. The better preserved specimens from E. of Grange du Pin (Hérault) show that the surface of the branches is covered with a fine, transversal, wrinkled striation. This ornamentation recalls more the genus *Chai-nodyction* Foerstre 1887 than the genus *Subretepora* d'Orb. 1849, which has a characteristic coarse longitudinal striation.

The specimens from E. of Grange du Pin (Hérault) agree in their structure and dimensions with the specimens described by NEKHOROSHEV from the the Hochwipfelschichten of the Hohe Trieb (Carnian Alps). Therefore I believe them to be conspecific.

Occurrence: E. of Grange du Pin (Hérault). Asghilian. Hohe Trieb, Carnians Alps, Hochwipfelschichten. (Upper Ordovician.)

II. TREPOSTOMATA Ulrich.

PRASOPORIDAE Simpson 1887.

PRASOPORA Nicholson and Etheridge jun. 1877.

PRASOPORA THORALI n. sp.

(Pl. I, fig. 10.)

Holotype, the specimen the section of which is illustrated here on pl. I, fig. 10. E. of Grange du Pin (Hérault). Asghillian. — In the Collections of the National Museum in Prague.

Description. The zoarium forms solid, bulbous, hemispherical to subconical masses which grow to a considerable size. The largest (fragmentary) zoarium I know is more than 120 mm wide and 68 mm high.

The base of the zoarium is either flat or slightly convex and has generally the wrinkled, concentrically striated epitheca preserved. Very coarse striae and furrows of growth are marked on it.

The upper surface of the zoarium is generally more or less worn so that the arrangement of the zoecial apertures is usually very indistinct. It is only in well preserved places that it is possible to distinguish the minute, densely grouped, subpolygonal, generally subhexagonal zoecial apertures of a diameter of 0,36 to 0,39 mm. Generally there are four to five apertures in 2 mm of the length of the surface of the zoarium. Among the zoecial apertures of normal size there occur minute groups of seven to nine zoecia which are slightly larger than the others (with a diameter of 0,45—0,49 mm) and which may

be therefore described as flat monticullae. Here and there we find among the zoecial apertures of mesopores which it is difficult to distinguish from the zoecial apertures. Rarely there occur on the zoecial walls very minute thorns which take the place of true acanthopores.

Inner structure. Vertical transparent sections of the zoarium show that it is composed of several generations of zoecia which overgrow each other mutually. The zoecia are cylindrical and contain in their axial part rare diaphragms. In the cortical part the number of diaphragms increases

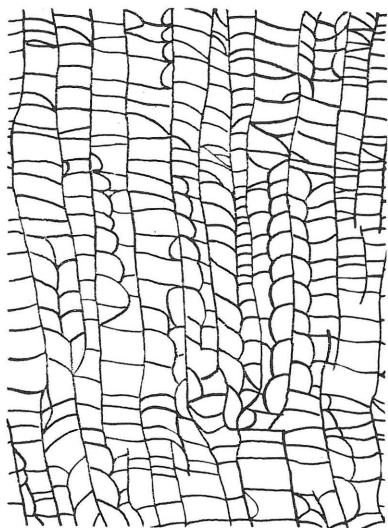


Fig. 2.

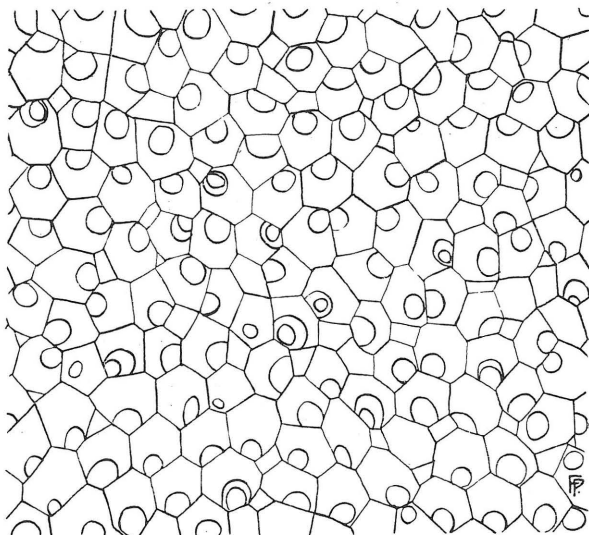


Fig. 3.

Prasopora thorali n. sp.

Fig. 2. Vertical, and Fig. 3. transverse section of the zoarium. cca 11 x. E. of Grange du Pin. (Hérault.) Asghillian.

rapidly and in the zoecia there occur cystiphragms increases rapidly and in the zoecia there occur cystiphragms. These form continuous rows, generally on one side of the zoecia, more rarely on both. Where they occur the otherwise horizontal diaphragms become generally convex or irregularly arranged. There are usually six to seven cystiphragms in one row in 2 mm of the length of the zoecia. The zoecial walls are very thin in the axial part and but slightly thickened in the cortical one. Among the zoecia there occur also rare sections of narrow mesopores with very numerous, densely crowded horizontal diaphragms. There are usually nine to eleven diaphragms in 2 mm of the length of the mesopores.

The transversal sections of the zoecia found in tangential transparent sections are hexagonal to subhexagonal. Pentagonal sections are very rare.

