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TABULATA FROM NORWAY, SWEDEN AND FROM THE ERRATIC BOULDERS OF POLAND

(TABULATA Z NORWEGII, SZWECJI I Z GŁAZÓW NARZUTOWYCH POLSKI)

BY
ANNA STASIŃSKA

(WITH 14 TEXT-FIGURES, 6 TABLES AND 38 PLATES)

WARSZAWA 1967

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To Professor Roman Kozlowski –
my inspiring teacher

CONTENTS

INTRODUCTION

The purpose of this paper is to describe the results of a detailed morphological and taxonomical investigation of the Tabulata from Norway, Sweden (Island of Gotland) and from the erratic boulders of Poland. The stratigraphical correlation of Silurian in the above mentioned areas and in Estonia is given. These studies have also thrown some new light upon the development of Tabulata during Silurian in the Scandinavian-Baltic region.

A hundred and seven species assigned to twenty-six genera are described in the present paper. Thirty-six of the species and four of the genera are new. Moreover, a new family has been established.

The material from Norway was made accessible to the author by Paleontologisk Museum in Oslo. This material comes from the collections of J. KIAER (1893—1902, 1905, 1908, 1910). Some specimens considered in the present account were also collected by L. STØRMER in 1918, by P. STØRMER in 1938, and by TH. KJERULF.

The collections from the Island of Gotland were put at the disposal of the present author by Institut Royal des Sciences Naturelles de Belgique in Brussels, and by Naturhistoriska Riksmuseets, Paleozoiska Avdelning, in Stockholm. Some additional material was collected by Prof. K. POŻARYSKA, Palaeozoological Institute, Polish Academy of Sciences, Warsaw, and by the present author herself.

The large collection from the erratic boulders of Poland was given to the present author by Palaeozoological Laboratory, Polish Academy of Sciences, Poznań. A part of the material described comes also from the collections of Prof. R. KOZŁOWSKI and Prof. E. PASSENDORFER. Several specimens were collected by Dr. S. RUDOWSKI, Laboratory of Dynamic Geology, University of Warsaw, and by the present author.

The work was completed in the Palaeozoological Institute, Polish Academy of Sciences in Warsaw, in 1962—1966.

The comparative studies of the material described here with the Tabulata from Estonia were carried out in the Laboratory of Palaeozoology, Geological Institute of the Estonian Academy of Sciences in Tallinn. The classic development of Silurian and Ordovician sediments in Estonia and their similarity with the corresponding deposits in Sweden (Island of Gotland) and Norway (Oslo region) made possible the stratigraphical correlation of particular stages and substages, as well as the determination of the age of Tabulata from the erratic boulders.

The present author studied the fine structure of walls in the Palaeontological Institute, Academy of Sciences of U.S.S.R. in Moscow, where similar investigations on the Devonian Tabulata of Kazakhstan have been carried on by Dr. I. I. TCHUDINOVA.

ACKNOWLEDGEMENTS

The present author owes a special debt of gratitude to Professor R. KOZŁOWSKI, who has greatly helped in the preparation of this paper. She is also greatly indebted to Professor Z. KIELAN-JAWOROWSKA, director of the Palaeozoological Institute, Polish Academy of Sciences, who has critically read the manuscript.

The most sincere thanks are also due to Professor M. RÓŻKOWSKA (Palaeozoological Laboratory, Polish Academy of Sciences, Poznań), Professor K. POŻARYSKA (Palaeozoological Institute, Polish Academy of Sciences, Warszawa) and to Dr. S. RUDOWSKI (Laboratory of Dynamic Geology, Warsaw University), who kindly supplied their materials to the present author for investigation.

The present author's indebtness to Professor M. LECOMPTE (Institut Royal des Sciences Naturelles de Belgique) is great. Her present study would never be completed without the loan of the material from the Island of Gotland, which he collected himself. This collection allowed to start the interesting investigations. The present author would like to express her thanks to Professor A. CAPART, director of Institut Royal des Sciences Naturelles de Belgique, Bruxelles, who invited her for a month stay in Belgium, which enabled her the preparation of material for investigation. Thanks are also due to Mr. J. LE BON and the late Mr. M. VAN MEERBEEK (Institut Royal des Sciences Naturelles de Belgique) for preparation of thin sections and providing with necessary literature.

Thanks to the grant of the Polish Academy of Sciences, the present study was completed in Sweden and U.S.S.R.

While in Sweden, the present author had the opportunity to examine collections of the Tabulata from Island of Gotland, which are stored in Paleontologiska Institution, Lunds Universitets, and in Naturhistoriska Riksmuseets (Stockholm).

Professor C. REGNÉLL, director of Paleontologiska Institution, Lunds Universitets (Lund), kindly made available to the present author the collections of Tabulata being in his charge. Professor E. JARVIK, director of Paleozoologiska Avdelning, Naturhistoriska Riksmuseets (Stockholm), kindly supplied the materials to the present author for investigation. Under Docent J. E. HEDE's most competent guidance, the present author had an opportunity to see the important sections of Silurian on Island of Gotland. Dr. H. MUTVEI helped her in many ways during her visit in Stockholm. To all persons mentioned above the present author is greatly indebted.

Thanks are also due to Professor A. HEINTZ, director of Paleontologisk Museum (Oslo), and Dr. G. HENNIGSMOEN (Paleontologisk Museum, Oslo) for supplying the Norwegian materials for investigation.

The present author wishes to express her deep gratitude to Professor K. ORVIKU, director of the Geological Institute of Estonian Academy of Sciences, who invited the author to Tallinn. There, Dr. E. KLAAMANN kindly made available to her the collections of Tabulata. His friendly help was of great importance for completing her investigations.

The late Professor J. A. ORLOV (Palaeontological Institute, Moscow) invited the present writer to Moscow and helped her in many way. The director of Palaeontological Laboratory of the Institute for Geology and Geophysics (Siberian Division of the U.S.S.R. Academy of Sciences in Novosibirsk), Professor B. S. SOKOLOV, invited the present author to Novosibirsk. His sincere help, valuable advice and discussions were of great significance for the present paper.

In addition, the writer would like to express her thanks to the Soviet colleagues: Dr. I. I. TCHUDINOVA (Palaeontological Institute, Moscow), Dr. M. S. ZHIZHINA, Dr. M. A. SMIR-

NOVA (Institute of Arctic — NIIGA, Leningrad), Dr. V. D. TCHECHOVITCH (Geological Institute — VSEGEI, Leningrad), Dr. J. A. TESAKOV, Dr. V. N. DUBATOLOV (Palaeontological Laboratory, Novosibirsk). They friendly helped, made their collections available for her investigations and provided all useful informations.

The accompanying drawings are the work of Mrs. K. BUDZYŃSKA, while the photographs were prepared by Miss M. CZARNOCKA. The thin sections were made by Miss M. WITKOWSKA. These works above mentioned are fully appreciated by the present author.

The following abbreviations are used:
Z. Pal. — Palaeozoological Institute of the Polish Academy of Sciences, Warszawa, Poland.
INB — Institut Royal des Sciences Naturelles de Belgique, Bruxelles, Belgium.
RM — Naturhistoriska Riksmuseets, Stockholm, Sweden.
PMO — Paleontologisk Museum, Oslo, Norway.

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Warszawa, Al. Żwirki i Wigury, 93
August 1966

GENERAL PART

CORALLUM GROWTH AND STRUCTURE

The growth of the colony in the Tabulata begins with the auloporoid stage, as confirmed by several writers. LINDSTRÖM (1865) gave the best example of the development of young colonies in "*Favosites clausus*" and *Heliolites porosus* (1899) from Island of Gotland. BEECHER (1893), GIRTY (1895), VOJNOVSKY-KRIEGER (1928) display the auloporoid shape of protocorallites in genera *Favosites*, *Michelinia* and *Pleurodictyum*. Similar observations were made by SOKOLOV (1955) on representatives of *Favosites*, *Michelinia*, *Syringopora* and *Fletcheria*.

Budding is the most common method of asexual increase of coralla in Tabulata. A detailed investigation of budding in this group of corals, as well as in the Heliolitida was made by KOCH (1883), who in his studies applied the use of serial and thin sections. He observed that the offsets in *Favosites* appear between the two adjoining corallites. This process is known as interstitial increase. In *Syringopora* and *Sarcinula*, the young offsets are formed on the tubules or bridges connecting the adult corallites. The latter mode of budding was named by KOCH as „stolonal". In both cases mentioned, the budding has an external character, because the adult calyces do not take any part in this process, and the young offsets arise on the epitheca of adult corallites, or on the surfaces of tubules or connecting lamellae.

A detailed analysis of the asexual increase in Tabulata was given by SOKOLOV (1955, 1962), who stated that the budding from maternal zooids or the formation of buds between them is characteristic for this class. But comparatively rare in this group is intracalycal gemmation or fissiparous gemmation. The coenenchymal budding, common in Heliolitida, does not occur in the Tabulata. According to SOKOLOV (1955), the type of budding is characteristic for the peculiar orders and suborders. Having well preserved material, the present author was able to trace the growth and structure of the colonies in several representatives of Halysitida, Favositida and Auloporida.

In the Halysitida, the colony begins with protocorallite (Pl. XXXIV, Figs. 1, 5), which is characterized by an auloporoid shape. It is usually attached to the surface of an other corallum. Its proximal part is cup-shaped. While attaining 1 mm length, the protocorallite starts to gemmate. This first gemmation in *Catenipora* and *Halysites* is of basal type, and is similar to that in *Aulopora*. The first offset is formed at the terminal end of the protocorallite, on its basal side, which is attached to the substratum. The subsequent gemmation proceeds very early, and the new offsets always appear singly, on the basal side of a corallite. It results in a chain typical for Halysitida. The chain, when 1 cm long, consists already of about 12 corallites, which may reach a height of up to 7 mm (Pl. XXXIV, Figs. 8—10) and have a shape typical for the particular genus. In calyces, septa and tabulae appear very quickly. Budding at this

stage proceeds at a faster rate than vertical growth. In such a way, the first chain is formed. Later, budding occurs on the side walls (Pl. XXXIV, Figs. 6, 7). The first lateral offsets gemmate early and initiates the new chain (Pl. XXXIV, Fig. 3) hanging between the other chains of corallites (Pl. XXIV, Fig. 6). The young corallites appear on epitheca on the contact between adjoining corallites (Text-fig. 1). The buds rarely occur on the side walls (Text-fig. 2) and evidently

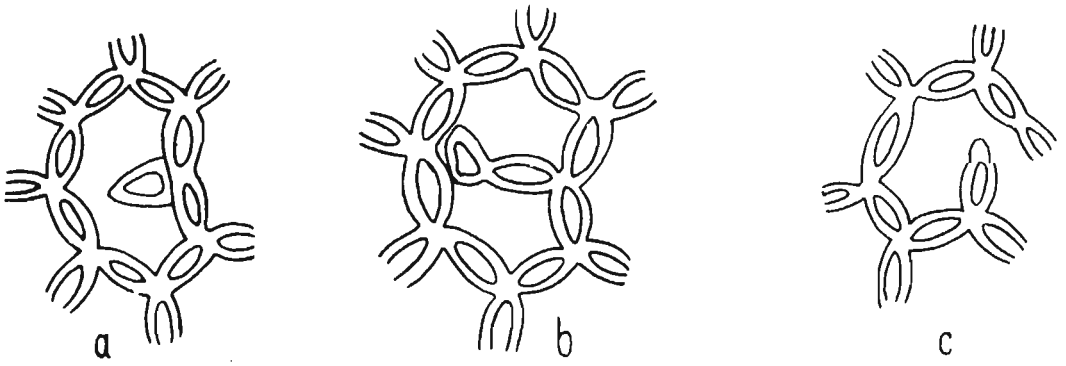

Fig. 1
Catenipora exilis EICHWALD: formation of young corallites (PMO-54825); ×7.

this happens only in *Catenipora*. The bud appears in form of a small convexity on the terminal part of the new corallite (Text-fig. 1 *c*). The young individuals gemmate, forming the new rank of corallites, which grows until meeting the rank of adult corallites. At the junction the young corallite flattens (Text-fig. 1 *b*) and only later, during the growth of a colony, it assumes the shape characteristic for the species (Text-fig. 3 *e*). The walls at the contact of a young and adult corallite are at first separate, but they gradually merge together, and at last there appears a common intercorallite wall.

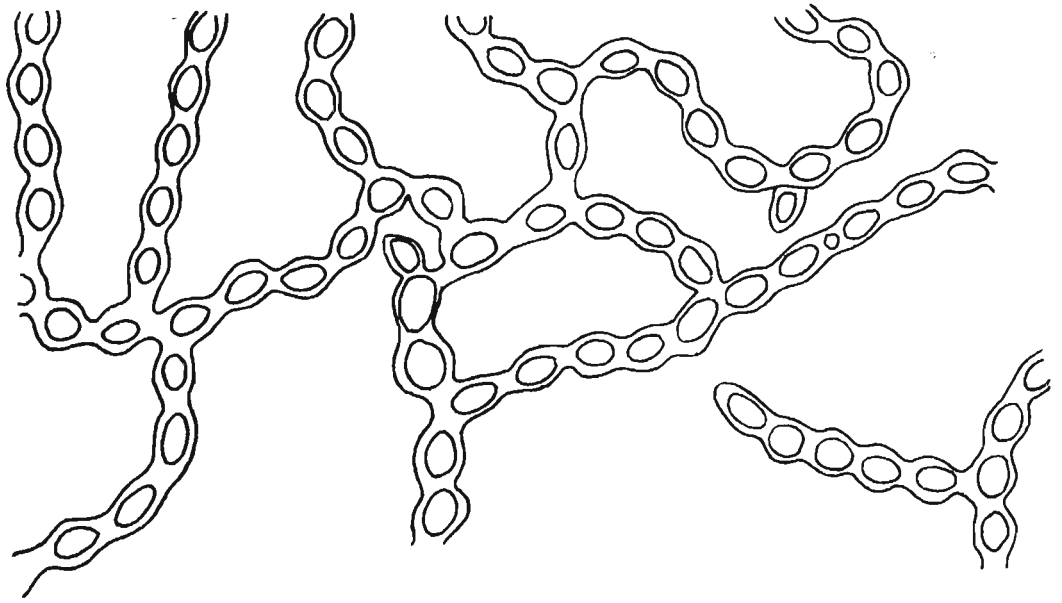

Fig. 2
Catenipora sp.: formation of young corallites (Z.Pal.T/III-56); ×6.

In the genus *Halysites*, usually in that place arise mesocorallites. In this way, the addition of the new chain of corallites causes the filling up of the broad lacunae, and the colony gradually assumes the character typical of that particular group of species. In this genus, budding takes place on the epitheca of the mesocorallite and, as already stated, never on the side walls of corallites. The mesocorallite appears between the young corallites only when they nearly reach the dimensions of mature individuals (Text-fig. 3*e*). The wall between adjacent corallites becomes double (Text-fig. 4-I*a*; Pl. XXXVIII, Fig. 1). Subsequently, the first, and later the second opening appears (Text-fig. 4-II*a*; Pl. XXXVIII, Fig. 8); they fuse together (Text-fig. 4-II*b*) forming a narrow slit (Text-fig. 4-I*b*, II*c*; Pl. XXXVIII, Fig. 3). During the further growth

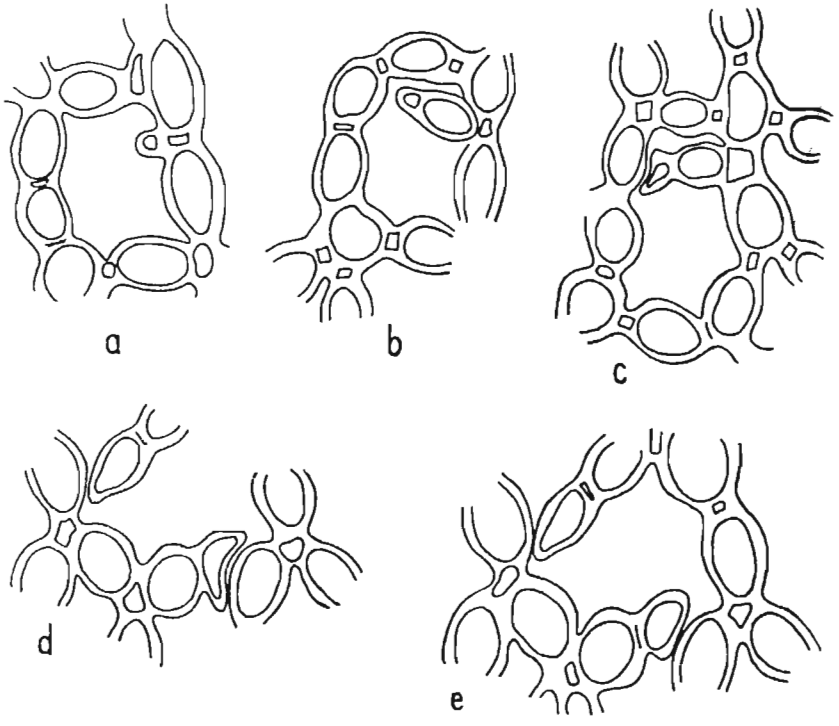

Fig. 3
Halysites junior KLAAMANN: formation of new chain of corallites (Z.Pal.T/III-78); ×6.

of corallites, the slit widens progressively until it reaches the size characteristic for the species (Text-fig. 4-I*c*, II*d*; Pl. XXXVIII, Figs. 3—5, 9, 10). At first, the mesocorallite side walls are thick (Text-fig. 4-I*a*, *b*, II*c*; Pl. XXXVIII, Fig. 5). In cross-section, they are crescentic or similar to even rollers (Pl. XXXVIII, Figs. 4—6), depending on the species. While the mesocorallites grow in size, their walls become thinner (Text-fig. 4-I*c*, II*d*; Pl. XXXVIII, Fig. 10). In some *Catenipora* species, the intercorallite wall is distinctly delimited from the side walls (Pl. XXXVIII, Fig. 12). In that place mesocorallites appear in *Halysites*, and in some species, these are very narrow and slit-shaped (Pl. VIII, Fig. 1). They are provided with tabulae well seen in the longitudinal sections, crossing the longer diameter of a mesocorallite.

Because in *Halysites*, the buds are formed on mesocorallites only, it may be deduced that mesocorallites are the equivalents of a stolon. The lack of mural pores particularly seems to indicate that mesocorallites provide a kind of a communication between the autocorallites.

Sometimes on the mesocorallite walls in *Halysites*, cracks are seen, which could be misinterpreted as specific characters. Detailed observation shows, however, that the walls are secondarily deformed and cracked (Pl. XXXVIII, Figs. 5, 11). These walls sometimes become folded and form a kind of short septa (Pl. XXXVIII, Figs. 2, 5). In normally developed corallites, formed in places where they have enough space to increase, the walls are even and without foldings or cracks.