The zoecia are generally mutually connected by their lateral very thin walls. The mesopores are much smaller than the zoecia, usually they are of subtetragonal shape, and they are always in an angular position. In general they occur isolated, it is only exceptionally that two are found together. Usually we find in the zoecia also sections of cystiphragmes. These are either semi-circular and adjoined to one of the zoecial walls, or suboval or subcircular and in this case free, in a subcentral position.

Remarks and affinities. The zoaria of this species vary greatly in shape, from irregular masses to quite regular hemispherical zoaria very similar to the genera *Diplotrypa* Nicholson 1879 and *Dianulites* Eichwald 1829. From this it is evident that the shape of the zoarium depends to a large degree on the external conditions of the environment. (I. e. biological forms.)

This species resembles in its internal structure, especially in its comparatively rare mesopores, the arrangement of the flat monticullae and the minute thorns of an acanthoporic character the species *Prasopora contigua* Ulrich (26 — p. 249, pl. XVI, fig. 24—26) from the upper part of the Trenton shales and Galena shales in Minnesota and Cincinnati, Ohio. It differs only in the slightly larger dimensions of the zoecial elements, the rarer mesopores, and the larger, less continuous cystiphragms.

On the other hand *Prasopora thoralis* n. sp. shows a fairly close affinity to the species *Prasopora fistuliporoides* Vinassa de Regny 1910 (21 — p. 12, pl. 11, fig. 8—11), especially to the specimens described later from Capolago (Carnian Alps); (VINASSA DE REGNY, 1915 — 20 — p. 101, pl. XIII [II], fig. 1—3). In addition to the differences in the dimensions of the zoarial elements the main difference between the two species is the presence of monticullae and minute thorn-like acanthopores in the species *Prasopora thoralis* n. sp. I believe therefore their mutual relation to be analogous to that between the species *Prasopora contigua* Ulrich 1886 and *Prasopora simulatrix* Ulrich 1886, concerning which Ulrich (26 — p. 249). ULRICH remarks that they are perhaps varieties of one and the same species.

Occurrence. E. of Grange du Pin (Hérault), Asghillian.

Glauzy (Hérault), Caradoc.

Villeneuve Minervois, in the brook 1200 metres North of the commune.

TREMATOPORIDAE Ulrich 1890.

BATOSTOMA Ulrich 1882.

BATOSTOMA GABIANI n. sp.

(Pl. I., fig. 4., pl. II., fig. 10—11.)

Holotype, the fragment of a zoarium here illustrated on pl. I., fig. 1. E. of Grange du Pin (Hérault), Asghillian. — In the collections of the National Museum in Prague.

Description. Zoarium dendroid, composed of fairly strong, more or less flattened branches. The diameter of the branches ranges from 12,4 mm to 20,92 mm. Zoecial apertures circular, thick-walled, close together in groups, considerably large, subequal. Among them there stand out minute groups of slightly larger zoecia which may be described as flat monticulae. The distance between the monticulae amounts generally to 3—3,5 mm. Usually there are two zoecia in 2 mm of the length of the surface of the zoarium. The diameter of the zoecial apertures ranges from 0,74 mm to 0,77 mm. The larger apertures grouped together in the maculae attain a size up to 0,77 mm. At the surface of the zoarium we can observe in the thickened zoecial walls numerous, minute mesopores, generally of tetragonal shape, with closed apertures. Similarly we find generally in the centre of each macula a group of closed mesopores. The diameter of the mesopores ranges from 0,24 to 0,32 mm. True acanthopores are not developed. In their place there occur at the surface of the zoecium minute, fairly numerous thorn-like tubercles on the zoecial walls.

Internal structure. In longitudinal transparent sections of the branches of the zoarium there occur elongated, cylindrical, rather large, longitudinal sections of the zoecia. At the proximal end of each zoecium we find usually one or two diaphragms. Otherwise there are no diaphragms whatever in the zoecia of the axial part of the zoarium. In the axial part the zoecial walls are very thin and their thickness increases only quite gradually in the direction towards the surface of the zoarium. In the marginal part of the zoarium the zoecia turn gradually sideways and open obliquely on the surface. In these places we find again rare diaphragms (usually one or two, more rarely three) in the zoecia. In the marginal part fairly frequent, but relatively short mesopores occur among the zoecia. They are provided with numerous horizontal diaphragms.

In cross sections of the zoarium we can see distinctly a marked difference between the very narrow marginal and the relatively wide axial part, in the ratio of 1 : 0,20—0,25. In the axial part the transverse sections of the zoecia are thin-walled, suboval, generally subcircular. More rarely there occur also subpolygonal sections. Among them we find sometimes smaller, generally angularly disposed, subtrigonal to subtetragonal sections of mesopores of different sizes. In the narrow marginal part of the zoarium there are found the distal ends of the zoecia with thickened zoecial walls and rare diaphragms.

Remarks and affinities. The species *Batostoma gabiani* n. sp. shows in its large zoecia and angularly arranged mesopores an affinity to the species *Batostoma magnopora* Ulrich from the Trenton shales, Minnesota. (Ulrich 1895 — p. 291, pl. XXV, fig. 12—15). But it differs from it especially by its circular apertures and the presence of numerous flat maculae. Other-

wise it is well characterized by its dimensions which distinguish from all the other representatives of the genus.