On the polished surface of a young colony, young corallites are often visible, which do not join at the initial stage with the chains of the corallites (Text-fig. 5*a*). It seems that there existed the possibility for the planula to settle on the sediment filling the lacunae, during the life of a colony. It is possible to trace the development of a coral life from the first plate formed by settled larva. The plate is a tiny disc, which gradually becomes surrounded by walls (Text-fig. 5*a*). Later the young corallite becomes elongate, and in cross-section it becomes gradually oval in shape (Text-fig. 5*b*). When the young corallite grows, close to the chain of adult individuals, their union takes place early (Text-fig. 5*c*), and in this case they completely

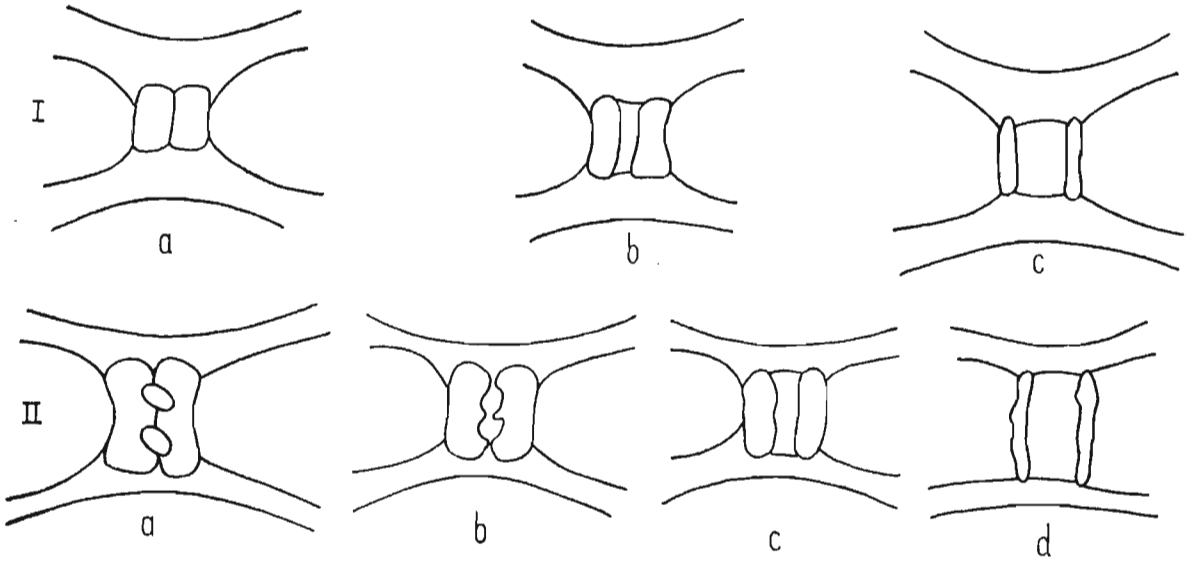

Fig. 4
Halysites junior KLAAMANN: formation of mesocorallites (Z.Pal.T/III-78); ×24.

fuse together. In this way, the new chain arises (Text-fig. 5*d-h*) and the further growth of this continues normally. Sometimes, the young corallite gemmates before connecting with the other chain and its offset adheres to the rank encountered. Up to now, this fact has not been observed, probably because young colonies were never previously studied.

In tracing the development of a young colony, it is sometimes possible to find several chains which are not joined together. In such a case it seems that several larvas settled very close together on the substratum at the same time. Each of them gave the rise to an independent chain, which only later, during increase, join together, gradually forming a common colony. Consequently, it seems highly probable that a colony can develop as a result of the settlement of not only one, but also of several larvae.

The mode of budding in *Cystihalysites* was not studied because of the lack of suitable material. However, even in this genus, it may be seen that young corallites arise at the contacts between the adult ones, and in places where the vesicular tissue occurs (Text-fig. 6). It was not possible, however, to ascertain the part played by this tissue in the formation of a new bud.

Besides, it is not clear whether two buds arise at the same time, or only one bud. It seems that only one bud arises at a time, and during growth this gradually recedes from the place of origin, at a progressively increasing angle (Text-fig. 6 *a-c*).

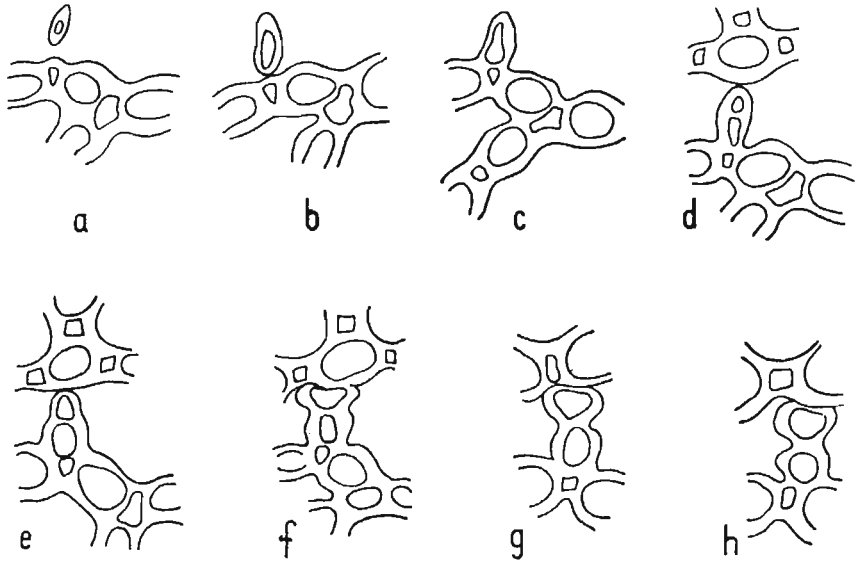

Fig. 5
Halysites junior KLAAMANN: formation of new chains composed of corallites not connected in their incipient stages with chains of adult corallites (Z.Pal.T/III-78); ×5·2.

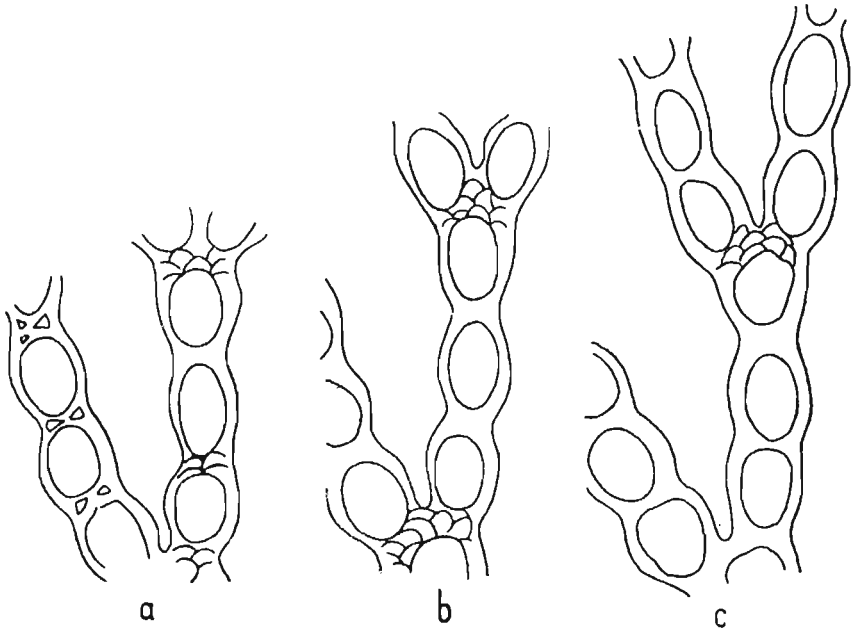

Fig. 6
Cystihalysites mirabilis TCHERNYCHEV: formation of young corallites (Z.Pal.T/III-16); ×6.

From the above observations it is clear that in the genera *Catenipora*, *Halysites* and *Cystihalysites* there occurs in the representatives of Halysitida gemmation typical for the class

Tabulata. The young corallites develop at the contact between the adult corallites. During further increase of a colony, the lacunae fill up with new chains of corallites, which gradually results in a net-structure, characteristic for any given species.

In *Catenipora*, lacunae are only somewhat elongate and usually polygonal, with rather sharp angles. On the other hand, in *Halysites* lacunae are more elongate, often narrow, with rounded angles. The size of lacunae is variable, and may reach up to 6 cm in length and 1 cm in width. The sides of lacunae consist of varying number of corallites, from one to twenty, and sometimes even more.

Within a colony, lacunae differ in size and shape and in the number of corallites on each side. However, the average dimensions and shapes of lacunae are rather constant and they form a net of pattern characteristic for each species. The shape of lacunae depends of the number of corallites between the branching points. Four types of lacunal structure may be distinguished:

I. Lacunae regular and polygonal. Each side of the lacuna consists of one or two corallites, and only exceptionally three of them are present. Here belong: *Catenipora exilis* and *C. piirsaluensiformis* n. sp. (Text-fig. 7*a-b*).

II. Lacunae are polygonal, though not so regular as in the previous group, which have their sides composed of several corallites, from one to five. The net in this group has lacunae rectangular and polygonal, slightly elongate, with sharp angles. Here are assigned several species: *Catenipora quadrata*, *C. escharoides* and *C. vespertina* (Text-fig. 8*a-c*).

III. Lacunae are similar to those described above, but much more elongate. The number of corallites forming the lacunae is large, and reaches more than ten. To that group should be assigned *C. heintzi* n. sp., *C. tractabilis* and *C. obliqua* (Text-fig. 9*a-b*).

IV. Lacunae strongly elongate, usually with rounded angles. They can be seen in *H. senior* and *H. junior* (Text-fig. 10 *a-b*), the colonies of which are composed of round or nearly round corallites, of relatively large diameter.

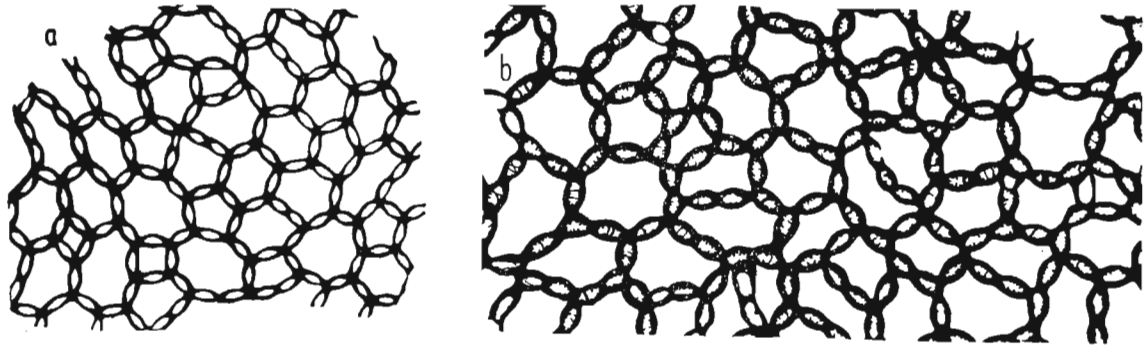

Fig. 7
Polygonal lacunae of regular shape: *a Catenipora exilis* EICHWALD (Z.Pal.T/III-135), ×3·3; *b C. piirsaluensiformis* n. sp. (Z.Pal.T/III-40), ×3·3.

The order Halysitida exhibit very peculiar, bushy form of colony, which is sometimes massive and is found in this group only. This peculiar shape results from the mode of junction between the corallites, since union takes place only along their two sides. In early representatives of the order, the corallites are polygonal in cross-section. They join together along four or six sides, forming multiserial ranks, sometimes of massive form.

The colonies of species which appeared later consist of corallites oval or rounded

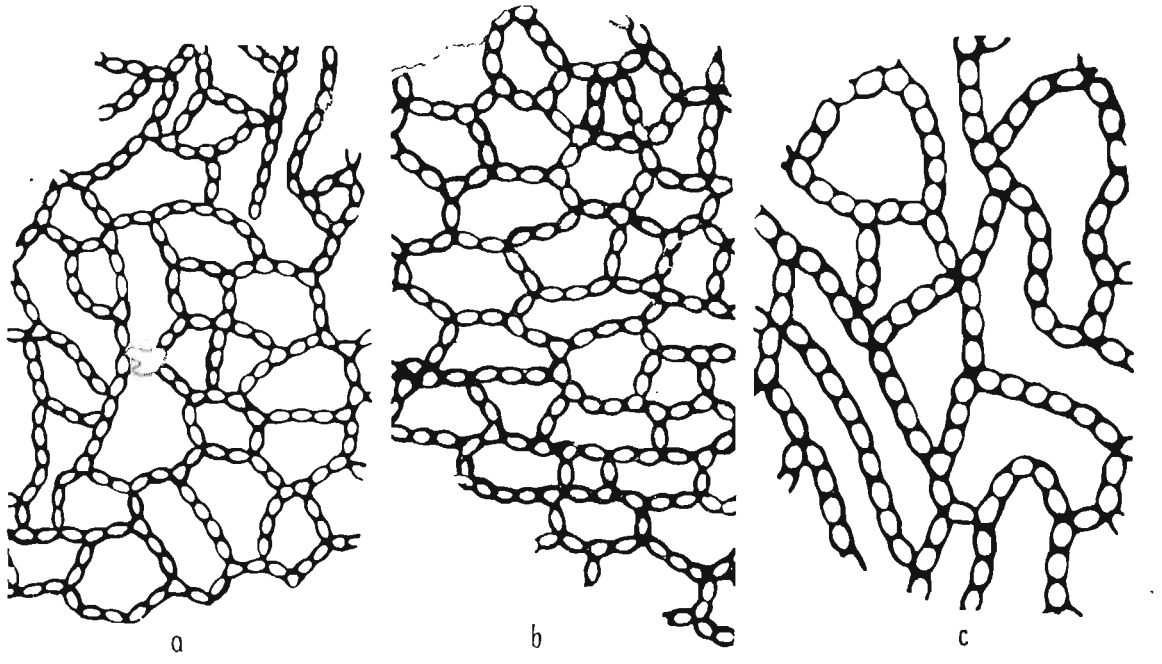

Fig. 8
Polygonal lacunae of not very regular shape: *a Catenipora quadrata* (FISCHER-BENZON) (INB-1779), ×2·8; *b C. escharoides* LAMARCK (Z.Pal.T/III-90), ×2·8; *c C. vespertina* KLAAMANN (Z.Pal.T/III-57), ×2·8.

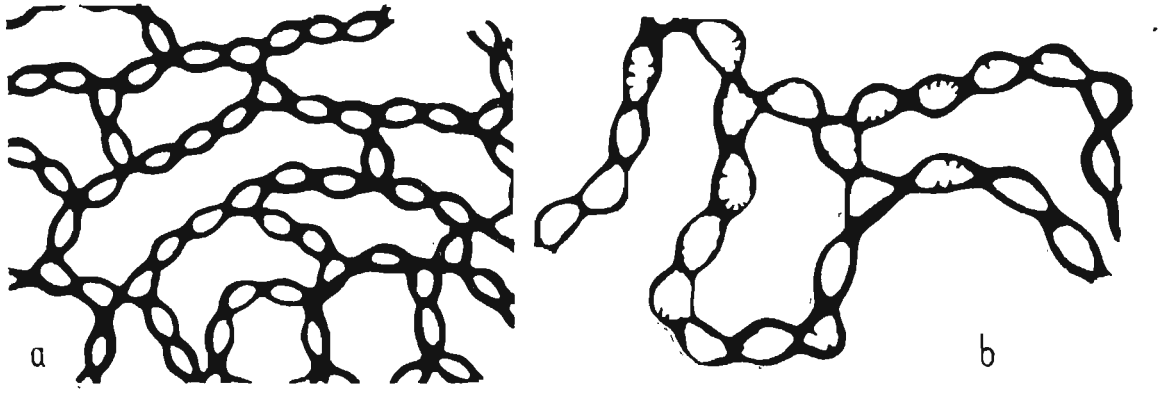

Fig. 9
Polygonal, elongate lacunae: *a Catenipora tractabilis* SOKOLOV (Z.Pal.T/III-56), ×3·7; *b C. obliqua* FISCHER-BENZON (Z.Pal.T/III-133), ×3·7.

in cross-section, which join together along two sides. In this way elongate ranks originate, which, while anastomosing, form in cross-section a kind of network.

The general shape of a colony is plate-like, discoidal or semiglobular. Its surface is slightly convex, usually even as a result of the uniform growth of the corallites. The young colonies show more regular, discoidal shape, because of the radial arrangement of corallites. The shape of the adult colonies is not precisely known.

Entire, well preserved colonies are only occasionally found. This is due to two main causes. Firstly, Halysitida are usually preserved in limestones, and the separation of a colony is rather difficult; weathered specimens are only occasionally found. The second reason is the fact that they probably lived in a mobile environment, which often caused the partial damage of a colony. Thus, the specimens with a perfectly preserved basal part are rarely found. Judging from previous descriptions, authors had at their disposal mostly fragmentary colonies. On this basis, they have often drawn inaccurate conclusions about the shape and size of a colony.

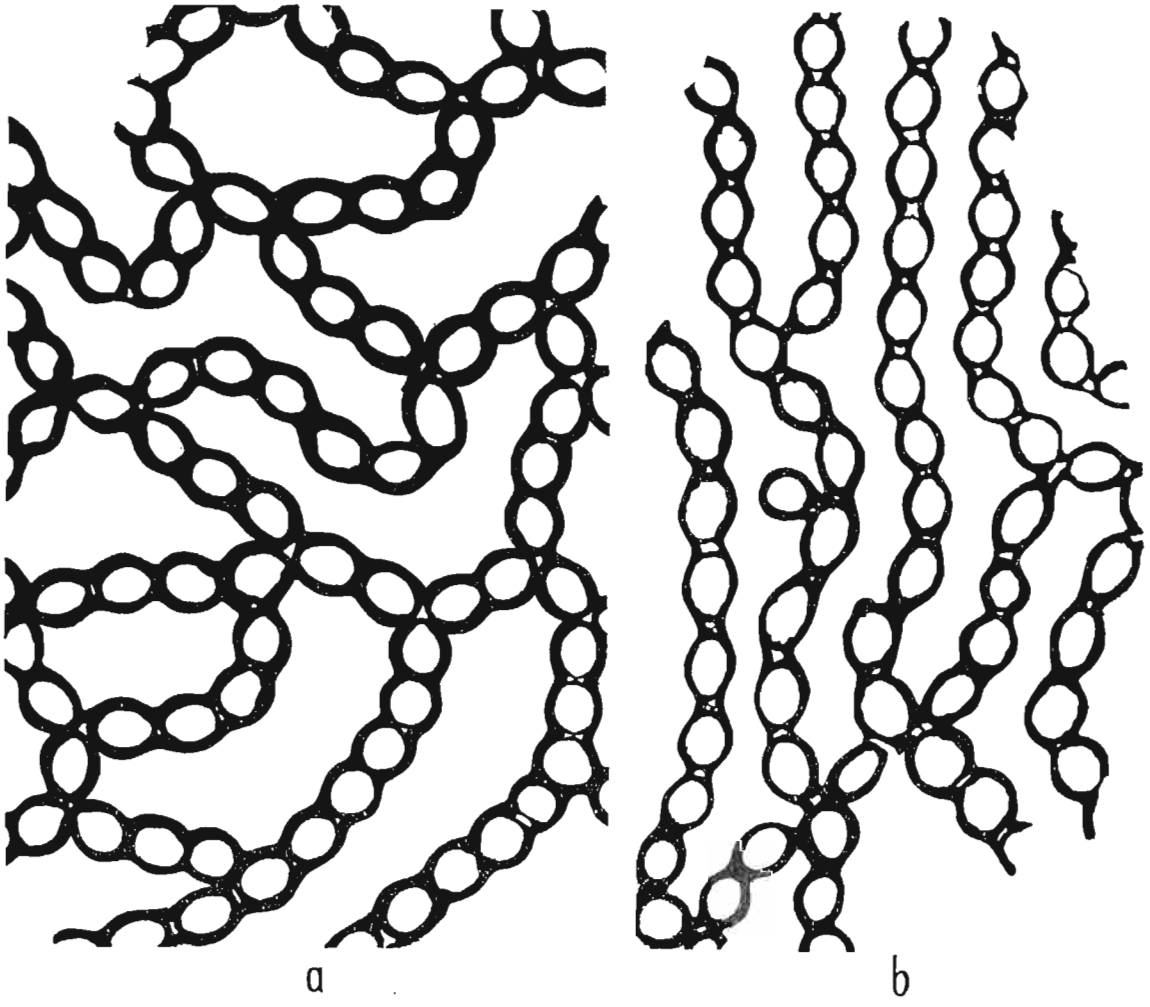

Fig. 10
Strongly elongate and narrow lacunae: *a Halysites junior* KLAAMANN (Z.Pal.T/III-113), ×3·2; *b H. senior* KLAAMANN (Z.Pal.T/IV-3), ×3·2.

The measurements of the colonies vary within rather wide limits. The largest of them are about 30 cm in diameter and 15 cm in height. They probably can attain the larger size, but it seems that they do not exceed very much the above mentioned dimensions.

On the basis of the material from the Silurian of the Island of Gotland, the present author could state that certain groups of related species exhibit a characteristic shape of colony. The group of such species as *C. escharoides* and *C. quadrata* exhibits in young stage of development

colonies discoidal in shape, not very high. The largest colony in the present author's material measures 6·5 cm in height. The old colonies become sometimes less regular. This probably depends upon amount of space available in which spreading growth may take place. In result, they may become either more plate-like or loaf-shaped.

The colonies assigned to the representatives of the genus *Halysites* are more semicircular and exhibit corallites oval in outline, nearly round. It was not possible to state whether any relationship exists between the dimensions of the corallites and those of a colony. The size of the corallites probably does not influence the dimensions of a colony.

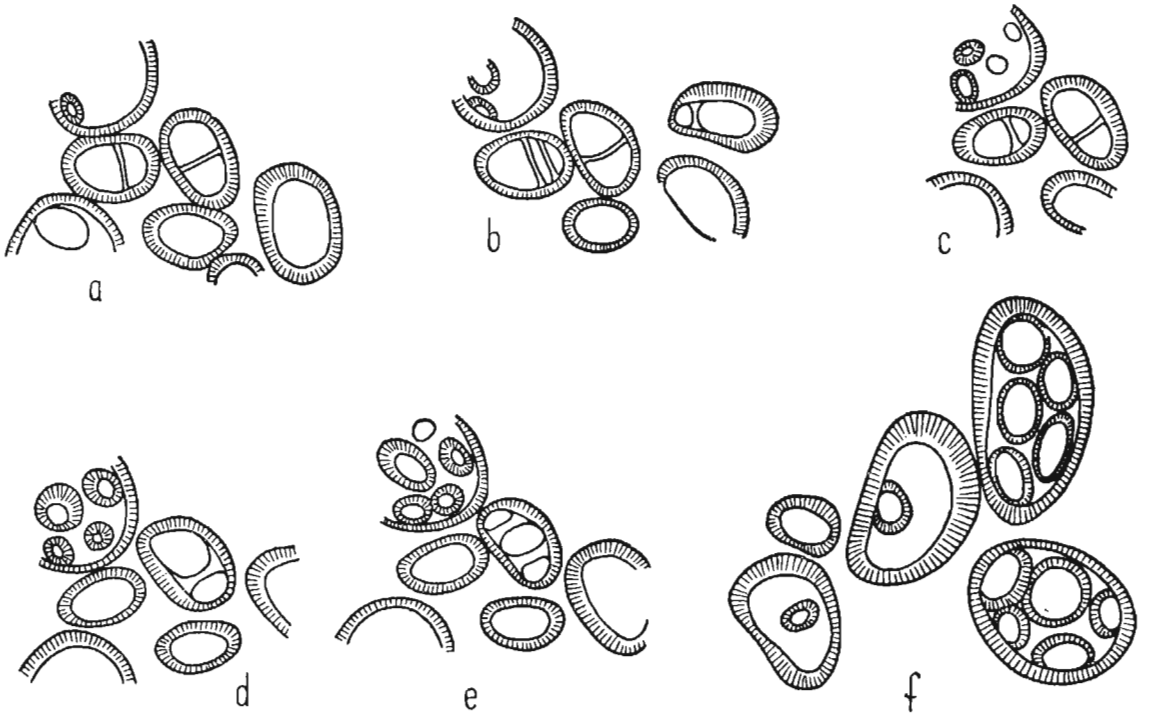

Fig. 11
Fletcheria tubifera MILNE-EDWARDS & HAIME: formation of buds (RM-21082); ×6.

The author had the possibility to trace the development of a young colony in the genus *Favosites*. The protocorallite is here characteristically broadened in its initial part, as is the case with *Aulopora* (Pl. XXXIV, Fig. 2). It gemmates from the basal part attached to the substratum, and there arise simultaneously two offsets. Because successive corallites also gemmate early the young colony, composed only from several corallites, settles at once into a semiglobular shape. The protocorallite is usually covered by the young corallites. It is only visible in the early stage of the development of a colony.

The earliest adjoining corallites are polygonal in cross-section. Tabulae and septal spines appear in the calyces very early. The shape of those first corallites, as well as their diameters, are from the very beginning characteristic for the species.

The similar development of a colony occurs in representatives of Auloporida, namely in the genus *Favosipora* n. gen., which is assigned to the family Romingeriidae SOK. The development of a colony in *Favosipora clausa* begins with the auloporoid stage (Pl. XXXIV, Fig. 4). The protocorallite shows the swollen basal part and is usually attached to the other

corallum. Its shape is very similar to the shape of the corallite in genus *Aulopora*. While budding, it gives simultaneously two offsets on its basal surface. These new corallites gemmate very early and the young colony is formed, exhibiting a semiglobular shape. Its corallites come into contact with all the walls only in the places where they appear in greatest number. In such a case, this part of colony is formed by polygonal corallites, typical for the genus *Favosites*. However, in places, corallites are not in contact, grow freely (Pl. XIII, Fig. 4). In this latter case, their outline is round in cross-section.

Most probably all representatives of the Tabulata have a similar development of the colony. The initial auloporoid stage begins with a protocorallite, which consists of a bubble-shaped, calcareous cover for the settled larva. Protocorallite is small and attached to the substratum. It always gemmates on its basal surface. The earliest corallites take, from the very beginning,

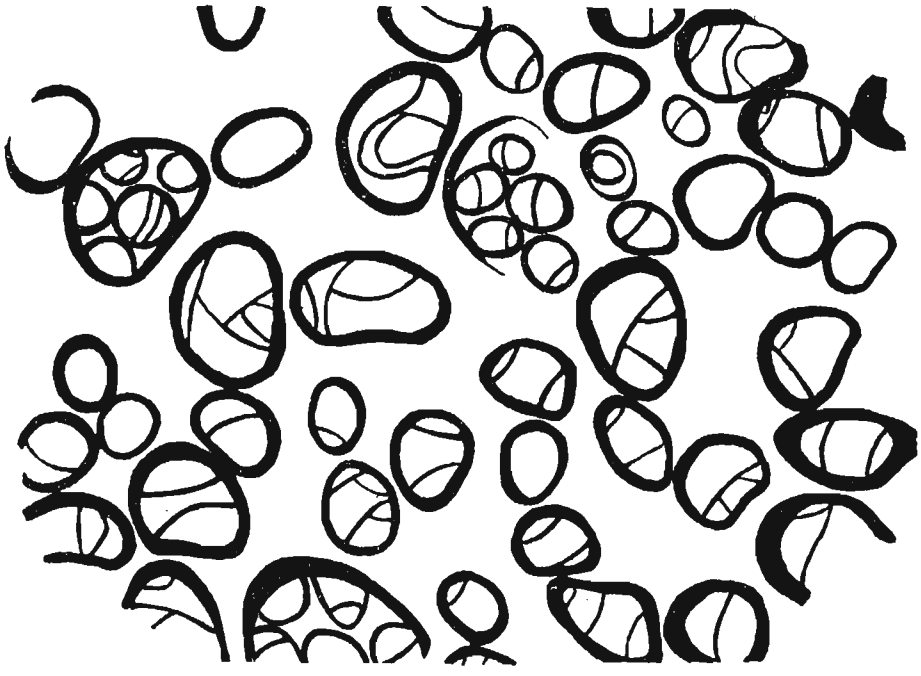

Fig. 12
Fletcheria tubifera MILNE-EDWARDS & HAIME: cross-section (RM-21082), ×4.

the position characteristic for the adult colonies of the particular genus, which later results in the formation of a typical shape. They bud early, and even the several first corallites form a colony in a manner characteristic for a given order.

Intracalycal budding, rarely occurring in the Tabulata, was observed by the present author in *Fletcheria tubifera* (order Auloporida). Here, in the maternal calyx, five buds successively appear (Text-fig. 11; Pl. XXXIII, Figs. 3*a*, 4). First, a flat disc appears near the wall. Then, around this disc, which forms the base of a bud, the walls are formed (Text-fig. 11*a*). Later, appear successively the other young corallites (Text-fig. 11*b-e*) up to five in number. They are of different size, which is the result of their successive appearance. Gradually, the corallites fill up the maternal calyx. Because of the lack of space, they become flattened laterally. This shape can be observed still after their separation from the maternal calyx and often remains in adults. The young corallites grow up inside the maternal calyx, the walls of which become

progressively thinner (Text-fig. 11*f*; Pl. XXXIII, Fig. 3*a*) and finally they break (Text-fig. 12). After that, the young corallites space apart from each other and the maternal calyx entirely disappears. In this way the bushy colony is formed, so that the corallites after leaving the maternal calyx do not come into contact again. The same mode of budding was traced in specimens of *Fletcheria mammilata* TCHERNYCHEV, 1937 from Silurian of Novaya Zemlya, now stored in the Central Museum in Leningrad. Budding here follows the same course as in *F. tubifera*, but the number of buds appearing in the calyx reaches only up to four. Probably, the latter number is characteristic for all *Fletcheria* species so far known, with the exception of *F. tubifera* in which it equals always five.

STRUCTURE OF WALLS AND SEPTA

The investigations of OGILVIE (1897), STRUVE (1898), WANG (1950), BRYAN and HILL (1941), KATO (1963) threw a great deal of light upon the origin, structure and the fine structure of the skeleton in the Tetracoralla and Hexacoralla. However, there exist only a few works on the fine structure of Heliolitida and Tabulata.

LINDSTRÖM (1889) studied the fine structure of the skeleton in the Heliolitida, and later, LECOMPTE (1936) presented significant data on the fine structure of Tabulata. The latter author distinguished two types of the fine structure of the wall: concentric, as in *Pachypora lamellicornis* LINDSTRÖM, and radially-fibrous as in genus *Thamnopora*. Detailed studies have been made of the fine structure of a species of *Favosites* by SWANN (1941, 1947). BRYAN and HILL (1941) found that spherulitic crystallization occurs during the development of all the skeletal elements, both in Tabulata and Heliolitida, as in Tetracoralla and Hexacoralla. According to SOKOLOV (1955), the skeleton is external in origin in Tabulata, as is the case for Tetracoralla and Hexacoralla. The skeleton reflects the outer shape of polyp, but the fine structure shows how the skeleton was secreted. TCHUDINOVA (1959) gave a detailed account of the development of the skeleton and its fine structure in representatives of the family Pachyporidae. BUEHLER (1955) considered the structure of the skeleton in the genera *Catenipora* and *Halysites*. He believed that Halysitidae have no true septa, though in some species there occur septal spines, placed on lamellar bases. The occurrence of auto- and mesocorallites in Halysitidae is connected, in BUEHLER's opinion, with the dimorphism of polyps. HAMADA (1957, 1959) presented detailed studies on the skeletal structure of the Halysitida. According to his observations, the corallite wall in the Halysitida is composed of three layers: the epitheca, the midwall and peripheral stereozone. The latter contains lamellae, which form bases for septal spines. Septal spines are of value in specific determinations. Recently KATO (1963), while investigating the Tetracoralla, distinguished two types of fine structure: trabecular and fibrous, both occurring also in Tabulata and Scleractinia. In KATO's opinion, there exists no essential difference in skeletal structure of these three groups of corals. The present author made observations on the fine structure of walls and septa in some Silurian representatives of the Tabulata: Halysitida, Favositida and Syringoporida. The structure of the walls and septa was studied in some representatives of the families Cateniporidae and Halysitidae (Halysitida). In the order Favositida these elements were investigated in the suborders Favositina and Alveolitina and in the order Syringoporida — in the genera *Syringopora* and *Multithecopora*.

STRUCTURE OF THE WALL

In all representatives of the families Cateniporidae and Halysitidae, the corallite wall is composed of three distinct layers: epitheca, middle and internal layers (Pl. XXXV, Figs. 3, 4). The epitheca is thin and covers the outer wall of the corallite in a uniform layer, not penetrating between adjacent corallites. It usually has a colour different from that of the remaining layers. Its darker or lighter shade seems to depend on the colour of the deposit. The epitheca consists of radially arranged fibres. They are thicker than fibres forming the wall, a fact observed especially clearly in *Catenipora oriens* (Pl. XXXV, Fig. 4). The exterior is marked by horizontal growth lines, seen in longitudinal sections (Pl. XXXV, Fig. 5), and on colonies with well preserved epitheca (Pl. XXXV, Figs. 1, 2). Growth lines are closely spaced, about 0·1 mm apart. Among them occur coarser lines, clearly distinguishable from the rest, and more loosely spaced. The distances between these latter correspond to the distances between the tabulae. Such an arrangement of coarse growth lines was observed in the representatives of *Catenipora, Halysites* and *Cystihalysites*. In order to determine the relations between the distribution of coarse growth lines and tabulae, the side surfaces with epitheca satisfactorily preserved were polished. On these surfaces, are visible tabulae situated exactly opposite the coarse lines. Judging from these observations, the tabulae and coarse lines were formed at the same time. While disconnecting from the tabula, the polyp stopped the secretion of the walls for a short time. However, calcium carbonate was deposited in places where the epitheca was formed, and as a result, a coarse ridge appeared. In addition, the occurrence of alternating dense or less dense arrangements of both growth lines and tabulae probably indicates seasonal growth (Pl. XXXV, Figs. 1, 2).

The wall in the representatives of *Catenipora, Halysites* and *Cystihalysites* is composed of two distinct layers: middle and internal (Pl. XXXV, Figs. 3, 4). The middle layer is usually darker than the internal one and is also much wider. Both layers are composed of radially arranged fibres, with weakly visible growth layers. This is called a radial type of structure. The fibres of the middle layer are thicker than those of the internal layer. The intercorallite walls in some species, as in *Catenipora piirsaluensiformis* n. sp. (Pl. VIII, Fig. 2) are formed by the middle layer only. However, in the majority of species, the intercorallite walls are distinguishable from the true walls (Pl. IV, Fig. 4*a*). The structure of the intercorallite wall is very difficult to recognize, because it consists of very fine fibres. In some species, these walls are divided into two parts, which in the genus *Halysites* form the walls of mesocorallites. These walls consist also of very thin fibres and their arrangement is indeterminate. The above observations are in agreement with the investigations on wall structure in Halysitida by HAMADA (1957, 1959). The present author investigated structure of walls in the genera *Thecia* and *Laceripora*, assigned to the family Theciidae, suborder Favositina. In examined specimens of *Thecia* the walls are provided with epitheca and their fine structure is radial. The structure of the walls in *Angopora* and *Kiaerites* (Angoporidae n. fam.) was also the subject of the present author's investigations. The walls and epitheca in *Angopora* species show a radial type of microstructure. However, in species of *Kiaerites* n. gen., the walls are formed by widened bases of septal spines (Pl. XXXVII, Figs. 3*a-b*), i.e. by septotheca. The true wall, if present, is reduced here to so thin a layer that it could not be distinguished from the bases of septal spines. The septotheca in the form mentioned is covered by an epitheca. The radial structure of the walls was also observed in the genera *Palaeofavosites, Mesofavosites, Multisolenia* — all assigned to the family Favositidae. The structure of the walls in representatives of the suborder Thamnoporina was not investigated, because of the scarcity of well-preserved material. The walls and connecting tubules of *Syrin-*

gopora and *Multithecopora* (order Syringoporida) show a concentric type of fine structure. But, the covering epitheca, on the other hand, has a radial structure (Pl. XXXVII, Fig. 2).

Therefore, the studies of the structure of walls in some representatives of Tabulata show that they consist of fine, radially arranged fibres. In that radial arrangement, two types of fibres could be distinguished on the basis of their thickness. If the fibres are very fine, they cannot be well distinguished, and then the growth lamellae are more prominent. In such a case, a concentric structure is present. When coarse fibres are present, growth lamellae are less obvious, and then a radial structure may be observed.

The epitheca in Tabulata has its fibres always radially arranged, and furthermore, they are thicker than the fibres forming the wall. The epitheca occurs on the outer side of the corallite wall, in both bushy and massive colonies. The position of the epitheca is clearly visible in *Palaeofavosites*, the genus from Norway forming massive colonies. They split easily along the walls of corallites, which show their surfaces covered with epitheca, the same as on the corallites forming bushy colonies in which, as in genus *Syringopora*, corallites communicate only by means of tubules. Thus the dark line occurring between the walls is nothing more than the epitheca itself. If the section cuts the thick growth lines, the traces of epitheca are displayed as a dark line or a series of spots.

STRUCTURE OF SEPTA AND SEPTAL SPINES

Septa in the representatives of Halysitida are usually well-developed. Their bases, in form of lamellae, are situated in the middle layer (Pl. XXXVI, Fig. 2*a*). From those bases, extend spines directed slightly upwards. The lamellae, clearly visible on the longitudinal sections, have their bases rounded. On sections cutting the distal part of a lamella, where the spines already appear, it is visible in form of broken line (Pl. XXXVI, Fig. 2*b*). However, where a longitudinal section cuts the septal spines, it shows spots densely arranged in straight, longitudinal rows (Pl. XXXVI, Fig. 2*b*). The number of septal lamellae in one specimen is usually up to twelve. The width of lamellae is variable, according to the species. Very broad lamellae occur in *Catenipora piirsaluensiformis* n. sp. (Pl. XXXVI, Fig. 2 *a-b*).

The septal spines extending from the lamellae differ in length. They are best developed in the representatives of *Catenipora*. In *Catenipora quadrata*, and *C. escharoides* especially, they are very long, reaching the centre of the calyx, where their ends twist and unite to form a false columella, which is spongy and oval in cross-section (Pl. III, Figs. 3—7). In *C. oriens*, septal spines are also very long. However, here they do not join together, and do not form any columella (Pl. V, Fig. 3*a-b*). In the other species of *Catenipora*, septal spines are less pronounced, shorter and mostly thin, which often results in their being damaged. They can only be seen in well preserved calyces.