Occurrence: E. of Grange du Pin. (Hérault.) Asghillian.
Glauzy, Caradoc.

HOMOTRYPELLA Ullrich 1886.

HOMOTRYPELLA MIQUELI n. sp.

(Pl. I., fig. 6; pl. II., fig. 1—2.)

Holotype, the specimen here illustrated, on pl. I., fig. 6. E. of Grange du Pin (Hérault), Asghillian. — In the collections of the National Museum in Prague.

Description. Minute, bushy zoarium composed of slim cylindrical branches of 2,4—3,2 mm in diameter. Apertures crowded close together, oblique, subcircular, to slightly subpolygonal, in most cases subpentagonal, with a diameter from 0,16 to 0,18 mm. Here and there we find among the normal zoecia minute groups of fove to seven larger zoecia (0,19—0,21 mm) which represent flat monticullae. Here and there smaller, polygonal apertures of mesopores are inserted between the apertures. But the mesopores never form macullae. Their diameter ranges from 0,10 to 0,13 mm. Acanthopores very small, indistinct, in general arranged angularly.

Internal structure. In longitudinal transparent sections of the zoarium we see that the outer marginal part of the zoarium is strikingly narrow when we compare it with the axial part. In the axial part the zoecia are long, cylindrical, parallel with each other. Their walls are very thin and finely crenulated. There are no diaphragms in the axial part.

In the marginal part the zoecia turn gradually sideways and open under a very oblique angle at the surface. In the lower parts of the marginal part they show always several diaphragms. Their number never exceeds two to four, and the interspace between them is quite considerable. Near the aperture each zoecium has one row of large, heavily arched cystiphagms. The zoecial walls of the marginal part are thickened and not crenulated. Mesopores relatively short narrow coniform, with numerous horizontal diaphragms.

In a transversal section the axial part shows irregularly subpolygonal sections of zoecia of different sizes. Among them we find the smaller polygonal sections of mesopores also minute, relatively short acanthopores.

Remarks and affinities. The species *Homotrypella miqueli* n. sp. shows certain affinities to the species *Homotrypa exilis* Ulrich (26 —

p. 236, pl. XIX., fig. 10—16) and *Homotrypa minnesotensis* Ulrich (26 — p. 236, pl. XIX., fig. 1—9). The species *Homotrypella miqueli* n. sp. has the zoecial walls in the axial part finely crenulated like *H. minnesotensis* Ulr., in the marginal part thickened and straight like the species *H. exilis* Ulrich, whereas they remain thin in *H. minnesotensis* Ulrich. All these three species approach each other by the complete absence of diaphragms in the axial part. The gradual curving of the zoecia towards the surface in the marginal part is also very similar in our species and in *H. minnesotensis* Ulrich. Shape, size and arrangement of the cystiphragms in the species *H. miqueli* n. sp. are more reminiscent of the species *H. exilis* Ulrich. But *H. miqueli* n. sp. differs from the two other species mentioned in the above not only by the smaller dimensions of the zoarial elements, the greater rarity of the diaphragms, but especially also by the arrangement of the mesopores. In *H. minnesotensis* Ulrich and *H. exilis* Ulrich the mesopores are arranged in characteristic maculae, whereas in the species *H. miqueli* n. sp. they are scattered all over the surface of the zoarium. This gives the generic difference between these species. The grouping of the mesopores in the maculae was given as the characteristic feature of the genus *Homotrypa* Ulrich 1882 to distinguish it from the kindred genus *Homotrypella* Ulrich 1886 (ULRICH, 26 — p. 255; ULRICH, 25 — p. 370; ULRICH 26 — p. 240; NICLES AND BASSLER 14 — p. 29, a. o.). *Homotrypella miqueli* n. sp. belongs to the second group of the genus *Homotrypella* characterized by a narrow marginal part of the zoarium with oblique apertures (BASSLER, 2 — p. 189). But it differs from all the representatives of this group, known to me from the literature, by the entire absence of diaphragms in the axial part, and in this it approaches again certain representatives of the group *Homotrypa* Ulrich 1882.

Occurrence: E. of Grange du Pin (Hérault). Asghillian.

HETEROTRYPIDAE Ulrich 1890.

DEKAYIA Milne-Edwards and Haime 1851.

DEKAYIA CRENULATA n. sp.

(Pl. I., fig. 7; pl. II., fig. 8—9.)

Holotype, after the monotype, the specimen here illustrated on pl. I., fig. 7. E. of Grande du Pin (Hérault). Asghillian. — Collections of the National Museum in Prague.

Description. Minute, ramose zoarium composed of slim, cylindrical branches. The diameter of the branches ranges from 3,6 to 4,6 mm. Zoecial apertures minute, subpolygonal, thick-walled, close packed. Generally there are six to seven, more rarely up to eight zoecial apertures in 2 mm of the length. Their diameter ranges generally from 0,17 to 0,21 mm. Here and there we

find however minute groups of five to six zoecia which are slightly larger than the others (diameter 0,23—0,25 mm) and which may be considered to represent flat, indistinct monticullae.

Among the zoecial apertures there occur very numerous, fairly large acanthopores, generally in an angular position. The distal ends of the acanthopores rise slightly above the zoecial apertures and produce the characteristic, granulous aspect of the surface of the zoarium. No mesopores.