In the genus *Halysites*, the septal spines are far less developed than in *Catenipora*. They are short and not always visible in cross-sections. Often, they can be only detected in well-preserved calyces or on longitudinal sections as traces. Sometimes, a longitudinal section shows only the lamellar bases, without preserved spines. In the representatives of *Catenipora* without preserved spines, the septa can be traced in longitudinal sections of the walls, where their lamellar bases are visible.

In the representatives of *Cystihalysites*, septa are more weakly developed than in *Halysites*.

The same is true for *Solenihalysites*, which has traces of septa occasionally visible in longitudinal sections.

The fine structure of septa in the representatives of the order Halysitida is different from that of the walls. The fibres forming septa are arranged around the central axis. Those centres occur in the form of barely visible, dark spots. Each septum occurs in the form of a lamella with extending septal spines, which are single trabeculae (Pl. XXXVI, Fig. 2 *a-b*).

In the suborder Favositina, the structure of septa in *Thecia* and *Laceripora* was investigated. In the genus *Thecia*, the wall is folded and septal lamellae appear on its convexities. The number of lamellae reaches up to six. The fine structure of septa, as well as of the wall, is radial (Pl. XXXVI, Fig. 3). In *Laceripora*, septal ridges are probably of the same type as in *Thecia*. However, the scarcity of material of that genus did not permit any detailed observation.

In the genus *Angopora* (Angoporidae n. fam.), septa occur in form of lamellae with extending spines (Pl. XXXVII, Fig. 1). The lamellae are narrow, with the structure similar to trabecular. In the middle of each lamella, a row of spots occurs, and from these extend thin, radially arranged fibres. This structure is visible only on well-preserved fragments. The same kind of structure is present in the septal spines.

The fibres in septa, both in their lamellar bases and in the spines, are very thin and difficult to observe.

Genus *Kiaerites* n. gen. has walls composed of the bases of septal spines. If there is a true wall present, it is reduced to so thin a layer that it cannot be distinguished from the broadened bases of spines. This theca is covered by an epitheca. Septal spines are very numerous, long and pointed. They lie close to each other for one third of their length, forming a wide wall. Septal spines have a trabecular structure. The dark line passes along the axis of the spine and thin fibres extend radially from it (Pl. XXXVII, Fig. 3*a-b*). This fine structure of the septal spines is similar to that in *Angopora*, but *Kiaerites* lacks lamellae, forming the bases for septal spines.

In the family Favositidae, in the genera *Palaeofavosites*, *Mesofavosites* and *Multisolenia*, the septal spines are only the extensions of the wall.

In the representatives of the order Syringoporida, namely in *Syringopora* and *Multithecopora*, the septal spines are composed of very thin fibres, which are hardly distinguishable. The dark line passing along the axis is visible in longitudinal sections and in cross-sections in form of dark and light spots.

As can be seen from the observations above, the septa in Tabulata are of two types: 1) spines corresponding to the extensions of the wall, or 2) lamellae and spines with a trabecular structure. The fibres which form septa are very thin, and so their trabecular structure can hardly be distinguished. In septal spines, fibres extend radially from the false axis, from the dark line or spots.

Judging from the fine structure of the walls, it is possible, that the ectoderm of the polyp in Tabulata was somewhat differentiated, because it could secrete not only the wall and spines as its prolongations, but also septa of trabecular structure.

The fine structure of walls and septa can be characteristic for particular orders. In Halysitida, the radial structure occurs, while the Syringoporida are characterized by their concentric type of fine wall-structure. The septa in both orders are trabecular in all their representatives. Therefore, in this instance, both orders form a uniform group.

In representatives of Favositida, however, it seems that different types of fine wall-structure occur and that the septal spines are in most of them just the extensions of walls. But in some species septa of trabecular structure occur.

Septa with trabecular structure are present in Angoporidae n. fam., namely in the genera *Angopora* and *Kiaerites* n. gen. Both genera cannot be assigned to the family Theciidae, whose representatives have their septal lamellae formed on the convexities of folded walls.

The occurrence of trabecular septa was connected with more complicated structure of the ectoderm of polyp, thus the genera *Angopora* and *Kiaerites* should be assigned to a new family.

DISTRIBUTION OF TABULATA IN THE UPPER ORDOVICIAN AND SILURIAN OF THE SCANDINAVIAN-BALTIC REGION AND IN THE ERRATIC BOULDERS OF POLAND

Tabulata of the Scandinavian-Baltic region have been known since the XVIII century, when FOUGT (1749) mentioned *Corallium gothlandicum*, probably a synonym of *Favosites gothlandicus* LAMARCK. LAMARCK (1801) described as *Tubipora prismatica* colonies of *Favosites*, the genus he later established (1816). Next, EICHWALD (1829—1854, 1860, 1861) described 30 species of Tabulata from Estonia. Moreover, Tabulata from the Baltic region were described by PANDER (1830), KUTORGA (1835), HISINGER (1837) and LONSDALE (1845). The most precise early descriptions of some Tabulata were published by MILNE-EDWARDS & HAIME (1850—1854). SCHMIDT (1851, 1881) was the first to consider the stratigraphic range of Tabulata within the Ordovician and Silurian of Estonia. ROEMER (1861), FISCHER-BENZON (1871), WEISSERMEL (1894) and WIMAN (1901) described Tabulata from the erratic boulders of the Baltic region, which most probably come from the Ordovician and Silurian of Estonia.

Corals from Sweden are mainly known as a result of the papers of LINDSTRÖM (1872, 1873, 1876, 1882, 1896) and ANGELIN & LINDSTRÖM (1878—1880). Some information about Tabulata from the Baltic region was given by NICHOLSON (1879), while revising this group. Some details about Norwegian corals can also be found in KIAER's papers (1879, 1908). Tabulata are briefly mentioned by MUNTE, HEDE & POSTA (1925).

In 1928 TEICHERT reported several Tabulata species from Estonia, and TRIPP (1933) described representatives of Favositida from the Island of Gotland. The latter author considered the forms he described in a very broad sense, and came to the conclusion that in the Silurian of the area mentioned there are only three species: *F. asper* D'ORB., *F. gothlandicus* LAM. and *F. hisingeri* M.-EDWARDS & HAIME. *F. asper* is very similar to *Palaeofavosites alveolaris* (GOLDF.), and *F. hisingeri* seems to be, the most probably, a representative of *Mesofavosites* (Pl. XIV, Figs. 3*a*, 4*b*; Pl. XV, Fig. 8).

The last of the more recent publications on Tabulata from the Island of Gotland, is that of JONES (1936), in which the genus *Angopora* was described for the first time. In 1953, HILL described some Tabulata from the Middle Ordovician of Norway. Between 1749, when FOUGT's paper was published, and 1950 no monographic study of Tabulata from Sweden, Norway and Estonia was made, even though the most classic profiles of Ordovician and Silurian occur in these areas. In these deposits, the Tabulata are no less numerous than groups important for stratigraphy, such as brachiopods and ostracods.

TRIPP's paper (1933) did not demonstrate either the large diversity within the Tabulata from the Island of Gotland or their stratigraphic significance. Recent investigations in the U.S.S.R. have proved the great value of the Tabulata for stratigraphic purposes. SOKOLOV (1951a, b, 1952a, b, 1955) has shown the immense diversity and stratigraphic importance of

the Tabulata in the Ordovician and Silurian of Estonia. Later KLAAMANN (1958, 1959, 1961a, b, 1962a, b, 1964) described several new species, and also gave detailed descriptions and diagnoses for all Estonian Tabulata so far known, represented by 196 species. KLAAMANN (1962) fixed the index species for the Ordovician and Silurian of Estonia and on this basis he accurately delimited the stages.

Owing the work of SOKOLOV and KLAAMANN, the section in Upper Ordovician and Silurian in Estonia became standard. So now the division established by KLAAMANN (1962) can also be used in other regions, which makes correlation of the Ordovician and Silurian rocks of Norway and Sweden (and probably also those of Great Britain) possible.

I. NORWAY

The Norwegian Tabulata described in the present paper come from the Oslo region, where they occur in Silurian deposits as one of the most common fossil groups. Their occurrence in the Oslo region is in association with a limestone facies, developed in 3 areas: 1) Ringerike, 2) Oslo-Asker, 3) Holmestrand-Skien.

The Silurian sediments in the region under consideration are not metamorphosed and the fossils found there are satisfactorily preserved. They are frequently found in different horizons, which permits the precise biostratigraphical division of the latter.

KJERULF (1855) divided the Palaeozoic sequence of the Oslo region into stratigraphical units, called "Etagen", numbered from 1 to 9. Subsequent writers added letters to the numbers. The Silurian of the Oslo region was described by KIAER (1908), who first introduced the divisions used up to the present day.

The most recent subdivision is that of STRAND and HENNINGSMOEN (1960), who distinguished 5 series within the Cambro-Ordovician and Silurian sequence.

The complete Ordovician succession includes the following: *Ceratopyge* Series (2e-3a), *Asaphus* Series (3b-c), *Ogygiocaris* Series (4aα), *Chasmops* Series (4aβ-4bδ) and *Tretaspis* Series (4c-5b). They are developed as limestones and shales. The earliest Tabulata are found in Series 4, and were described by KIAER (1904) and HILL (1952).

The Silurian deposits of the Oslo region consist of the following series: *Striclandia* (6), *Pentamerus* (7), Lower Spiriferid (8) and Upper Spiriferid (9). Those series are subdivided into stages and substages, mainly on the basis of brachiopods.

Tabulata are the most common fossils in the Silurian deposits of the Oslo region. Their distribution in this area is related to the occurrence of limestone facies, developed in Ringerike, Oslo-Asker, Holmestrand and Skien.

KIAER (1908) mentioned the following species from the region under consideration: *Halysites catenularia* Lam., *H. escharoides* LAM., *H. macropora* EICHW., *Favosites fougti* M.-EDWARDS & HAIME, *F. hisingeri* M.-EDWARDS & HAIME, *F. gothlandicus* LAM., *Favosites* sp., *Pachypora cristata* BLUM., *Alveolites labechei* M.-EDWARDS & HAIME, *Coenites* sp. and *Syringopora bifurcata* LONSD.

The present author, while investigating a collection of Silurian Tabulata from the Oslo region, was able to state that they are represented by 40 species which were assigned to eleven genera. Of that number, 18 species and 3 genera are new (see Table 1).

Table 1

DISTRIBUTION OF SILURIAN TABULATA IN THE OSLO REGION (NORWAY)

Species \ Series / Stages	RINGERIKE																OSLO-ASKER																HOLMESTRAND															
	Silurian																Silurian																Silurian															
	Llandovery					Wenlock								Ludlow			Llandovery				Wenlock												Llandovery				Wenlock								Ludlow	
	Undivided 6	Striclandia (6)				Undivided 7	Pentamerus (7)			Undivided 8	Lover Spiriferid (8)				Undivided 9	Upper Spiriferid (9)	Undivided 6	Striclandia (6)			Undivided 7	Pentamerus (7)			Undivided 8	Lower Spiriferid (8)					Undivided 6	Striclandia (6)			Undivided 7	Pentamerus (7)			Undivided 8	Lower Spiriferid (8)				Ludlow	
		6a	6b	6c		7a	7b	7c		8a	8b	8c	8d		9a			6a	6b	6c		7a	7b	7c		8a	8b	8c	8d			6a	6b	6c		7a	7b	7c		8a	8b	8c	8d		
Catenipora heintzi n. sp.													+																																	
C. exilis EICHWALD																																														
C. minuta n. sp.					+																																									
C. maxima FISCHER-BENZON							+																																							
C. oriens KLAAMANN																						+																								
C. malmoeyensis n. sp.																						+																								
C. norvegica n. sp.																							+																							
C. quadrataeformis n. sp.																		+																													
C. llandoverensis n. sp.																						+																								
C. ringerikensis n. sp.							+									+																														
C. spiroddensis n. sp.																					+																									
C. vespertina KLAAMANN																																														
Solenihalysites norvegicus n. gen., n. sp.																																														
Angopora hisingeri JONES								+																																						
Kiaerites norvegicus n. gen., n. sp.								+																																						
Palaeofavosites abstrusus KLAAMANN																					+																									
P. alveolaris (GOLDFUSS)																	+				+																									
P. aff. *alveolaris* (GOLDFUSS)																																														
P. balticus (RUKHIN)																					+																									
P. haapsaluensis KLAAMANN																					+																									
P. hystrix SOKOLOV						+											+																												
P. kalvensis n. sp.																	+																												
P. oelensis KLAAMANN																					+																									
P. raikkuelensis SOKOLOV																	+					+			+																				
P. schmidti SOKOLOV																	+				+																									
P. spiroddensis n. sp.																					+																									
Sparsisolenia kiaeri n. gen., n. sp.*																																														
Multisolenia tortuosaeformis KLAAMANN						+																																								
Mesofavosites imbellis KLAAMANN					+																																									
M. silicificatus KLAAMANN																	+																												
M. validus KLAAMANN																																														
Favosites favosiformis SOKOLOV																																														
F. favosus (GOLDFUSS)					+																																									
F. gothlandicus LAMARCK																																														
F. ingens KLAAMANN					+																																									
F. kjerulfi n. sp.**																																														
F. malmoeyensis n. sp.																																														
F. norvegicus n. sp.																																														
F. stoermeri n. sp.								+																																						
Coenites juniperinus EICHWALD										+																																				
Syringopora blanda KLAAMANN																																														
S. multifaria KLAAMANN													+																																	
S. norvegica n. sp.																																														
Multithecopora norvegica n. sp.							+																																							+

* Series 7 (Skeeir). ** Silurian Oslo-Asker Area.

1. RINGERIKE AREA

Tabulata in this area are present from the Lower Llandovery. The deposits of Lower Llandovery (Series 6) contain mainly calcareous sandstones and shales. Respectively, the fauna of the series is composed of brachiopods, while corals are rather rare. KIAER (1908) cites from the Stage 6a only *Favosites asper* D'ORB. Limestones, containing corals, do not appear until the Upper Llandovery (Series 7). Corals together with stromatoporoids become reef-forming for the first time in Stage 7b.

As can be seen from Table 1, each of the three stages (7a-c) contains a different assemblage of species.

The deposits of the Wenlockian Lower Spiriferid Series (8) are developed as shales, calcareous sandstones and limestones. Corals occur in all stages of this series, but are most common in the pure limestones of the Stage 8c. Three species were described from Series 8 (see Table 1).

Tabulata are also present in Upper Spiriferid Series (9), where only *Catenipora ringerikensis* n. sp. from the Stage 9a in Storøy, was described.

From the species investigated, one may state that *Pentamerus* Series (7) in Ringerike area corresponds to the stages: Tamsalu (G_{II}), Raikküla (G_3) and Adavere (H) of Llandovery in Estonia. *Multisolenia tortuosaeformis* KLAAM. and *Palaeofavosites hystrix* SOK. are characteristic for the two first stages. In the Adavere Stage, *Favosites favosus* (GOLDF.) and *F. ingens* KLAAM., were found. But *Catenipora maxima* (FISCHER-BENZON) and *Mesofavosites imbellis* KLAAM. occur in Estonia first in the Wenlockian, in the Jaani (J_1) Stage.

Coenites juniperinus EICHW. is the index species for the Upper Wenlock (Jaagarahu-J_2 Stage) in Estonia. Thus Series 8 in Norway could correspond with the Wenlockian. *Syringopora multifaria* KLAAM. occurs in Norway in Series 8, but in Estonia first in the Ludlowian Stages Paadla (K_2) and Kaugatuma (K_3).

2. OSLO-ASKER AREA

The Silurian deposits occurring in the Oslo-Asker area represent Series *Striclandia* (6), *Pentamerus* (7), Lower Spiriferid (8) and Upper Spiriferid (9). They are developed as shales, calcareous sandstones and limestones. Corals in that area occur higher than *Striclandia* Series. They are described in the present paper from Series 6 to 9 in Malmøy and from Series 6 in Hvalstad and Spirodden.

In the Lower Llandovery (Stages 6a, 6b) in the Malmøy area corals are not numerous. Only six species have been found here (see Table 1).

Tabulata are more common in Series 7, and, according to KIAER (1908), especially in Stage 7b. In Series 7 (KIAER, 1908), the new genera *Alveolites (Subalveolites?)* and *Syringopora* appear, which, however, are not represented in the collection studied here. From that series, 9 species in the present paper are described (see Table 1).

Series 8 of the area under consideration, is developed mainly as shales, with limestones overlying them in the upper part of Stage 8b. According to KIAER (1908), the limestones of Stage 8c are very rich in fossils, including corals. Tabulata occur in the limestones of Stages 8c and 8d. From Series 8, of the area considered, 2 species are described in the present paper (see Table 1).

The corals in the Asker area occur from the *Striclandia* Series (6) upwards, and are especially numerous in Stage 6c. They are also present in Series 7 to 9 within the area, but were not

included into the collection investigated here. Thus, only Tabulata from Series 6 in Hvalstad, and Stage 6c in Spirodden are considered in the present paper (see Table 1).

From the Baerum area, only one representative of Tabulata was described, namely *Palaeofavosites alveolaris* (GOLDF.), from Stage 6c in Sandviken. Among the species described from Series 6 in Malmøy, three are common in the Llandovery of Estonia: *Palaeofavosites hystrix* SOK. and *P. raikkuelaensis* SOK. from the Tamsalu (G_{II}) and Raikküla (G_3) Stages as well as *P. silicificatus* KLAAM. from the Tamsalu Stage. Thus, Series 6 in Malmøy corresponds with the lower stages of the Llandovery.

The assemblage of species from Series 7 in Malmøy is characteristic for the Llandovery of Estonia. *Favosites favosus* (GOLDF.), the index form for Adavere Stage, and *F. ingens* KLAAM., known from the same stage, are also present here. But *Palaeofavosites raikkuelaensis* SOK. is found in Estonia in the Tamsalu and Raikküla Stages, and *Catenipora oriens* KLAAM. appear first in Wenlock, in Jaani (J_1) Stage. Thus Series 7 in Norway corresponds with the higher stages of the Llandovery in Estonia.

From Series 8 in Malmøy, two species were described (see Table 1), which occur in Estonia, in the Llandovery.

3. HOLMESTRAND AND SKIEN AREAS

The Silurian deposits in this area represent all four series distinguished. They are developed as shales and limestones. Corals in Series *Striclandia* (6) are not numerous in this area. KIAER (1908) cited here only one representative of the Tabulata: *Favosites asper* D'ORB. The *Pentamerus* Series (7), represented by limestones, contains a rich coral fauna, especially in the sediments of Stage 7b, exposed in Bjerkøy (see Table 1). From the same stage, in Langøy, only one species (*Syringopora blanda* KLAAM.) was described. The Lower Spiriferid Series (8), is represented by limestones of great thickness, containing corals. These limestones contain small coral reefs with, according to KIAER (1908), genera *Halysites* and *Favosites*, which are very common. The reef limestones are also present in the Upper Spiriferid Series (9), but the reefs are here built by stromatoporids as well. Only a few Tabulata from two series mentioned are described in the present paper. In Series 8, two species from sections at Berkøy and in the Kommersøy peninsula, were found (see Table 1). In Series 9, only one species of Tabulata was found in Langøy (see Table 1).

From the Skien area, only one representative of the Tabulata was described, namely *Sparsisolenia kiaeri* n. gen., n. sp.

The stratigraphic distribution of Norwegian Tabulata, investigated by the present author, does not give any complete picture of their diversity and ranges in the Silurian within the areas mentioned. General conclusions only may be drawn about the range of Tabulata in the Series 6—8. The Llandovery of the Oslo region is characterized by the presence of numerous species. They are mostly representatives of the order Favositida, mainly *Palaeofavosites* and *Favosites*. The genus *Catenipora* occurs also very often, and the present number of its species is nearly equal to that of *Palaeofavosites*. The same fauna assemblage is found in the Llandovery of Estonia.

Tabulata from a large assemblage in Series 6 is characterized by the strong diversity of *Palaeofavosites* and the first appearance of the genera *Mesofavosites* and *Catenipora*. Among the representatives of *Palaeofavosites*, *P. alveolaris* (GOLDF.), *P. balticus* (RUKHIN) are present. These are the index forms for the Lower Llandovery of Estonia. Very characteristic is the occurrence of *P. schmidti* SOK. and *P. balticus* (RUKHIN), which have very wide geographical

ranges and are known from the Silurian of England, Estonia, East Taimyr, Siberian Platform, Tadzhikhstan, East Kazakhstan and Middle Asia.

In Series 7, new genera *Multisolenia*, *Kiaerites*, *Favosites* and *Syringopora* appear. The genus *Catenipora* is still represented by several species, but *Palaeofavosites* is less numerous than in Series 6. The genus *Favosites* begins rapidly develop and in Series 7 there occur the index species for the Middle Llandovery: *F. gothlandicus* LAM. and *Multisolenia tortuosaeformis* KLAAM., and for the Upper Llandovery, *F. favosus* (GOLDF.).

The genus *Coenites* appears in Series 8 of the Oslo region. *Coenites juniperinus* EICHW. is the index species for the Wenlockian. In the same series, *Palaeofavosites*, *Mesofavosites*, *Favosites* and *Catenipora* still occur.

FACIES

Four facies has been distinguished in the Oslo region. They are: western, eastern, transitional between eastern and western, and northern facies (STRAND & HENNINGSMOEN, 1960). The western facies, developed around districts Ringerike and Skien-Langesund, is characterized by the presence of calcareous sandstones. In the Malmøy district, and on the other islands near Oslo (east part of Oslo-Asker region) the eastern facies is developed, with shales and limestones. The transitional facies is found in the Baerum-Asker district (western part of Oslo-Asker region). The northern facies is present in Hadeland and Mjøsa districts.

The distribution of various species of Tabulata in areas of a different facial development is distinctly marked in all series, from 6 to 9 (see Table 1).

KIAER (1908) called attention to the facial changes in the Silurian deposits of the Oslo area. He stated that the Llandovery is differently developed facially in the Ringerike district than in that of Malmøy, basing this conclusion upon observations of brachiopods occurring in the areas. A regional comparison of the Tabulata from Series 7 is most easily done in the Ringerike and Malmøy districts, from which come most of the specimens described here.

Series 7

Ringerike	Malmøy
Catenipora maxima FISCHER-BENZON	—
C. ringerikensis n. sp.	—
—	*Catenipora llandoverensis* n. sp.
—	*C. malmoeyensis* n. sp.
—	*C. norvegica* n. sp.
—	*C. oriens* KLAAM.
Palaeofavosites hystrix SOK.	—
—	*P. raikkuelensis* SOK.
Kiaerites norvegicus n. sp.	—
Multisolenia tortuosaeformis KLAAM.	—
Mesofavosites imbellis KLAAM.	—
Favosites favosus (GOLDF.)	*F. favosus* (GOLDF.)
—	*F. malmoeyensis* n. sp.
—	*F. norvegicus* n. sp.

This comparison shows that the assemblages from Series 7 are generically and especially specifically different in the two regions. There are only two common species: *F. ingens* and *F. favosus*, which are the index species for the Upper Llandovery. In the Ringerike district two species of *Catenipora* are present: *C. monstruosa* and, related to the latter, *C. ringerikensis*. The representatives of Favositida are more numerous in this district than on Malmøy, and the following genera are represented: *Palaeofavosites*, *Multisolenia*, *Mesofavosites* and *Favosites*. The species of *Catenipora* are different in the Malmøy district than in Ringerike and the genus is represented by: *C. oriens*, *C. norvegica* and *C. malmoeyensis*.

In the Holmestrand area, where, as in Malmøy, the eastern facies is developed, corals are also numerous, especially in limestones of Series 7. One might expect that Tabulata occurring in this series should be related to those of the same series in Malmøy. However, among the species described here, only one (*Favosites ingens* KLAAM.) is common to both areas. The representatives of *Catenipora* in the Holmestrand area form a group different from that found in Malmøy. They are: *Catenipora quadrataeformis* n. sp., with the related *C. vespertina* KLAAM. Thus the assemblages of species are different in two areas with the same type of facies.

II. ISLAND OF GOTLAND

The distribution of Tabulata on the Island of Gotland is connected with reef facies. Corals are very numerous here and form the group which, to a considerable extent, is the principal component in the reef limestones. The variety in Tabulata species seen on Gotland is every bit as great as that in Silurian of Estonia.

Tabulata appear here in the Lower Visby Marl and continue up to the highest Silurian horizons. They were assigned to 34 species and 17 genera (see Table 2) in the present paper.

The material investigated shows that in the Visby Marl, the Högklint Group and the Slite Group, representatives of Favositida prevail. They are mostly assigned to *Palaeofavosites*, *Angopora*, *Favosites* and *Subalveolites*. Halysitida are also found comparatively often. In the Upper Visby Marl, genus *Catenipora* is common, in the Högklint group *Halysites* appears, while in the Klinteberget *Solenihalysites* predominates.

On the basis of TRIPP's work (1933), it seems that in the Upper Visby Marl, and in the Högklint and Slite Groups, besides *Palaeofavosites*, numerous representatives of *Mesofavosites* are present, because "*Favosites*" *asper* D'ORB., described in the paper mentioned, should probably be assigned to *Palaeofavosites alveolaris* (GOLDF.) sensu lato, and *F. hisingeri* M.-EDWARDS & HAIME — to *Mesofavosites* (Pl. IX, Figs. 3a, 4b; Pl. XV, Fig. 8).

Two species occurring in the Upper Visby Marl are present also in Estonia. These are *Palaeofavosites aliquantulus* KLAAM. from the Adavere Stage (H) and *Syringopora novella* KLAAM. from the Jaani (J_1) and Jaagarahu (J_2) Stages. Most probably, in the Högklint Group, *Catenipora escharoides* LAM. (Halshuk) and *?Thamnopora undvaensis* KLAAM. (Högklint) are present. *?Thamnopora undvaensis* occurs in Estonia in the Jaani Stage (J_1).

From the younger limestone (i.e. Tofta Limestone) only one species is described in the present paper. This is *Favosites mirandus* SOK. (Kopparsvik), which in Estonia occurs in the Jaagarahu Stage (J_2). *Halysites junior* KLAAM. and *Multisolenia excelsa* KLAAM. from the Slite Group are known also in Estonia from the Jaagarahu Stage. From the Klinteberget Limestone comes *Halysites senior* KLAAM., which in Estonia was found in the Jaani Stage (J_1). This species appears earlier on the Island of Gotland, probably in Högklint Group, in Irevik and Visby. Besides, from the Klinteberget Group comes *Solenihalysites gotlandicus* n. gen., n. sp. (Eksta).

Table 2

DISTRIBUTION OF TABULATA IN THE BALTIC REGION

NORWAY (after Strand and Henningsmoen, 1962) — Silurian; SWEDEN—ISLAND OF GOTLAND (after Regnéll and Hede, 1960) — Silurian; POLAND — erratic boulders; ESTONIA — Ordovician (Middle, Upper), Silurian (Lower: Llandovery, Wenlock; Upper: Ludlow)

Species	Norway, Llandovery: Undivided 6	Striclandia 6: 6a	6b	6c	Wenlock: Undivided 7	Pentamerus (7): 7a	7b	7c	Undivided 8	Lower Spiriferid (8): 8a	8b	8c	8d	Ludlow: Undivided 9	Upper Spiriferid (9): 9a	9b	9c	9d	9e	9f	9g	Sweden: Undivided Silurian	Lower Visby Marl	Upper Visby Marl	Högklint Group	Tofta Limestone	Slite Group	Halla Marl	Mulde Marl	Klinteberg Group	Hemse Group	Eke Group	Burgsvik sandstone and Oolite	Hamra Limestone	Sundre Limestone	Poland: Ordovician or Silurian	Ordovician	Silurian	Estonia: Ordovician, Middle: D_{III}	Upper: E	F_{1a}	F_{1b}	F_{1c}	F_2	Silurian, Lower, Llandovery: G_I	G_{II}	G_{III}	H	Wenlock: J_1	J_2	Upper, Ludlow: K_1	K_2	K_3	K_4
Sarcinula luhai Sokolov																																					+						+											
S. organum (Linnaeus)																																					+					+	+											
S. rakverense Sokolov																																					+			+														
Catenipora arctiformis n. sp.																								+																														
C. crassa n. sp.																											+																											
C. carlsoensis n. sp.																						+																																
C. escharoides Lamarck																							+	+														+																
C. heintzi n. sp.													+																									+																
C. hedei n. sp.																								+																														
C. exilis Eichwald								+																														+										+						
C. jarviki n. sp.																						+																																
C. minuta n. sp.					+																																																	
C. maxima (Fischer-Benzon)							+															+?																+											+					
C. obliqua Fischer-Benzon																																				+																		
C. oriens Klaamann						+																																											+					
C. malmoeyensis n. sp.						+																																																
C. norvegica n. sp.							+																																															
C. llandoverensis n. sp.						+																																																
C. regnelli n. sp.																								+																														
C. piirsaluensiformis n. sp.																																				+																		
C. quadrata (Fischer-Benzon)																							+	+																														
C. quadrataeformis n. sp.		+			+																																																	
C. ringerikensis n. sp.							+								+																																							
C. spiroddensis n. sp.				+																																																		
C. spiroddensiformis n. sp.																						+																																
C. tractabilis n. sp.																																					+					+												
C. vespertina Klaamann															+																							+											+					
Halysites junior Klaamann																											+											+												+				
H. senior Klaamann																						+																											+					
Cystihalysites mirabilis Tchernychev																						+														+																		
C. blakewayensis Sutton																																				+																		
Solenihalysites norvegicus n. gen., n. sp.									+																																													
S. gotlandicus n. sp.																						+																																
Angopora hisingeri Jones								+																+														+											+					
A. tenuicula Klaamann																						+																																
Kiaerites norvegicus n. gen., n. sp.								+																																														
Thecia confluens (Eichwald)																																						+												+				
T. saaremica Klaamann																																						+												+				
T. swinderniana (Goldfuss)																						+																+														+		
Laceripora cribrosa Eichwald																																						+														+		
Palaeofavosites abstrusus Klaamann				+																																								+										
P. aliquantulus Klaamann																								+																								+						
P. alveolaris (Goldfuss)	+																																												+	+	+							
P. aff. *alveolaris* (Goldfuss)					+																																						+											
P. balticus (Rukhin)				+																																									+	+	+	+						
P. forbesiformis Sokolov																																						+							+	+								
P. haapsaluensis Klaamann				+																																							+	+										
P. hystrix Sokolov	+					+																																								+	+							
P. legibilis Sokolov																																					+							+										
P. kalvensis n. sp.	+																																																					
P. oelensis Klaamann				+																																									+									
P. raikkuelensis Sokolov	+																																														+							
P. schmidti Sokolov	+		+	+																																						+	+	+		+		+						
P. spiroddensis n. sp.			+																																																			
P. tersus Klaamann																						+																												+				
Priscosolenia kozlowskii n. sp.																																				+																		
P. rozkowskae n. sp.																																				+																		
Sparsisolenia kiaeri n. gen., n. sp.					+																																																	
Multisolenia tortuosaeformis Klaamann						+																																									+							
M. excelsa Klaamann																						+																												+				
Mesofavosites imbellis Klaamann					+																																	+											+					
M. silicificatus Klaamann	+																																												+									
M. validus Klaamann											+																																					+						
Favosites adaverensis Sokolov																						+																										+						
F. exilis Sokolov																																						+									+?	+?						
F. favosiformis Sokolov											+																											+										+						
F. favosus (Goldfuss)					+																																											+						
F. gothlandicus Lamarck						+																+																+									+	+						
F. ingens Klaamann					+		+																																									+						
F. kogulaensis Sokolov																																						+														+		
F. lichenarioides Sokolov																						+																											+					
F. kjerulfi n. sp.																																																						
F. mirandus Sokolov																										+																								+				
F. norvegicus n. sp.					+?																																																	
F. opinabilis Klaamann																																						+													+?			
F. pseudoforbesi pseudoforbesi Sokolov																																						+														+		
F. pseudoforbesi ohesaarensis Klaamann																																						+																+?
F. similis Sokolov																																						+													+	+		
F. stoermeri n. sp.								+																																														
F. subfavosus Klaamann																																						+									+							
F. subgothlandicus Sokolov																																						+														+		
F. vicinalis Klaamann																																						+															+	
Syringolites kunthianus Klaamann																							+?	+?																									+					
Parastriatopora sokolovi Smirnova																																				+																		
Pachypora lamellicornis Lindström																								+																														
?Thamnopora undvaensis Klaamann																						+																+											+					
Subalveolites callosus Klaamann																						+																												+		+		+
S. panderi Sokolov																						+																											+	+				
S. sokolovi Klaamann																						+																											+					
Subalveolitella majuscula Klaamann																						+																+										+						
Coenites juniperinus Eichwald									+																																									+				
Syringopora blanda Klaamann						+									+																																						+	
S. blandaeformis n. sp.																																				+																		
S. crassa n. sp.																																				+																		
S. maxima n. sp.																																				+																		
S. lindstroemiformis n. sp.																																				+																		
S. polonica n. sp.																																				+																		
S. multifaria Klaamann												+										+																														+	+?	
S. novella Klaamann																								+														+											+	+				
S. norvegica n. sp.														+																																								
S. parva n. sp.																																				+																		
S. parviformis n. sp.																																				+																		
S. schmidti Tchernychev																																						+														+		
S. schmidtiformis n. sp.																																				+																		
Multithecopora norvegica n. sp.							+																													+																		
Fletcheria tubifera Milne-Edwards & Haime																						+																																
Favosipora clausa (Lindström)																						+																																

In either the Hemse or Eke Group *Angopora tenuicula* KLAAM. occurs, a species described in Estonia from the Jaani Stage.

On the basis of an occurrence of Tabulata genera and species, it seems that the Upper Visby Marl, the Tofta Limestone and the Högklint Group are the equivalents of the Jaani Stage (J_1), and the Slite Group — of the Jaagarahu Stage (J_2).

KLAAMANN (1962), analysing the material recorded in TRIPP's paper (1933), stated that the Visby Marl are the equivalents of beds not older than those of Adavere Stage (H). The Högklint Group could be the equivalent of the Adavere and Jaani Stages, while the Slite Group may be that of the Jaagarahu Stage. The Hemse and Eke Groups, in which the assemblage of Tabulata changes, could be the equivalents of the early Ludlow, Paadla (K_2), Kaugatuma (K_3) and Ohesaare (K_4) Stages.

III. ERRATIC BOULDERS OF POLAND

In erratic boulders of Poland, Tabulata occur very often. Fifty-two species assigned to fifteen genera are described in the present paper (see Table 2). Fifty per cent of these species occur also in the Upper Ordovician and Silurian of Estonia (see Table 2). Because of this fact, their stratigraphic position could be determined.

Among the Tabulata from the Polish erratic boulders, none of the oldest Ordovician (*Eofletcheria orvikui* Stage) representatives have been found. However, representatives of Tabulata from the higher, *Sarcinula* Stage, are present. The species, regarded as the index forms for this Stage, have been found (namely *Sarcinula organum* (LINN.) and *S. luhai* SOK.) as well as *Palaeofavosites schmidti* SOK., which in Estonia appears for the first time in this stage, but later continues up to the end of the Llandovery. This last-mentioned species has a very wide geographical distribution (Llandovery of East Taimyr, Siberian Platform, Wenlock of Tadzhikhstan). It is characteristic that in the erratic boulders, the species *Sarcinula rakverense* SOK. is present, which is the only representative of the genus in the Rakvere Stage (E) in Estonia. But the species characteristic for the Nabala Stage (F_{1a}), in which Tabulata are not numerous in Estonia, has not been found in the erratic boulders. However, the species characteristic for the higher stages: Wormsi (F_{1b}), Pirgu (F_{1c}), and Porkuni (F_2), in Estonia, were found in the erratic boulders. Ordovician Tabulata from the erratic boulders of Poland are weakly differentiated generically, which is also a characteristic of Estonian Tabulata. In the erratic boulders Tabulata from nearly all stages of Upper Ordovician in Estonia are found. The numerous Silurian Tabulata known from Estonia were also found in Poland.

In the erratic boulders, *Favosites gothlandicus* is found. In Estonia this species belongs to the assemblage of index species for the stage with *Palaeofavosites paulus* SOK. and *Mesofavosites fleximurinus* SOK. The stage mentioned is the equivalent of the Upper Llandovery. *Favosites gothlandicus* is very common in Estonia and has a wide geographical range. It is known from the Llandovery and Wenlock of U.S.S.R. and the Silurian of Czechoslovakia, Sweden (Island of Gotland), England and Australia.

From the assemblage of index species for the Lower Wenlock (i.e. Stage *Favosites jaaniensis* SOK.) in the erratic boulders, *Mesofavosites imbellis* KLAAM. was found, as well as *?Thamnopora undvaensis* KLAAM. characteristic for this stage. No index species for the Stage *Coenites juniperinus* EICHW. has been found in the erratic boulders. The Tabulata genera: *Thecia*, *Mesofavosites*, *Thamnopora*, *Syringopora* appear in the erratic boulders of Wenlockian age.

Considerably more numerous index species are present in the assemblage of Tabulata from the Lower Ludlow of Estonia than in the older stages. Here belong the following species, found in the erratic boulders: *Favosites pseudoforbesi pseudoforbesi* SOK., *Thecia swinderniana* (GOLDF.), *Laceripora cribrosa* EICHW. and *Siringopora schmidti* TCHERN.

In conclusion, it may be stated that in the erratic boulders of Poland, Tabulata occur representing the assemblages of all the Silurian stages in Estonia. Among them, index forms are also present.

DEVELOPMENT OF TABULATA DURING ORDOVICIAN AND SILURIAN IN THE SCANDINAVIAN-BALTIC REGION

Studies on Tabulata, which have been done in Estonia by SOKOLOV (1951a, 1951b, 1952a) and KLAAMANN (1959, 1961a, 1961b, 1962a, 1962b, 1964), as well as those described in the present paper, allow to trace the general outline of the history of this group in the Scandinavian-Baltic region.