Internal structure. In a transversal transparent section of the zoarium we see in the axial part thin-walled, polygonal (generally penta- to hexagonal) cross sections of zoecia. In the cortical part the zoecial walls are thickened. The zoecia contain numerous diaphragms. Among the zoecia we find very numerous acanthopores which extend their proximal ends nearly to the axial part of the zoarium.

In a longitudinal transparent section we find in the axial part sections of narrow coniform zoecia without diaphragms. The zoecial walls are very thin and strikingly crenulated.

In the cortical part of the zoarium the zoecia turn rather abruptly sideways and run obliquely towards the surface. Near the apertures there occur in them some close grouped diaphragms (8—10). The zoecial walls are thickened and contain numerous acanthopores. No mesopores.

Remarks and affinities. *Dekayia crenulata* n. sp. differs from all the representatives of the genus, I know from the literature, in their numerous acanthopores and crenulated zoecial walls in the axial part of the zoarium. Therefore I consider it as representing an independent species.

The genus *Dekayia* Milne-Edwards- and Haime 1851 is quite widespread in the North American Ordovician. Its occurrence in the Devonian is rather doubtful. But up till now it had not been given for the European Ordovician. The species *Dekayia crenulata* n. sp., described in the above, is therefore its first representative ascertained in Europe.

Occurrence: E. of Grange du Pin (Hérault).
Asghillian.

HALLOPORIDAE Bassler 1911.

HALLOPORA Bassler 1911.

HALLOPORA FORMOSA n. sp.

(Pl. I., fig. 5; pl. II., fig. 5—6.)

Holotype, the specimen here illustrated on pl. I., fig. 5. E. of Grange du Pin (Hérault). Asghillian. — Collections of the National Museum in Prague.

Description. Zoarium dendroid, composed of slim branches dividing quite frequently and dichotomically. The section across the branches is generally circular to slightly elliptical, and their diameter ranges from 5,4 to 6,2 mm. Apertures circular, thick-walled, subequal, fairly large (0,36—0,39 mm). There are usually two to three apertures in 2 mm of the length of the surface of the zoarium. Among the apertures we see fairly numerous, more minute, polygonal apertures of the mesopores surrounding entirely some of the apertures. Here and there the mesopores are grouped together in minute masses which may be described as maculae. No acanthopores. The diameter of the mesopores ranges from 0,15 to 0,17 mm.

Internal structure. In longitudinal transparent sections it is possible to observe in the axial of the zoarium long, slim, narrow coniform, thin-walled zoecia. The proximal part of the zoecia contains always closely packed, regularly arranged diaphragms, their number varying in the individual zoecia between twelve and fourteen. No diaphragms in the central part of the zoecium.

In the marginal part of the zoarium, which is relatively narrow, the zoecia turn gradually sideways with their distal ends, towards the surface of the zoarium. Near the aperture each zoecium contains two to four closely grouped diaphragms. The zoecial walls are distinctly thickened. Among the zoecia we find also longitudinal sections of narrow, conical mesopores with very numerous, transversal diaphragms.

In a transversal transparent section we find in the axial part of the zoarium the circular, subequal sections of zoecia, together with numerous, polygonal sections of mesopores, sometimes surrounding the individual zoecia on all sides. In the narrow marginal part the zoecial walls are thickened and among the zoecia we see the longitudinal sections of the narrower mesopores.

Remarks and affinities. The species *Hallopora formosa* n. sp. differs from the species *Hallopora meridiana* n. sp. from E. of Grange du Pin (Hérault), described below, in its stronger branches, its much more numerous mesopores, and the larger number of diaphragms in the proximal part of the zoecia.

Otherwise the species is very much like the species *Hallopora taramelli* (VINASSA DE REGNY, 1911 — 21 — p. 11, pl. 11, fig. 4) from Palon di Pizzul, Uggwa and Capolago in the Carnian Alps, with which it is perhaps identical. The main difference between the two species is that *Hallopora taramelli* Vinassa de Regny has slightly larger zoecia (0,4—0,5 mm) and a greater number of diaphragms in the distal part of the zoecia.

Occurrence: E. of Grange du Pin (Hérault).
Asghillian.

HALLOPORA MERIDIANA n. sp.

(Pl. I., fig. 7—8, pl. II., fig. 3—4.)

Holotype, the specimen here illustrated on pl. I., fig. 8. Asghillian. E. of Grange du Pin (Hérault). — Collections of the National Museum in Prague.

Description. The zoarium is composed of very minute, calcareous, slightly flattened branches. Frequent dichotomy. The diameter of the bran-

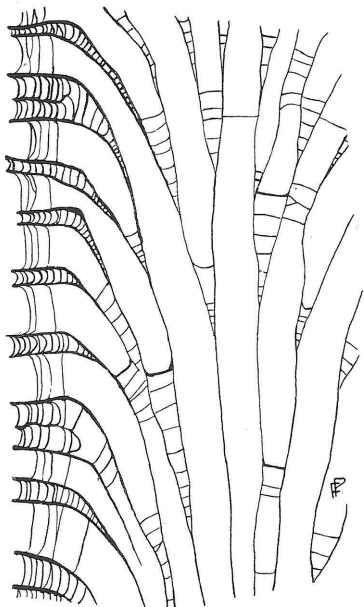


Fig. 4. — *Hallopora meridiana* n. sp.