Tabulata appear in the region mentioned, in the Middle Ordovician. In Estonia, they occur in the bryozoan-algal bioherms of the Vasalemma Stage (D_{III}). The first genera appearing in the Middle Ordovician of that region (*Eofletcheria* BASSLER and *Lyopora* NICH. & ETHERIDGE) are assigned to the order Lichenariida. This order, known from Middle Cambrian, occurs continuously from the Lower Ordovician up to the Ludlovian. Both genera mentioned are present in the Middle and Upper Ordovician, and have a wide geographical range. *Eofletcheria*, represented only by 5—6 known species, occurs in the Baltic region, Urals, Siberian Platform, West Europe and North America. *Lyopora* is, however, represented by 10 species, described from the Baltic region, Altai, Kazakhstan, West Europe and North America. The representatives of both genera are also present in Norway (HILL, 1953). Thus, the Estonian Stage with *Eofletcheria* can also be distinguished in Norway, in the Mjøsa district (Mjøsa Limestone) and in Gjerpen Langesund (*Encrinite* Limestone). Accordingly, it seems that Stage 4 in Norway may be correlated with the Vasalemma Stage (D_{III}) in Estonia.

The Upper Ordovician Tabulata from the Scandinavian-Baltic region represent 3 orders: Sarcinulida, Halysitida and Favositida. They are not numerous generically. Order Sarcinulida is represented here by the genus *Sarcinula*, while the Halysitida are represented by *Catenipora* alone. However, of order Favositida 3 genera occur here: *Palaeofavosites*, *Mesofavosites* and *Multisolenia*. All the genera mentioned above appear in Upper Ordovician and are not found above the Silurian. Within the genus *Sarcinula*, only 6 species are known, which occur from the Upper Ordovician to the Llandovery, and so far they have been found only in the Scandinavian-Baltic region and in China. The remaining genera are very numerous in terms of species, and have wide geographical distributions.

Ordovician genera appeared in the following stratigraphical succession: *Sarcinula*, *Catenipora*, *Palaeofavosites*, *Mesofavosites* and *Multisolenia*. Auloporidae are also found in Ordovician, but so far, they have never been satisfactorily investigated.

In Estonia, the stratigraphic series with *Sarcinula* was established, and contains the stages: Rakvere (E), Nabala (F_{1a}), Wormsi (F_{1b}), Pirgu (F_{1c}) and Porkuni (F_2). In the Rakvere Stage, the only representative of Tabulata is *Sarcinula rakverense* SOK. In the Nabala Stage, Tabulata are represented by Auloporida, as well as by *Catenipora obliqua* (FISCHER-BENZON) from the

Halysitida. In the Wormsi Stage appear the representatives of Favositida, namely *Palaeofavosites*, as well as *Sarcinula* and *Catenipora*, which latter continue up to the Pirgu Stage. *Multisolenia* and *Mesofavosites* made their first appearance in the Porkuni Stage, and *Palaeofavosites* is still represented by numerous species. In spite of the appearance of new genera in the Porkuni Stage in Estonia, this stage also was assigned to Ordovician because of the presence of *Sarcinula* and *Tetradiida*, which are never found in Silurian.

According to KIAER (1904), in the Norwegian Stage 5a, 5b occur *Sarcinula*, *Catenipora* (*Halysites parallela* SCHMIDT and *H. escharoides* LAM.) and probably also *Palaeofavosites* (*Favosites asper* D'ORB.). The occurrence of *Sarcinula* in both of the stages 5a and 5b, permits one to suppose, that these stages are coeval with the Estonian stage with *Sarcinula* (i.e. Upper Ordovician).

The occurrence of *Sarcinula rakverense* SOK. on the Island of Gotland seems also to indicate that there Upper Ordovician should be present in the beds unexposed.

As can be concluded, Tabulata in the Ordovician of the Scandinavian-Baltic region are generically weakly differentiated. In that region they reach the maximum of their development in the Silurian, though at the beginning of Llandovery, only a few genera occur. Only representatives of *Palaeofavosites, Mesofavosites* and *Catenipora* are present. *Palaeofavosites* attains its maximum of development in Stage with *P. paulus* SOK. and *Mesofavosites fleximurinus* SOK. (the oldest Silurian in Estonia), but *Mesofavosites* also plays important role here. This series, including the Estonian Stages Juuru, Tamsalu and the lower part of Raikküla, can be investigated not only in Norway, but also in Taimyr and Siberia (ZHIZHINA, 1959, 1960, 1961; SOKOLOV, 1960), as well as in South-east Iran (FLÜGEL & RUTTEN, 1962).

In younger sediments, established in Estonia on the basis of the presence of *Parastriatopora celebrata* KLAAM. and including only the upper part of Raikküla Stage, some new genera appear: *Parastriatopora, Syringopora, Hexismia* and *Multisolenia*. At this time, *Favosites gothlandicus* LAM. attains an enormous development. Similar changes in the Tabulata assemblage are observed at that time in Norway. The Tabulata fauna is renewed for the second time in the youngest part of the Llandovery, which in Estonia is distinguished as a series with *Mesofavosites obliquus* SOK. and corresponds with the Adavere Stage. The new elements here are: *Subalveolites, Subalveolitella, Placocoenites* and *Halysites*. The generic and specific diversity of Tabulata reaches its maximum here. At this time, *Catenipora* and *Palaeofavosites,* with well developed septal apparatus, become abundant. The representatives of *Favosites* are distinguished by large diameters of the corallites (*Favosites favosus* GOLDF.), *F. favosiformis* SOK., *F. ingens* KLAAM.). This stage is present in Oslo region, on the Island of Gotland, and in Podolia (KLAAMANN, 1962), where it corresponds with Kitaigorod Horizon. In addition, it was also distinguished in the Silurian of the Siberian Platform (SOKOLOV, 1960).

The next renewal of Tabulata fauna, mainly at the specific level, occurs in the Wenlockian stage with *Favosites jaaniensis* SOK. At this time, the genus *Thecia* appears and *Palaeofavosites*, *Catenipora* and *Mesofavosites* become extinct. This stage is distinctly differentiated in Norway and on the Island of Gotland.

Tabulata reach the maximum of their evolution in the younger stage with *Coenites juniperinus* EICHW. The new genera here are: *Coenites*, *Cladopora* and *Romingerella*. Halysitida become extinct. The stage with *Coenites juniperinus* can be traced in Silurian of Norway, Sweden (Island of Gotland), England and probably also in America (KLAAMANN, 1962).

A great development of *Favosites* takes place in the Lower Ludlow, in the stage with *Favosites similis* SOK. and *F. kogulaensis* SOK. *Thecia swinderniana* (GOLDF.) and *Laceripora cribrosa* EICHW. take part in the formation of bioherms. At this time, *Parastriatopora* and *Pa-*

laeofavosites are no longer present, but there are numerous representatives of *Syringopora*. It seems that the stage with *F. similis* and *F. kogulaensis* can be distinguished in the Ludlovian of the Oslo region and on the Island of Gotland (Hemse and Eke Groups), it can be also traced in Middle Asia and in the Urals (KLAAMANN, 1962).

Silurian Tabulata reach a very great development in the Scandinavian-Baltic area. In Estonia and on the Island of Gotland, they take a significant part in forming of bioherms, but in Norway, most probably biostromes. From the Ordovician and Silurian of Estonia, 196 species were described. It seems that in the Silurian of Norway and of the Island of Gotland, the number of species should be about the same. There are many species common for Norway and Estonia, as well as for the Island of Gotland and Estonia. For the time being, the only common species for those three areas is *Catenipora maxima* (FISCHER-BENZON, 1871). However, the occurrence of related species, especially of *Catenipora*, should be noted.

The list of related species in the areas mentioned is as follows:

Norway	Island of Gotland	Estonia
	I	
Catenipora quadrataeformis n. sp.	—	—
—	*Catenipora quadrata* F.-B.	—
—	*C. escharoides* LAM.	—
—	—	*Catenipora vespertina* KLAAM.
	II	
C. maxima (FISCHER-BENZON)	*C. maxima* (FISCHER-BENZON)	*C. maxima* (FISCHER-BENZON)
C. ringerikensis n. sp.	—	—
—	*C. hedei* n. sp.	—
C. spiroddensis n. sp.	—	—
C. spiroddensiformis n. sp.	—	—
	III	
C. oriens KLAAM.	—	*C. oriens* KLAAM.
C. malmoeyensis n. sp.	—	—
C. norvegica n. sp.	—	—
C. minuta n. sp.	—	—
	IV	
C. llandoverensis n. sp.	—	—
—	*C. regnelli* n. sp.	—
C. heintzi n. sp.	—	—
	V	
—	*C. crassa* n. sp.	—
—	*C. carlsoensis* n. sp.	—

Catenipora quadrataeformis n. sp. is the first species to appear in Series 6 in Norway. It has no completely developed columella. Next, in the Lower Visby Marl (= Series 7) *C. quadrata* and *C. escharoides* occur, both species having a well developed columella. *C. vespertina* appears in higher stages, Jaani (Estonia) and Series 9 (Norway).

The distribution of groups of related species reflects the facial differences in those three areas. The occurrence of endemic forms is also brought to prominence, but the poorly known Tabulata of Norway and Sweden do not permit any precise determination of what percentage they form in each area. Probably, as studies on those Tabulata proceed, the number of endemic species will diminish.

SYSTEMATIC POSITION OF TABULATA

Although the Tabulata have been known for a long time, their systematic position was hardly recognized, because of the inclusion within that group of various other representatives of the Coelenterata as well as members of other phyla. Representatives of the Tabulata were described for the first time by LINNAEUS in 1745, who called them Lithophyta, and assigned them to the suborder Zoophyta.

The Tabulata, a group established by MILNE-EDWARDS and HAIME (1849), primarily included, besides the forms presently assigned here, also many others, which were later transferred to Heliolitida, Hydrozoa, Alcyonaria, Tetracoralla and Bryozoa.

Several writers have attempted to revise genera, the inclusion of which within this group was doubtful. The most important contributions were made by LINDSTRÖM (1873) and NICHOLSON (1879), who excluded from Zoantharia Tabulata MILNE-EDWARDS & HAIME two families: Labechiidae and Milleporidae, and assigned them to Bryozoa. Later on, CUMMINGS (1911—1915) also proved that the family Monticuliporidae, until that time included to Tabulata, should be assigned to the Bryozoa. Equally important was the separation from the Tabulata of the subclass Heliolitoidea; LINDSTRÖM (1873, 1876, 1899) and KIAER (1899, 1904) were the first who, on the basis of studies of Scandinavian Heliolitoidea, showed that no close relationship exists between the group mentioned and the Helioporacea and Tabulata.

ABEL (1920) was the first to notice the isolated systematic position of the heliolitids among the other corals. He established the name Heliolitida, which indicates a taxonomic status higher than that of family. This name was used in "Grundzüge der Paläontologie" (ZITTEL, 1924), where the Heliolitida are treated as the equivalent of Tabulata.

JONES and HILL (1940) regarded the Heliolitida as a separate subclass, taxonomically equivalent to subclasses Tabulata, Tetracoralla and Hexacoralla. This also was the opinion of LECOMPTE (1950).

Studies on the Heliolitida were developed to a greater extent in the papers of Soviet palaeontologists, who have considered this group as an independent systematic unit. Heliolitida have been described in papers of TCHERNYCHEV (1937—1941, 1951), RUKHIN (1938, 1939) and SOKOLOV (1939—1963) as separate group, not connected with Tabulata. SOKOLOV described the Heliolitoidea as a separate subclass of corals, and reviewed its constituent systematic units.

HILL (1956) retreated from her earlier held point of view, assigning again the Heliolitidae to the Tabulata. FLÜGEL (1956), while revising the Heliolitida, asserted the previous opinion of JONES and HILL, proving the independence of that group from the Tabulata.

According to the present author, the isolation of the Heliolitida as a separate subclass of the Anthozoa is entirely justified, because of the presence in those corals of coenenchymal tissue, unknown in the Tabulata and Tetracoralla, as well as the occurrence of 12 septa.

The Chaetetida also differ essentially from the Tabulata and were assigned by SOKOLOV (1939, 1950, 1955, 1963) to the Hydrozoa. The investigations of that author, based on the extremely abundant corals of the Palaeozoic deposits of the U.S.S.R., have shown the immense diversity within this group and the peculiar features of its structure. Those features preclude entirely the possibility of including the Chaetetida not only within Tabulata, but also within the class Anthozoa. They are outstanding in lacking any septal structure, in increasing by the longitudinal division, and in having trabecular structure of walls. Those characters, according to SOKOLOV, are not found in the Tabulata. Especially the lack of septa places in doubt the rank of Chaetetida within the Anthozoa altogether. The pseudo-septal extensions found in the representatives of the Chaetetida have, according to SOKOLOV, only a reproductive function. Thus, the separation of Chaetetida from the Tabulata seems to be entirely justified and sufficiently proved.

The peculiarities in structure of the remaining representatives of the Tabulata, offer irrefutable evidence for the independence of the whole group and for its high taxonomic position.

During recent years, different classifications have been proposed, especially by LECOMPTE (1962), SOKOLOV (1955, 1963, 1965) and HILL and STUMM (1956). In LECOMPTE's classification Tabulata were assigned together with Tetracoralla as the two suborders to within the order Madreporaria. According to this author, a number of characters in Tabulata is not sufficiently well defined to provide any indication of their relationship with the other groups of Coelenterata. Unlike most palaeontologists, who have regarded Tabulata as an artificial group, he is of the opinion that there exists no possibility other than to retain their separate systematic position. In LECOMPTE's opinion, the present classification of Tabulata is not satisfactory, based, as it is, exclusively on morphology, regardless of phylogeny. According to this author, a more detailed investigation of fine structure could help in tracing and elucidating phylogenetic relationships, while otherwise such conclusions would be premature.

SOKOLOV advanced Tabulata to the higher rank of subclass, and in a number of papers (1947—1963), he attempted to ascertain the relationship between the orders and families. He agrees with LECOMPTE that, so far as the systematic problems of Tabulata are concerned, the old method of morphological comparisons of this group with the representatives of other corals should be abandonned. Instead, the new method, based on the phylogenetic relations within the group between its individual representatives, with the simultaneous elimination of alien elements, should be used.

SOKOLOV gave a detailed review of all previous opinions on the systematic position of the Tabulata. On this basis, as well as from his own investigations, he came to the conclusion that, after the exclusion of some families and genera, the remaining families are related and are united by a number of common and important characters, which prove the uniformity and independence of this group. In SOKOLOV's classification, the Tabulata form a subclass within the class Anthozoa. The arguments in favour of this view are: the probable common origin, the simple structure of the skeleton, the uniform plan of the septal structures and the same mode of asexual increase. All this, according to SOKOLOV, justifies the designation of the Tabulata to a separate subclass.

SOKOLOV has recently (1965) proposed some changes in the systematic division of Tabulata, namely placing the orders according to the sequence of their appearance in time. Those

changes make the division of the Tabulata a natural one, reflecting the evolution of genera, families and orders. The systematic division presented by SOKOLOV, is the result of investigations of a great amount of material collected from U.S.S.R. territory. Moreover, these results are connected with detailed biostratigraphic investigations and reflect the various palaeogeographic types of fauna.

The present investigation of the Tabulata from the Scandinavian-Baltic Region has thrown fresh light upon the group, especially on the Halysitida, most numerously represented in the present paper. The development of a colony in Halysitida, which begins with the auloporoid stage, the structure of their walls and septa, as well as the mode of gemmation are closest to those found in the Tabulata and do not differ essentially from them. The presence of mesocorallites in the genus *Halysites*, the vesicular tissue in the genus *Cystihalysites* and the tubular structures between the corallites in the new genus *Solenihalysites* may arouse some doubt. However, these structures connecting the corallites are, most probably, the equivalents of the tabules occurring in the *Syringopora*, or of the lamellae of the *Sarcinula*, and the buds may appear on them, as is the case with the representatives of the Halysitida. In the *Cystihalysites*, the vesicular tissue is essentially different from the coenenchymal tissue of Heliolitoidea, because the offsets in *Cystihalysites* are not formed inside this tissue, as is the case in *Heliolites*, but outside it, as in the mesocorallites of *Halysites*. Accordingly, there are no grounds for uniting the Halysitida with the Heliolitoidea.

There exists no doubt about the assignment of the representatives described here of the Sarcinulida, Favositida and Syringoporida to Tabulata, because the development and structure of their colonies are typical for the subclass.

In the present paper, the new family Angoporidae has been established within the Favositida, on the basis of the paratrabecular structure of septa in its representatives. This peculiar structure of septa is not to be found in any typical representative of the family Theciidae, to which *Angopora* was previously assigned. The paratrabecular structure of septa indicates a constitution of the polyp different from that found where septa are formed by folding of walls.

In the present paper Auloporida are represented by two species only: *Fletcheria tubifera* M.-EDW. & HAIME and *Favosipora clausa* (LINDSTRÖM).

The systematic position of *Fletcheria* M.-EDW. & HAIME (family Fletcheriidae) seems to be in doubt, because of the occurrence of intracalycal budding, which has so far never been observed in the Tabulata. *Fletcheria tubifera* is, however, characterized by the constitution of its corallites, typical for Tabulata, which could indicate a closer relationship with the Tabulata than with the Tetracoralla.

Favosipora clausa was assigned by SOKOLOV (1950) to the family Romingeriidae. The ramose colony of that form, becoming in places massive as a result of fusion of corallites, proves a closer relationship with the Favositidae. Corallites, in places where they are more crowded, become polygonal in cross-section, and pores appear at the angles of their walls. The forming of a colony, coherent in places, seems to indicate that *Favosipora clausa* is near the incipient form for the genus *Palaeofavosites*.

The present author applies here the classification proposed by SOKOLOV (1965) since it is a natural grouping.

SYSTEMATIC PART

Class **ANTHOZOA**

Subclass **TABULATA**

Order **SARCINULIDA** Sokolov, 1962

Family SYRINGOPHYLLIDAE Počta, 1902

Genus **SARCINULA** Lamarck, 1816

Type species: Madrepora organum Linnaeus, 1758; Sweden, Island of Gotland, ?Silurian.

Diagnosis (after Sokolov, 1962). — Corallites cylindrical, with thick walls and epitheca. Connecting plates arranged apart, or situated closely one upon another, depending on arrangement of the rings of pores. Septal trabeculae closely arranged, often entering visceral chambers in form of 20—24 short ribs, concealed in the regions of the occurrence of pores and pronounced beyond the calyces, in form of a kind of aureola on the connecting plates. Tabulae thick, horizontal, rarely slightly curved.

Distribution. — Upper Ordovician — Lower Llandovery. Scandinavian — Baltic Region; China.

Sarcinula luhai Sokolov, 1951

(Pl. I, Fig. 3 *a-b*)

1854. (?)*Syringophyllum organum* M.-Edwards & Haime; H. Milne-Edwards & J. Haime, Monography of British..., p. 295, Pl. 71, Figs. 3, 3*a*, 3*b*.
1936. *Sarcinula organum* (Linnaeus); I. Cox, Revision..., Pl. 4, Figs. 5, (?)6.
1951*a*. *Sarcinula luhai* Sokolov; B. S. Sokolov, Tabuljaty..., pp. 92—94, Pl. 16, Figs. 6—7; Pl. 17, Figs. 1—2.

Material. — Fragment of colony from erratic boulder, Poland (Z. Pal. T/III-108); two thin sections.

Description. — Corallum massive, semiglobular. Preserved fragment 8.5 cm wide, 4.8 cm high. Corallites cylindrical, radially arranged, 1.5—3.0 mm apart. Corallite diameter 3.0—3.5 mm. Walls up to 0.5 mm thick. The number of mural pores is 24 in one ring. Connecting

plates overlying each other, densely arranged or closely fitting. Tabulae horizontal, sometimes uneven; septal structures well developed.