Vertical section of the zoarium. $\times 5$. E. of Grange du Pin. (Hérault.) Asghillian.

ches ranges generally from 2,4 to 3,6 mm, and only exceptionally we find branches up to 5,4 mm. Apertures subcircular to subpolygonal, with thick walls. Their size is variable enough. In most cases the diameter of the apertures measures 0,33—0,36 mm, but there are also slightly larger apertures (0,39 mm). Generally there are three to four zooecia in 2 mm of the length of the surface of the zoarium. The mesopores are relatively rare, minute (0,10—0,15 mm), polygonal, in most cases tetragonal. Generally they occupy an angular position and they occur but rarely in pairs. No maculae, nor any real acanthopores. Instead of them we find minute, indistinct tubercles on the zooecial walls.

Internal structure. In the longitudinal transparent sections we find in the axial part thin-walled, long, narrow coniform, longitudinal sections of zoecia. Generally the zoecia have in their proximal part six to eight simple diaphragms, regularly disposed. The uppermost diaphragm is always distinctly stronger than the others. In the remaining axial part of the zoarium there are either no diaphragms at all, or there are only isolated diaphragms (one or two). Among the zoecia there are inserted here and there narrower mesopores, with very numerous horizontal diaphragms.

The peripheric part of the zoarium is relatively narrow. In it the zoecia curb sharply sideways towards the surface of the zoarium so that the apertures are nearly vertical. Near the apertures each zoecium has generally three to four, more rarely up to six closely grouped diaphragms. The zoecial walls are thickened.

In a transversal transparent section we see in the axial part of the zoarium the transversal sections of the subcircular to circular zoecia of unequal size, which are more or less in contact with each other. Between them the tetragonal sections of the smaller mesopores are inserted, but they never encircle the zoecia.

Remarks and affinities: The species *Hallopora meridiana* n. sp. differs from the species *Hallopora formosa* n. sp., described in the above, in its far smaller zoarium, the smaller number of mesopores which do not form maculae, and the lesser number of diaphragms in the proximal part of the zoecia.

Otherwise it is similar to the species *Hallopora pulchella* Ulrich (26 — p. 283, pl. XXII., fig. 1—12) from the upper portions of the Trenton Shales, Minnesota (St. Paul, Cannon Falls), with which it agrees especially in the relatively small number of mesopores and the isolated diaphragms in the central parts of the zoecia. But it differs from them in the external habitus with its smooth surface, without numerous projecting monticulae which are characteristic for *Hallopora pulchella* (Ulrich).

Occurrence: E. of Grange du Pin (Hérault). Asghillian.

III. CYCLOSTOMATA Busk.

CERAMOPOROIDEA Bassler 1913.

FISTULIPORIDAE Ulrich 1882.

FISTULIPORA McCoy 1850.

FISTULIPORA ALIENA n. sp.

(Pl. II., fig. 7.)

Holotype (here described), the specimen part of which is illustrated on pl. II., fig. 7. Neighbourhood of the caves at Limouzis (Hérault), Silurian. — National Museum in Prague.

Description. Free, minute, hemispherical to bulbous zoaria comprising several layers, 20—22 mm in diameter and 16—27 mm in height. The basal surface of the zoaria is flat, sometimes with the concentrically wrinkled epitheca preserved. Maculae and monticulae are not known.

Internal structure: In transparent cross sections we can see that the zoarium is composed of multiple, concentric, monolamellar generations overgrowing each other. The height of the different phases of growth ranges from 0,80 to 0,85 mm. The zoecia are typically cylindrical or slightly flattened, straight, with thin walls and a very short oblique proximal part. Diaphragms occur either quite isolately or are entirely absent. Where they are developed they occur one at a time in the upper part of the zoecium. The vesicular tissue filling the interspaces between the zoecia is likewise thin-walled, very coarse. The individual vesicles are fairly large, generally sub-tetragonal in a longitudinal section, usually higher than wide. In most cases they are arranged in two to three perpendicular columns.

In cross sections the sections of the zoaria are more or less circular to slightly oval, with a diameter of 0,32—0,34 mm. The lunarium is but slightly marked and appears at best as a broad rim occupying more than one third of the periphery of the zoecium. The individual zoecia are grouped relatively close together, with four to five zoecia in 2 mm of the length. The vesicular tissue surrounds in one to three series the individual zoecia. In a transparent cross section the individual vesicles appear as a tissue of subpentagons or sub-hexagons of different sizes.

Remarks and affinities. The genus *Fistulipora* McCoy 1850 which is widely distributed in the Upper Silurian, Devonian, and Lower Carboniferous, is represented in the Ordovician only by the species *F. primaeva* Bassler (1911 — p. 109, textfig. 40a—e) from the Baltic Middle Ordovician (Glaucinite Limestone B₂ — Pawlowsk, USSR) and by two species from the North American Middle Ordovician, which up till now have not been described in detail (Appalachian Valley). The species *F. aliena* n. sp. and the species *F. primaeva* Bassler show both the characteristics of primitive representatives of the genus *Fistulipora* McCoy, a very coarse vesicular tissue and a slightly marked lunarium. *F. aliena* n. sp. differs from the species mentioned above especially in the occurrence of diaphragms in the zoecia and the larger dimensions of the zoarial elements. The coarse vesicular tissue distinguishes it from the other representatives of the genus.