Distribution. — Poland: erratic boulders, locality Oborniki; Estonia: Upper Ordovician; Norway: Stage 5a.

Sarcinula organum (LINNAEUS, 1745)

(Pl. I, Fig. 4)

1745. *Madrepora composita* LINNAEUS; C. LINNAEUS, Amoenitates..., p. 25, Fig. 6, No. 1.
1749. *Madrepora composita* LINNAEUS; C. LINNAEUS, *Ibid*..., p. 96, Pl. 4, Fig. 4, No. 1.
1758. *Madrepora organum* LINNAEUS; C. LINNAEUS, Systema naturae, p. 1276.
1951*a*. *Sarcinula organum* (LINNAEUS, 1745); B. S. SOKOLOV, Tabuljaty..., pp. 88—90, Pl. 15, Figs. 5—7.

Material. — Fragments of two colonies from erratic boulders, Oborniki, Poland (Z. Pal. T/III — 5,55); two thin sections of specimen Z. Pal. T/III/5, and four thin sections of specimen Z.Pal.T/III-55.

Description. — Corallites cylindrical, up to 3 mm in diameter, 2—3 mm apart, in places nearly connected. Thickness of walls in range 0.5—0.6 mm, 24 pores in one ring. Rings of pores 2 mm apart, rarely 3—4 mm. Connecting plates up to 2 mm apart, rarely 3—4 mm apart. Tabulae horizontal. Septal ridges short.

Distribution. — Poland: erratic boulders; Sweden: Island of Gotland, erratic boulders; Estonia: Upper Ordovician, Stages Wormsi and Pirgu.

Sarcinula rakverense SOKOLOV, 1951

(Pl. I, Fig. 1 *a-b*)

1951*a*. *Sarcinula rakverense* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp 90—91, Pl. 16, Figs. 1—2).

Material. — Fragment of colony from erratic boulders, Poland (Z.Pal.T/III-130); 3 thin sections, and fragment of colony from Island of Gotland (INB-1758); 3 thin sections.

Description. — Corallites cylindrical up to 2.5—3.0 mm in diameter. Walls 0.5 mm thick. 24 pores in one ring, rings spaced 2—4 mm apart. Connecting plates thin, sharply separated from each other. Tabulae funnel-shaped. Septal ridges weakly developed.

Distribution. — Sweden: Island of Gotland, erratic boulders; Poland: erratic boulders; Estonia: Upper Ordovician, Rakvere Stage.

Order **HALYSITIDA** SOKOLOV, 1962

Family CATENIPORIDAE HAMADA, 1957

Subfamily CATENIPORINAE HAMADA, 1957

Genus **CATENIPORA** LAMARCK, 1816

Type species: Catenipora escharoides LAMARCK, 1816. Baltic shore.

Diagnosis. — Colony composed of corallites forming chains and provided with septa. No mesocorallites.

Distribution. — Genus *Catenipora* occurs often in erratic boulders, but is also present on Island of Gotland and in Norway where its range is from Series 6 to 9.

The species of *Catenipora* from Scandinavian — Baltic Region can be united into 5 following groups:

I. *Catenipora arcticus* — group, colonies of which are formed by polygonal, slightly elongate lacunae, composed of corallites oval in cross-section, with weakly convex walls and small diameters (up to 1 mm); intercorallite walls are delimited and septa short. To this group can be assigned *Catenipora arcticus* TCHERN., *C. arctiformis* n. sp. and *C. jarviki* n. sp., from Wenlock of Island of Gotland and from Llandovery of Taimyr.

II. *C. escharoides* — group, colonies of which have polygonal lacunae composed of corallites oval in cross-section, with diameters up to 1.53 mm, with intercorallite walls not delimited. Septa are very long, connected together at the inner extremities and forming columella. In that group can be placed the following species: *Catenipora escharoides* LAM. and *C. quadrata* (FISCHER-BENZON) from Island of Gotland; *C. quadrataeformis* n. sp. and *C. vespertina* KLAAM. from Norway, occurring on Island of Gotland.

III. *C. maxima* — group with lacunae polygonal, usually composed of a small number of corallites, which are oval in cross-section, with diameters up to 4.6 mm, delimited intercorallite walls and weakly developed or not developed septal spines. This group include the following species: *Catenipora maxima* (FISCHER-BENZON) from Estonia; *C. ringerikensis* n. sp. and *C. spiroddensis* n. sp. from Norway; *C. spiroddensiformis* n. sp. and *C. hedei* n. sp. from Island of Gotland. *C. maxima* has the largest diameters of corallites in that group.

IV. *C. oriens* — group with polygonal, slightly elongate lacunae, corallites oval in cross-section, slightly rounded, 0.90—1.92 mm in diameter. Walls are comparatively thick and septal spines long. This group includes: *Catenipora oriens* KLAAM. from Estonia, *C. norvegica* n. sp., *C. minuta* n. sp. and *C. malmoeyensis* n. sp. from Norway.

V. *C. llandoverensis* — group with colonies having lacunae more or less elongate, corallites nearly rectangular in cross-section, up to 1.2 mm in diameter. Walls between the adjacent corallites delimited, septal spines comparatively long. The group includes the following species: *Catenipora llandoverensis* n. sp. from Norway and *C. regnelli* n. sp. from Island of Gotland.

In addition to 17 species included into 5 above mentioned groups, there are in the collection studied 7 species of *Catenipora* (*C. crassa* n. sp., *C. carlsoensis* n. sp., *C. heintzi* n. sp., *C. exilis* EICHWALD, *C. obliqua* FISCHER-BENZON, *C. piirsaluensiformis* n. sp., *C. tractabilis* (SOKOLOV)), which cannot be included into these groups. They differ also from each other in some respects and cannot be grouped together.

Catenipora arctiformis n. sp.

(Pl. I, Fig. 2; Text-fig. 13)

Type specimen: INB 1800; Pl. I, Fig. 2; Text-fig. 13.
Type horizon: Wenlock, Upper Visby Marl.
Type locality: Sweden, Island of Gotland, Högklint.
Derivation of the name: arctiformis — similar to *C. arcticus* (TCHERNYCHEV, 1941).

Diagnosis. — Lacunae polygonal, slightly elongate, with sides composed of 2—5 corallites. In cross-section, corallites oval, with side walls slightly convex. Longer diameters ranging 0.9—1.0 mm, shorter usually 0.6 mm. Walls 0.06—1.0 mm thick. Intercorallite walls distinctly differentiated, thickness ranging 0.1—0.2 mm. Septal spines short.

Table 3

MORPHOLOGICALLY-COMPARATIVE TABLE OF *CATENIPORA* LAMARCK

Species	Shape of lacunae in cross-section	Number of corallites on sides of lacuna	Shape of corallites in cross-section	Longer diameters of corallites (in mm)	Shorter diameters of corallites (in mm)	Thickness of walls (in mm)	Intercorallite walls	Thickness of intercorallite walls (in mm)	Tabulae	Distance between tabulae in mm	Septa
Catenipora arctiformis n. sp.	polygonal, slightly elongate	2—5	oval, sidewalls slightly convex	0·9—1·0	0·6	0·06—0·10	differentiated	0·1—0·2	slightly concave	0·2—0·6	short
C. jarviki n. sp.	elongate	1—10	oval	0·6—0·9	0·4—0·5	0·06	weakly differentiated	0·2	horizontal	0·2—0·3 0·4—0·5	short
C. quadrata (FISCHER-BENZON)	elongate, more or less regular	1—10	oval, subrectangular, or subquadrate	0·60—1·15 exceptionally 1·38	0·69—1·00	0·07—0·23	not differentiated	0·1—0·3	horizontal, concave	0·15—0·40 0·60—0·80	long, fused at centre to form columella
C. escharoides LAMARCK	polygonal, elongate	5—12	oval, elongate	1·07—1·53	0·92—1·23	0·15—0·23	not differentiated	0·15—0·23	horizontal, uneven	0·15—0·76	long, fused at centre to form columella
C. quadrataeformis n. sp.	polygonal, slightly elongate	1—6	oval, subrectangular or subquadrate	0·69—1·15	0·61—0,76	0·07—0·23	not differentiated	0·07—0·23	horizontal, slightly concave	0·15—0·76	long, no continuous columella
C. vespertina KLAAMANN	elongate	6—9	oval, elongate, round	1·38—1·45	1·15—1·30	0·15—0·20	not differentiated	0·15—0·20	horizontal, uneven	0·23—0·63	long, fused at centre to form columella
C. maxima (FISCHER-BENZON)	polygonal	1—4	oval	3·6—4·1	2·5—3·0	0·2—0·3	differentiated	0·2—0·3	horizontal, uneven, incomplete	0·4—0·8 1·0—1·3	absent
C. ringerikensis n. sp.	polygonal	1—3	oval	2·5—3·3	2·5—3·0	0·2—0·3	differentiated	0·2—0·3	horizontal, uneven, incomplete	0·3—0·1	absent
C. spiroddensis n. sp.	polygonal, elongate	2—7	oval, elongate with slightly convex walls	1·3—1·6	1·0—1·1	0·2—0·3	differentiated	0·3—0·4	horizontal, slightly concave	0·3—1·0	short, numerous
C. spiroddensiformis n. sp.	polygonal, elongate	to 12	oval, elongate	2·2	1·15	0·2—0·3	differentiated	0·3	horizontal, concave	0·3—0·8	absent
C. hedei n. sp.	strongly elongate	numerous	oval, elongate	3·0—3.3	1·6—1·8	0·2—0·3	differentiated	0·2—0·3	horizontal, concave, incomplete	0·3—0·5	absent
C. minuta n. sp.	polygonal, slightly elongate	1—5	oval	0·9—1·0	0·4—0·5	0·1		0·2	horizontal, slightly uneven	0·1—0·5	long numerous,
C. oriens KLAAMANN	slightly elongate	2—5	oval, rounded	1·53—1·92	1·30—1·53	0·20—0·38		0·53—0·76	horizontal, uneven	0·38—1·07	long, numerous
C. malmoeyensis n. sp.	polygonal	1—4	oval	1·4—1·7	1·0—1·3	0·2—0·3		0·4—0·6	horizontal, uneven	0·3—1·0	long
C. norvegica n. sp.	polygonal, elongate	2—8	oval	1·4	1·1	0·2—0·3	differentiated	0·4—0·6	horizontal, uneven, incomplete	0·2—0·4 0·5—0·7	long, numerous
C. llandoverensis n. sp.	polygonal, slightly elongate	3—7	oval, subrectangular	0·90—1·15	0·63—0·76	0·07—0·23			horizontal, uneven	0·23—0·38 0·63	long, numerous
C. regnelli n. sp.	polygonal, elongate	1—13	oval, subrectangular	1·0—1·2	0·7—0·9	0·1—0·2	differentiated	0·1—0·2	horizontal, slightly concave, uneven	0·2—0·8	long, numerous
C. crassa n. sp.	polygonal, slightly elongate	1—3	oval	1·3—1·8	1·2—1·5	0·5	differentiated, consist of two parts	0·6	horizontal, concave	0·2—0·6	long, numerous, thick
C. carlsoensis n. sp.	polygonal, elongate	?	oval, nearly circular	1·2—1·5	1·0—1·5	0·5	differentiated, not consisting of two parts		horizontal, concave	0·2—0·5	long, numerous
C. exilis EICHWALD	polygonal	1—3	oval, strongly elongate	1·45—1·84	0·76—0·80	0·46		0·46	horizontal	0·30—0·38 0·40—0·70	short
C. heintzi n. sp.	polygonal, elongate	4—7	oval, nearly rectangular	1·53—1·76	1·1—1·3	0·2—0·3			horizontal, incomplete	0·2—0·38 0·69—0·76	short
C. piirsaluensiformis n. sp.	polygonal, regular	1—3	oval	1·39—1·53	1·0—1·15	0·3		0·6	horizontal	0·15—0·20 0·38—1·00	long, directed upwards, with broad bases
C. obliqua FISCHER-BENZON	polygonal, elongate	1—8	oval	1·7—2·8	1·53—1·92	0·2			horizontal, slightly concave, or convex, incomplete	0·2—0·38 0·7—1·0	long, numerous
C. tractabilis (SOKOLOV)	polygonal, very elongate	8—14	oval, elongate	1·39—2·00	1·0—1·5	0·15—0·30			horizontal	0·7—1·0 0·3—0·38	present

Material. — Fragment of colony from Island of Gotland (INB-1800), 3 thin sections.

Description. — Colony small, low, flattened, 7 cm long, 5.5 cm wide, 2 cm high. Lacunae polygonal, elongate, measuring 4×4 mm, 8×7 mm, 7×3 mm. Sides of lacunae composed of 2—5 corallites, which are oval in cross-section, with their side walls weakly convex. Longer

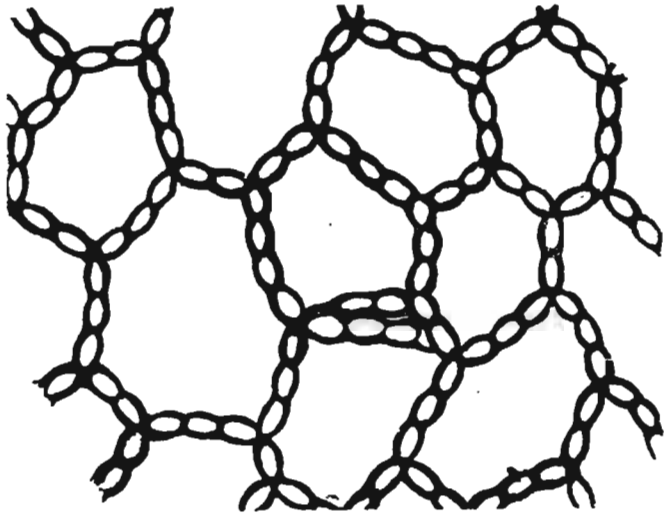

Fig. 13
Catenipora arctiformis n. sp.: cross-section (INB-1800); ×5.

diameters of corallites ranging 0.6—1.0 mm, shorter usually 0.6 mm. Walls 0.06—0.10 mm thick. Intercorallite walls distinctly differentiated, fairly thick, ranging 0.1—0.2 mm. Tabulae horizontal, slightly concave, spaced 0.2—0.6 mm apart. Septal spines short, poorly preserved.

Remarks. — The new species is to some extent similar to *C. arcticus* TCHERNYCHEV, 1941, having however less elongate lacunae, with sides composed of 1—7 corallites, instead of 2—5 as in the case of *C. arctiformis* n. sp. The corallites of *C. arcticus* are more oval in cross-section, and their walls more convex.

Distribution. — Sweden: Island of Gotland, Högklint, Upper Visby Marl.

Catenipora crassa n. sp.

(Pl. VII, Fig. 1*a-b*)

Type specimen: RM-19873; Pl. VII, Fig. 1*a-b*.
Type horizon: Silurian.
Type locality: Sweden: Island of Gotland, Lilla Rone.
Derivation of the name: Lat. *crassus* — thick; because of very thick corallite walls.

Diagnosis. — Lacunae slightly elongate, polygonal, with sides composed of 1—2 corallites. Corallites oval in cross-section, their longer diameters ranging 1.3—1.8 mm, shorter 1.2—1.5 mm. Walls very thick, ranging up to 0.5 mm. Intercorallite walls up to 0.6 mm thick, differentiated,

consist of two parts. Septal spines numerous, thick, often meeting at centre of visceral chamber of a corallite.

Material. — Fragment of a colony (INB-1873); 2 thin sections.

Description. — Colony small. Preserved fragment 3.5 cm wide, 3.5 cm long, 1.2 cm high. Lacunae slightly elongate, polygonal, measuring 6×3 mm and 3×3 mm. Sides of lacunae composed of 1—3 corallites. Corallites oval in cross-section, their longer diameters ranging 1.3—1.6 mm, rarely attaining 1.8 mm; shorter diameters 1.2—1.5 mm. Walls exceptionally thick, ranging 0.3—0.5 mm, latter thickness being the most common. Intercorallite walls well differentiated and thicker than side walls, measuring up to 0.6 mm. They consist of two parts, sometimes with a slit between them, but never with any distinct mesocorallite. Fine structure well preserved. Epitheca thick. Tabulae horizontal, convex in places, spaced, 0.2—0.6 mm apart. Septal spines numerous, thick, sometimes meeting at centre.

Remarks. — *Catenipora crassa* n. sp. differs from all known species in having unusually thick side walls of corallites, and well differentiated intercorallite walls, which consist of two parts. *C. crassa* n. sp. is similar to *C. carlsoensis* n. sp. (see below).

Catenipora carlsoensis n. sp.

(Pl. VII, Figs. 3, 4 *a-b*)

Type specimen: RM-19778; Pl. VII, Fig. 4 *a-b*.
Type horizon: Silurian, Wenlock.
Type locality: Sweden: Island of Gotland, Lilla Carlsö.
Derivation of the name: carlsoensis — after the name of type locality Carlsö.

Diagnosis. — Lacunae polygonal, elongate. In cross-section, corallites oval, nearly circular, with longer diameters 1.2—1.5 mm and shorter diameters 1.0—1.5 mm. Walls up to 0.5 mm thick. Intercorallite walls well differentiated. Septal spines long, numerous.

Material. — Fragments of 9 colonies (RM-19778, 19871—74, 19950—54), 4 thin sections of the specimen RM-19778 and 5 sections of the specimen RM-19951.

Description. — Lacunae polygonal, elongate, average 6×5 mm. Corallites oval, nearly circular, in cross-section ranging 1.2—1.5 mm in length, 1.0—1.2 mm, rarely 1.5 mm in width. Walls 0.3—0.4 mm thick, often up to 0.5 mm thick. Intercorallite walls wide, distinctly differentiated from side walls, but not divided into two parts. Tabulae horizontal, slightly concave, or more strongly concave in places, spaced 0.2—0.5 mm apart. Septal spines long and numerous.

Remarks. — The species investigated is similar to *C. crassa* n. sp., but differs from the latter in having smaller corallites and undivided intercorallite walls.

Distribution. — Sweden: Island of Gotland, Lilla Carlsö, Lilla Rone; Wenlock.

Catenipora escharoides LAMARCK, 1816

(Pl. III, Figs. 5—8)

1816. *Catenipora escharoides* LAMARCK; J. B. LAMARCK, Histoire naturelle..., 2, p. 207.
1954. *Halysites escharoides* (LAMARCK); H. D. THOMAS & S. SMITH, The coral genus..., pp. 768—770, Pl. 20, Figs. 2, 3; Pl. 21, Figs. 1-3*b*, non Pl. 21, Fig. 2 *a-b*.

Material. — Fragments of 11 colonies from Island of Gotland, one of them nearly complete (RM-19790—91, 19793, 19964—65, 20062; INB-1772, 1937; Z.Pal. T/IV-4, T/III-49, 90); 4 thin sections of each from the following specimens: RM-19964, Z.Pal. T/IV-4, T/III-49, 90; 5 thin sections of specimen RM-20062; 2 thin sections of each from specimens INB-1772 and 1937.