Occurrence: Neighbourhood of the caves at Limouzis (Aude).

Upper Silurian. Together with *Semicoscinium* sp. in limestones formerly referred to the Cambrian.

CONCLUSION.

As far as I have been able to judge from the material at hand the bryozoan fauna of the Ordovician and Silurian of Southern France is characterized by the predominance of the order *Trepostomata*. Up till now it has been possible to determine six representatives, whereas *Cryptostomata* are represented only by four, and *Cyclostomata* by one. We have to mention however that the association described in the above could be considered as more or less complete.

The Bryozoa described were derived, after M. THORAL'S kind information, in part from the Asghillian and Upper Caradoc of E. of de Grange du Pin and of Mont Glauzy, and in part from the Upper Silurian recently ascertained at Limouzis. The last two localities had formerly been referred to the Cambrian. As may be seen from the following synoptical table, the localities of E. de Grange du Pin, Mt. Glauzy, and Villeneuve Minervois have certain species in common, and this leads us to suppose that they belong to one and the same horizon. The locality at Limouzis characterized by the isolated find of *Semicoscinium* sp., and its Bryozoan fauna are so far very incompletely known. Stratigraphically they are younger (Silurian) and have no closer relation with the others.

Species:	E. of Grange du Pin	Mt. Glauzy	Limouzis	Villeneuve Minervois
<i>Graptodictya eremita</i> n. sp.	+	.	.	.
<i>Ptilodictya</i> sp.	+	.	.	.
<i>Chasmatoporella metzi</i> Nekh.	+	.	.	.
<i>Semicoscinium</i> sp.	.	.	+	.
<i>Prasopora thoralis</i> n. sp.	+	+	.	+
<i>Batostoma gabiani</i> n. sp.	+	+	.	.
<i>Homotrypella miqueli</i> n. sp.	+	.	.	.
<i>Dekayia crenulata</i> n. sp.	+	.	.	.
<i>Hallopora formosa</i> n. sp.	+	.	.	+
<i>Hallopora meridiana</i> n. sp.	+	+	.	.
<i>Fistulipora aliena</i> n. sp.	.	.	+	.

With regard to paleogeography and stratigraphy we have to emphasize that the occurrence in masses of Bryozoa in the uppermost layers of the Ordovician of Southern France (Languedoc) corresponds in its stratigraphical position to similarly rich bryozoan associations in other regions. (For inst. in the English and Baltic Caradoc and Asghillian, in the Bohemian and Carnian Caradoc, in the North American Trenton and Cincinnati, a. s. o.). But it has not the same close relations to all of them. From neighbouring regions the bryozoan association from the Carnian Alps shows the closest relation, being characterized likewise by the rich development of *Trepotomata*. For both regions the rich representation of the families *Halloporidae* Bassler and *Prasoporidae* Nich. and Eth. is very characteristic. From among the species described from the neighbourhood of Pallon di Pizzul, Ugwa and Capolago it is especially *Hallopora taramealii* Vinassa de Regny 1910, which closely approaches the South French species *H. formosa* n. sp., and *Prasopora fistuloporoides* Vinassa de Regny 1910 which manifests close relations to the species *P. thoralis* n. sp. from Montagne Noire. A similar close affinity to the Bryozoa from the Ordovician of Montagne Noire is manifested by an association from another part of the Carnian Alps, from the Hohen Trieb, derived from the so-called *Hochwipfelschichten*. These beds had been referred at first to the Lower Carboniferous, to the group of *Visé*, but recently B. NEKHOROSHEV (1936) has proved that they belong to the Ordovician. A comparison of the bryozoan association of the two regions enables us to say that the *Hochwipfelschichten* seem to represent the Upper Caradoc. This opinion is founded especially on the occurrence of the characteristic species *Chasmatoporella metzi* Nekhoroshev which is common to both. Besides *Ptilodictya* sp. ex gr. *lanceolata* Goldfuss from the Hohen Trieb shows a close affinity to *Ptilodictya* sp. from E. Grange du Pin, and a similar affinity exists between the South French *Graptodictya eremita* n. sp. and the Carnian *Graptodictya* sp. In my opinion it is most probable that the last two species are conspecific.

The rich fauna of *Trepotomata* from the *Zahořany beds* d₂ (Caradoc) of the Barrandien of Bohemia, which too has elements in common with the fauna of the Carnian Caradoc (*Monotrypa certa* Počta) manifests no affinity whatever to the fauna from Montagne Noire. Further a slight connexion is manifested also by the Bryozoan fauna of the English Caradoc, where in difference from the South French, Carniolan, and Bohemian associations of Ordovician Bryozoa, *Cryptostomata* (especially various representatives of the families *Phylloporinidae* Ulrich and *Ptilodictyonidae* Zittel) predominate by far over the *Trepotomata*. Only the species *Chasmatoporella metzi* Nekh. has its analogon in the Scottish Upper Caradoc in a smaller form not described up till now in detail of

the genus *Chasmatoporella* Nekhoroshev, derived from Bwlch-Y-Gaseg (Merionethshire).

The Bryozoa of the Ordovician regions of North Africa, Spain and Western France are still either not known at all or known so imperfectly, that their detailed comparison with the Bryozoa of Montagne Noire is not possible.

Stratigraphically the occurrence of *Semicoscinium* sp. in the neighbourhood of Limouzis is most important. It had not been known before from the Silurian of the Mediterranean region. Similarly important from a paleogeographical point of view is the occurrence of the genus *Dekayia* M. Edwards and Haine, formerly restricted to the North American Cincinnati (Utica, Lorraine). Finally the occurrence of the silurian species *Fistulipora aliena* n. sp. is worth notice.

Geol. & Paleont. Department, Národní Museum, Praha 1938.

BIBLIOGRAPHY :

1. — Bassler R. S., A Study of the James Types of Ordovician and Silurian Bryozoa. Proceed. U. S. Nat. Museum, vol. XXX, No. 1442, pp. 66, with 7 pls. Washington 1906.
2. — Bassler R. S., The Early Paleozoic Bryozoa of the Baltic Provinces. U. S. Nat. Museum, Bull. 77, pp. xxi — 382, with 13 pls. Washington 1911.
3. — Bassler R. S., Bryozoa. Generorum et Genotyporum Index et Bibliographia. In: Fossilium Catalogus I.: Animalia, editus a W. Quenstedt. Pars 67, pp. 229. s'Gravenhage 1935.
4. — Bergeron J., Étude géologique du Massiv Ancien situé au Sud du Plateau Central. Pp. 355, with 9 pls. and 1 geol. map. Paris 1889.
5. — Bergeron J., Étude des Terrains Paléozoïques et de la tectonique de la Montagne Noire. Bull. Soc. Géol. France, ser. III, vol. xxvii, pp. 617—791, pls. xviii—xx. Paris 1900.
6. — Coryel H. N., Bryozoan Faunas of the Stone River Group of Central Tennessee. Proceed. Indiana Acad. Sci., for 1919, pp. 261—340, pls. i—xiv. Indiana 1921.
7. — Frech F., Die paläozoischen Bildungen von Cabrières. (Languedock). Zeitschrift d. Deutsch. Geol. Ges., vol. xxxix, pp. 360—488. Berlin 1887.
8. — Kettner R., Ueber das neue Vorkommen der untersilurischen Bryozoen und anderen Fossilien in der Ziegelei Perníkářka bei Košif. Bull. Int. Acad. Sci. Boheme, pp. 12, with 2 pls. Praha 1913.
9. — Lonsdale W., Corals, in R. S. Murchison's: Silurian System etc., part II., pp. 675—694, pls. xv—xvi bis. London 1839.

10. — Edwards M. & Haime J., Monographie des polypiers des Terrains Paléozoïques, précédée d'un tableau général de la classification des Polypes. Archives Mus. d'Hist. Nat., vol. V., pp. 261—279. Paris 1851.
11. — Nekhoroshev P. B., Novye Nachodki silurijskij Mšanok (Neue Funde von Silurischen Bryozoen). Transact. Centr. Geol. and Prospect. Inst. USSR., fasc. 61, pp. 40, with 2 pls. Leningrad—Moskva 1936.
12. — Nicholson A. H., On the structure and affinities of the »Tabulate Corals« of the Paleozoic Period with critical description of illustrative species. Pp. 342, with 15 pls. Edinburgh 1879.
13. Nicholson A. H., On the structure and affinities of the genus Monticulipora and its subgenera with critical description of illustrative species. Pp. 240, with 6 pls. Edinburgh 1881.
14. — Nicles J. M. & Bassler R. S., A synopsis of American Fossil Bryozoa. U. S. Geol. Survey Bull. No. 173., pp. xi—663. Washington 1900.
15. — Orbigny d', O., Prodrome de Paléontologie Stratigraphique. Vol. i, pp. ix—394. Paris 1849.
16. — Počta F., Bryozoaires, Hydrozoaires et partie des Anthozoaires, in J. Barrande's: Système silurien du Centre de la Bohême. Part I, Recherches paléontologiques. Vol. viii, part i, pp. 230 with 21 pls. Praha 1894.
17. — Prantl F., On the genus Polyteichus Počta. Věst. Král. Čes. Spol. Nauk, II. tř., pp. 14 with 1 pl. Praha 1933.
18. — Prantl F., Note préliminaire sur les Bryozoaires ordoviciens de la Montagne Noire. Věstník Král. Čes. Spol. nauk, II. tř., pp. 2. Praha 1939.
19. — Prantl F., Sur les Bryozoaires siluriens de la Montagne Noire. C. R. Acad. Sci. t. 208, pp. 1415—1416, Paris 1939.
20. — Vinassa de Regny P., Fossili ordoviciani del Capolago (Seekopf) presso il passo di Volaja. (Alpi Carniche). Paleontograph. Italiana, vol. xxi, pp. 97—115, pls. xi—xiii. Pisa 1925 (1915).
21. — Vinassa de Regny P., Fossili ordoviciani del Nucleo centrale carnico. Atti Accad. Gioenia Sci. Nat., ser. 5., vol. iii, pp. 48, with 3 pls. Padova 1910.
22. — Vinassa de Regny, Fossili ordoviciani di Uggwa. Memoire Inst. Geol. R. Univ. Padova, vol. ii, mem. 4, pp. 29, pls. (xvi) i. Padova 1914.
23. — Vinassa de Regny, Sulla classificazione dei Trepotomidi. Atti della Soc. Italiana Sci. Nat., vol. xix, pp. 20. Pisa 1920.
24. — Simpson G. B., A Handbook of the Genera of the North American Paleozoic Bryozoa, with an introduction upon the structure of the living species. Fourteenth Ann. Rep. St. Geol. N. Y. for 1894, pp. 407—608, with 25 pls. Albany 1897.
25. — Ulrich E. O., Paleozoic Bryozoa. Geol. Surv. Illinois, vol. viii, ppl. 285—688, pls. xxix—lxxviii. Illinois 1890.
26. — Ulrich E. O., On Lower Silurian Bryozoa of Minnesota. Geology of Minnesota, vol. iii, part I, pp. 96—332, pls. i—xxviii. Minneapolis 1895.
27. — Ulrich E. O., American Paleozoic Bryozoa. Journal Cincinnati Soc. Nat. Hist., vol. V, 1882, pp. 121—175, pls. vi—viii; vol. V, pp. 232—257, pls. x—xi; vol. VI, 1883, pp. 82—92, pls. i; vol. VI, pp. 148—168, pls. vi—viii; vol. VI, pp. 245—279, pls. xii—xiv; vol. VII, 1884, pp. 24—25, pls. i—iii.

28. — Ulrich E. O. & Bassler R. S., Revision of the Paleozoic Bryozoa. Part II: Trepostomata. Smith. Inst. Miscell. Coll. vol. xviii, pp. 15—55, pls. vi—xiv. Washington 1905.
29. — Thor al M., Contribution à l'étude géologique des Monts de Lacaune et des terrains cambriens et ordoviciens de la Montagne Noire, pp. 307, pls. 2 and 1 geol. map. Paris 1935.
30. — Thor al M., Sur l'âge des formations paléozoïques des environs de Caunes — Minervois (Aude). C. R. Soc. Géol. France, No. 16, pp. 308—309, Paris 1938.

EXPLANATIONS:

Plate I.

	Page
<i>Graptodictya eremita</i> n. sp.	84
Fig. 1. — Holotype. Natural Size. Asghilian. E. of Grange du Pin (Hérault).	
<i>Chasmatoporella metzi</i> Nekhoroshev	87
Fig. 2. — Reverse side of the zoarium. Natural size. Asghilian. E. of Grange du Pin (Hérault).	
Fig. 3. — Obverse side of the zoarium. Natural size. Asghilian. E. of Grange du Pin (Hérault).	
<i>Ptilodictya</i> sp.	85
Fig. 3. — Portion of the zoarium. Natural size. Together with <i>Chasmatoporella metzi</i> Nekh. Asghilian. E. of Grange du Pin (Hérault).	
<i>Batostoma gabiani</i> n. sp.	91
Fig. 4. — Fragment of the zoarium. Holotype. 0.5 x. Asghilian. E. of Grange du Pin (Hérault).	
<i>Hallopora meridiana</i> n. sp.	97
Fig. 5. — Fragment of the zoarium. Holotype. 0.5 x. Asghilian. E. of Grange du Pin (Hérault).	
<i>Dekayia crenulata</i> n. sp.	94
Fig. 6. — Fragment of the zoarium. Holotype. 0.5 x. Asghilian. E. of Grange du Pin (Hérault).	
<i>Homotrypella miqueli</i> n. sp.	93
Fig. 7. — Fragment of the zoarium. Holotype. 0.5 x. Asghilian. E. of Grange du Pin (Hérault).	
<i>Hallopora formosa</i> n. sp.	95
Fig. 8. — Fragment of the zoarium. Holotype. 0.5 x. Asghilian. E. of Grange du Pin (Hérault).	
Fig. 9. — Another fragment of zoarium. Paratype. 0.5 x. Asghilian. E. of Grange du Pin (Hérault).	
<i>Prasopora thoralis</i> n. sp.	89
Fig. 10. — Section, cut from the holotype, showing both longitudinal and transverse sections of the zoecia. cca 5 x. Asghilian. E. of Grange du Pin (Hérault).	

Plate II.

	Page
<i>Dekayia crenulata</i> n. sp.	94
Fig. 1. — Vertical section. 6 x.	
Fig. 2. — Transverse section. 6 x. Asghilian. E. of Grange du Pin (Hérault).	
<i>Hallopora formosa</i> n. sp.	95
Fig. 3. — Transverse section. 6 x.	
Fig. 4. — Vertical section. 6 x. Asghilian. E. of Grange du Pin (Hérault).	
<i>Hallopora meridiana</i> n. sp.	97
Fig. 5. — Transverse section. 6 x.	
Fig. 6. — Vertical section. 6 x. Asghilian. E. of Grange du Pin (Hérault).	
<i>Fistulipora aliena</i> n. sp.	98
Fig. 7. — Vertical section. 5 x. Silurian. Limouzis (Aude).	
<i>Homotrypella miqueli</i> n. sp.	93
Fig. 8. — Transverse section. 6 x.	
Fig. 9. — Vertical section. 6 x. Asghilian. E. of Grange du Pin (Hérault).	
<i>Batostoma gabiani</i> n. sp.	91
Fig. 10. — Vertical section. 6.5 x.	
Fig. 11. — Transverse section. 6.5 x. Asghilian. E. of Grange du Pin (Hérault).	