Description. — Colonies discoidal in shape. One of them nearly complete, 12 cm long, 12 cm wide and 5 cm high. Preserved fragment of another colony (about 20 cm wide and 5 cm high) shows that they apparently could reach larger dimensions. Lacunae polygonal, more or less elongate. Their dimensions 2×2 mm, 5×4 mm, 8×4 mm, 13×3 mm. Very long and narrow lacunae occur rarely. Sides of lacunae consist of 5—6 corallites, sometimes up to 12. In cross-section, corallites oval, more or less elongate. Longer diameters in range 1.07—1.53 mm, but usually equal 1.3 mm. Shorter diameters 0.92—1.23 mm. Walls 0.15—0.23 mm thick. Epitheca fairly thick. Intercorallite walls as thick as side walls, or slightly thicker. Tabulae horizontal or slightly curved, concave or faintly convex, spaced 0.15—0.76 mm apart. Septal spines long, meet at centre and fuse to form spongy columella, elongate in cross-section. Number of septal spines on periphery of corallite reaches up to 12.

Remarks. — Detailed studies of numerous cross-sections, and measurements of both diameters of the corallites suggest that great differences exist in the dimensions of the corallites, mainly in the lengths of the greater diameters. These variations were also observed by THOMAS and SMITH (1954). The colony from the Upper Visby Marl (INB 1772 from Luseklint) is the one most similar to the neotype. It is preserved in light yellowish grey limestone. The colony from the erratic boulders of Poland (Z.Pal.T/III-90) is also close to the neotype. Similar measurements to those of the neotype are also found in the corralites of colonies Z.Pal.T/IV-4 from Visby Marl and Z.Pal.T/III-49 from the erratic boulder of Poland. The measurements of corallites of the remaining coralla are close to those of specimen No. 635 in HISINGER's collection, and to those of the specimen B.M.R. 1810 from Silurian of Island of Gotland, described by THOMAS and SMITH (1954). These colonies are slightly similar to *C. quadrata*, but the most commonly occurring dimensions of corallites are typical for *C. escharoides*. However, the corallum described by THOMAS and SMITH (1954) from the Lower Visby Marl (B.M.R. 27637) from the beach ?North of Visby, should be assigned to *C. quadrata* because the average dimensions of its corallites are typical for those of the latter species. Nearly all of the early papers, in which *C. escharoides* was described, do not contain any precise measurements of corallites. Besides the revision of that species made by THOMAS and SMITH, all the other corals, which have been assigned to *C. escharoides* and described in the literature, require revision. For that reason, the present author does not cite any earlier paper in the synonymy of the above described species.

Distribution. — Poland: erratic boulders; Sweden: Island of Gotland, Visby, Luseklint, Irevik, Tofta Nyrivsudden, Halshuk; Lower and Upper Visby Marl.

Catenipora heintzi n. sp.

(Pl. III, Figs. 1, 2)

Type specimen: PMO-47481; Pl. III, Fig. 1.
Type horizon: Silurian, Stage 8*d* of Norway.
Type locality: Norway: Ringerike, Sønsterud.
Derivation of the name: heintzi — in honour of Prof. ANATOL HEINTZ from Oslo.

Diagnosis. — Lacunae polygonal, elongate. Sides of lacunae consist of 4—7 corallites. Corallites with weakly convex walls, oval, nearly rectangular in cross-section. Longer diameters ranging 1.53—1.76 mm, shorter 1.1—1.3 mm. Walls 0.2—0.3 mm thick. Septal spines short, densely arranged in vertical rows.

Material. — Two fragments of colonies from Norway (PMO-47481 and 47019) and two fragments of the colonies from the erratic boulders of Poland (Z.Pal.T/III/79 and 190); 2 thin sections of each mentioned specimen.

Description. — Colonies large, the biggest fragment is 8.5 cm long, 5.5 cm wide and 8 cm high. Lacunae polygonal, elongate, measuring 10×3 mm, 8×3 mm, sometimes 15 mm long, 2—4 mm wide, 4—7 corallites on the sides of lacunae. Corallites in cross-section oval, slightly rectangular, with weakly convex side walls. Longer diameters usually 1.53 mm, rarely 1.69—1.76 mm. Shorter diameters average 1 mm, sometimes 1.15—1.3 mm. Walls 0,2—0.3 mm thick, but measurements 0.38 mm also found. Fine structure well preserved, epitheca thin. Tabulae horizontal, even, in places incomplete, densely spaced 0.2—0.38 mm and 0.69—0.76 mm apart. Septal spines (not always preserved), short, densely arranged in vertical rows, up to 11 spines on the outline of a corallite. In longitudinal sections, visible traces of bases of spines, in form of points densely arranged in vertical rows.

Remarks. — *Catenipora heintzi* seems to be closest to *C. agglomeratiformis* (WHITEFIELD). This opinion is based on the description of *C. agglomeratiformis* given by TROEDSSON (1928) because WHITEFIELD's description (1900) is not sufficient enough for any more detailed comparison. Colonies of *C. heintzi* n. sp., especially those coming from Norway, are the most similar to those of *C. agglomeratiformis* from Greenland. According to BUEHLER (1955), *C. agglomeratiformis* is similar to *C. delicatulus* (WILSON, 1926). Infortunately, the material of *C. agglomeratiformis* is poorly preserved and BUEHLER proposed waiting for the determination of this species, until new material is found.

Distribution. — Poland: erratic boulders; Norway: Ringerike, Sønsterud, Silurian, Stage 8d.

Catenipora hedei n. sp.

(Pl. IV, Fig. 1*a-b*)

Type specimen: INB-1924; Pl. IV, Fig. 1*a-b*.
Type horizon: Wenlock, Upper Visby Marl.
Type locality: Sweden, Island of Gotland, Högklint.
Derivation of the name: hedei — in honour of Docent Dr. J. ERNHOLD HEDE of Lund.

Diagnosis. — Lacunae polygonal, elongate. Corallites oval, elongate, with longer diameters ranging 3.0—3.3 mm, shorter 1.6—1.8 mm. Walls 0.2—0.3 mm thick. Intercorallite walls well separated, as thick as side walls. No septal spines.

Material. — Fragments of 4 colonies from Island of Gotland (INB-1964 and RM-19999—20001); 2 thin sections of each specimen.

Description. — Fragments of colonies very small, being probably the younger parts of colonies. Lacunae not completely preserved, strongly elongate, composed of numerous corallites. Corallites oval in cross-section, elongate, with longer diameters ranging 3·0—3·3 mm, shorter 1·6—1·8 mm. Walls 0·2—0·3 mm thick. Fine structure well-preserved, epitheca thin. Intercorallite walls as thick as the side walls, well differentiated. Tabulae slightly concave, incomplete, sometimes horizontal, spaced 0·3—0·5 mm apart. No septal spines.

Remarks. — *C. hedei* n. sp. is similar to *C. maxima* (FISCHER-BENZON) from Estonia. It differs, however, in having narrower corallites and longer lacunae, composed of greater number of corallites.

Distribution. — Sweden: Island of Gotland, Visby, Högklint; Wenlock, Upper Visby Marl.

Catenipora exilis EICHWALD, 1829

(Pl. VII, Fig. 2, Text-fig. 7)

1829. *Catenipora exilis* EICHWALD; E. EICHWALD, Zoologia..., p. 193, Pl. 2, Fig. 13.
1858. *Catenipora exilis* EICHWALD; FR. SCHMIDT, Untersuchungen,.., p. 229.
1860. *Halysites exilis* EICHWALD; E. EICHWALD, Lethaea..., pp. 507—508.
1871. *Halysites jacovickii* FISCHER DE WALDHEIM; R. v. FISCHER-BENZON; Mikroskopische Untersuchungen..., p. 22, Pl. 3, Figs. 8, 9.
1955. *Halysites exilis* EICHWALD; E. J. BUEHLER, The morphology..., pp. 33—34.
1966. *Catenipora exilis* EICHWALD; E. KLAAMANN, Inkomunikatnye..., pp. 50—52, Pl. 14, Figs. 1—5, Text-fig. 25.

Material. — Fragment of colony from Norway (PMO-54895), fragments of 3 colonies from erratic boulders of Poland (Z.Pal.T/III-135, 136, 41); 2 thin sections of each specimen.

Description. — Fragments of colonies average in size, biggest fragment of a colony from Norway 8 cm long, 7·5 cm wide and 3 cm high. Corallites usually nearly vertically arranged, forming low and flat colony. Lacunae regularly polygonal. Sides of lacunae composed of few corallites, usually 1 or 2—3 of them. Corallites oval, strongly elongate in cross-section. Their longer diameters measuring usually 1·45 mm, sometimes 1·53 mm, rarely attaining 1·84 mm. Shorter diameters ranging 0·76—0·84 mm. Walls 0·15—0·2 mm thick. Intercorallite walls 0·46 mm thick. Fine structure well-preserved in places. Epitheca thin. Tabulae horizontal, loosely and regularly arranged, spaced 0·4—0·7 mm apart. In some places, spaced more closely 0·3—0·38 mm apart. Septal spines short, poorly preserved.

Remarks. — The species described above should be assigned to *Catenipora* because it lacks mesopores. *Catenipora immemorata* KLAAM. from Estonia is similar to *C. exilis* here described. It has, however, slightly larger corallites, as well as more septal spines than *C. exilis*. The colony of the described species, found in Norway, has less regular lacunae than the colonies from erratic boulders of Poland. The latter have lacunae arranged in form of a star, as it is the case with the specimens of this species described by FISCHER-BENZON (1871).

Distribution. — Poland: erratic boulders; Norway, Holmestrand, Bjerkøy, Stage 7c; Estonia: Upper Llandovery, Lower Adavere Stage.

Catenipora jarviki n. sp.

(Pl. II, Fig. 1*a-b*)

Type specimen: RM-Cn-19997; Pl. II, Fig. 1*a-b*.
Type horizon: Wenlock.
Type locality: Sweden: Island of Gotland, Visby.
Derivation of the name: jarviki — in honour of Prof. ERIK JARVIK, Stockholm.

Diagnosis. — Lacunae elongate, narrow, 1·3 mm long, 0·2—0·3 mm wide, with sides composed of 1—10 corallites. Corallites oval in cross-section, with longer diameter 0·6—0·9 mm and shorter 0·4—0·5 mm. Walls 0·06 mm thick. Intercorallite walls 0·2 mm thick. Septal spines short.

Material. — Colony from Island of Gotland (RM-19997); 4 thin sections.

Description. — Colony average in size; fragment being about a half of it, 6·5 cm long, 6·5 cm wide, 4 cm high. Lacunae polygonal, usually narrow and strongly elongate, with sides composed of 1—5 corallites; usually, however, more present up to 10. Corallites oval in cross-section, with longer diameter ranging 0·6—0·9 mm, shorter 0·4—0·5 mm. Walls 0·06 mm thick. Fine structure poorly preserved, epitheca thin. Intercorallite walls weakly differentiated, 0·2 mm thick. Tabulae horizontal, fairly thick, spaced 0·2—0·3 mm apart and 0·4—0·5 mm apart. Septal spines short, badly preserved; visible sometimes in longitudinal sections in form of spots, arranged in vertical rows.

Remarks. — *Catenipora jarviki* n. sp. is to some extent similar to *C. arctiformis* n. sp., but differs, however, in having smaller diameters of corallites and longer lacunae, composed of many more corallites than those of *C. arctiformis*.

Catenipora minuta n. sp.

(Pl. VI, Fig. 2*a-b*)

Type specimen: PMO-45294; Pl. VI, Fig. *2a-b*.
Type horizon: Silurian, Series 7.
Type locality: Norway, Ringerike.
Derivation of the name: minuta, Lat. *minutus* = small; from the small diameters of corallites.

Diagnosis. — Lacunae polygonal, slightly elongate, with sides composed of 1—15 corallites. Corallites oval in cross-section, 0·9—1·0 mm long, 0·4—0·5 mm wide. Walls 0·1 mm thick. Intercorallite walls 0·2 mm thick. Septal spines long, densely arranged in vertical rows.

Material. — Fragments of two colonies from Norway (RM-45294-5); 2 thin sections of each specimen.

Description. — Colony discoidal, average in size. Larger fragment 7 cm long, 6·5 cm wide, 4·5 cm high, comprising about a quarter of the whole colony. Lacunae small, polygonal, weakly elongate or elongate, their dimensions being 4×4 mm, 5×2 mm. In cross-section, corallites oval, slightly elongate with convex side walls. Their longer diameters ranging 0·9—1·0 mm, shorter 0·4—0·5 mm. Walls 0·1 mm thick. Epitheca thin. Intercorallite walls 0·2 mm thick. Tabulae horizontal or slightly uneven 0·1—0·5 mm apart. Septal spines numerous, rather long, densely arranged in vertical rows. They are visible only in places and in longitudinal section present in form of vertical rows of densely arranged points.

Remarks. — *C. minuta* n. sp. is similar to *C. norvegica* n. sp. but differs, however, in having much smaller dimensions of corallites, which are also slightly elongate in cross-section. The measurements of lacunae of the new species described above are also smaller.

Catenipora maxima (FISCHER-BENZON, 1871)

(Pl. IV, Fig. 2 *a-b*; Text-fig. 14)

1871. *Halysites obliqua* var. *maxima* FISCHER-BENZON; R. J. D. FISCHER-BENZON, Mikroskopische Untersuchungen..., p. 19, Pl. 2, Fig. 8.
1961. *Catenipora monstruosa* KLAAMANN; E. KLAAMANN, Tabuljaty..., pp. 91-92, Pl. 11, Figs. 1, 2; Text-Fig. 5.
1966. *Catenipora maxima* (FISCHER-BENZON, 1871); E. KLAAMANN, Inkomunikatnye..., pp. 58—59, Pl. 17, Figs. 4, 5.

Material. — Fragments of three colonies: from Island of Gotland (INB-1757), from Norway (PMO-47020) and from erratic boulder of Poland (Z.Pal.T/III-116); two thin sections of each specimen.

Description. — Lacunae polygonal, composed of 1—4 corallites. The latter oval in cross-section, with longer diameters ranging 3·6—4·1 mm, shorter 2·5—3·0 mm. Walls 0·2—0·3 mm

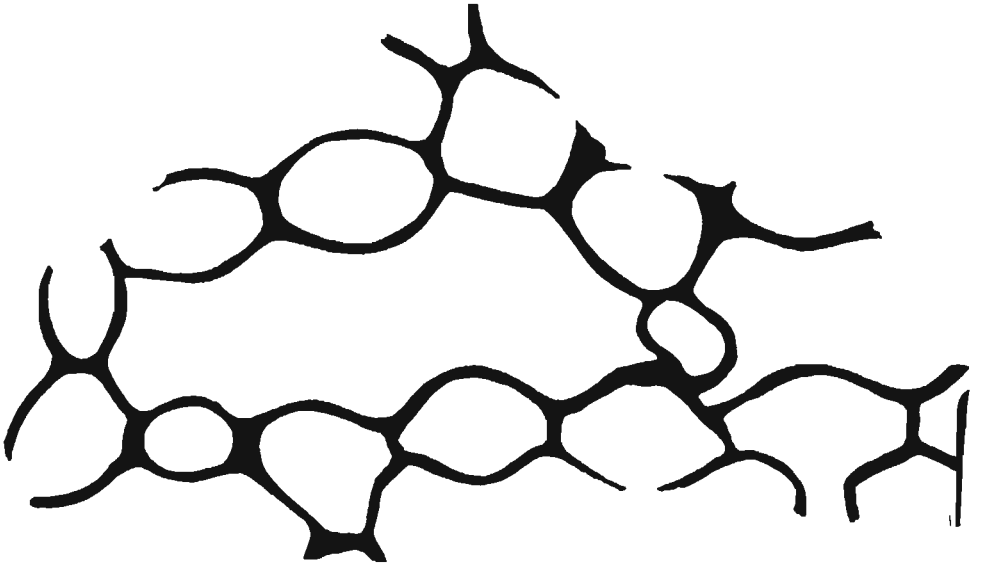

Fig. 14
Catenipora maxima (FISCHER-BENZON): cross-section (PMO-47020); ×5·5.

thick. Intercorallite walls as thick as side walls, or slightly thinner; distinctly separate from side walls. Tabulae horizontal, often incomplete or slightly uneven 0·4—0·8 mm and 1·0—1·3 mm apart. No septal spines.

Remarks. — Colonies of *C. maxima* (FISCHER-BENZON) from Estonia differ from those found in erratic boulders of Poland in having corallites with thicker walls and different dimensions. The Norwegian colonies of this species have tabulae less closely spaced.

Distribution. — Poland: erratic boulders; Norway: Ringerike, Tyrifjord, Stage 7b; Sweden: Island of Gotland, Silurian; Estonia: Wenlock, Jaani Stage.

Catenipora obliqua FISCHER-BENZON, 1871

(Pl. VII, Fig. 5)

1871. *Catenipora obliqua* FISCHER-BENZON; R. v. FISCHER-BENZON, Mikroskopische Untersuchungen..., p. 19, Pl. 2, Figs. 4, 5.

Material. — Fragment of colony from erratic boulder, Poland (Z.Pal.T/III-133); 2 thin sections.

Description. — Colony probably small; fragment only 3 cm long, 3 cm wide, 4 cm high. Lacunae elongate, average 9×3 cm, composed of 1—8 corallites on each side, but usually greater number present. In cross-section, corallites oval. Usually one of the corallite walls more convex than the others, often in the adjacent corallites such walls are arranged alternately. Corallite diameters ranging: longer 1·7—2·8 mm, most commonly 2·6—2·9 mm, shorter 1·53—1·92 mm,

but usually 1·53 mm. Walls 0·2 mm thick, poorly preserved, without epitheca, with obscure fine structure. Tabulae horizontal, slightly concave or convex, rather even, sometimes incomplete, spaced 0·2—0·3 mm apart in places where they are more crowded, and 0·7—1·0 mm while loosely arranged. Septal spines badly preserved, rarely visible, pointed and comparatively long. These more convex corallite walls are provided with greater number of septal spines than the opposite walls. Spines on intercorallite walls visible.

Remarks. — The specimens from the erratic boulders of Poland have longer corallite diameters than those described by FISCHER-BENZON (1871). There is some resemblance between the species described and *Halysites kuliki* TCHERNYCHEV (1938), but the corallites of the latter species are much smaller.

Distribution. — Poland: erratic boulders; U.S.S.R.: Silurian, Island of Waigach, Llandovery.

Catenipora oriens KLAAMANN, 1961

(Pl. V, Fig. 3 *a-b*)

1961. *Catenipora oriens* KLAAMANN; E. KLAAMANN, Tabuljaty..., pp. 89—90, Pl. 9, Figs. 7, 8; Pl. 10, Fig. 3; Text-fig. 3.

Material. — Fragments of two colonies from Norway (PMO-42944, 45151); 2 thin sections of each specimen.

Description. — Colonies large and high. Fragment of larger one 12 cm long, 10 cm wide, 10 cm high. Lacunae weakly elongate, with sides composed of 2—5 corallites, up to 1·3 cm long, 3·5 mm wide. Corallites connected directly, but well separated. In cross-section, they are oval, weakly elongate, rounded, their longer diameters ranging 1·69—1·92 mm, usually 1·53 mm, shorter diameters 1·3 mm, usually 1·38 mm, rarely 1·53 mm. Walls 0·2—0·38 mm thick. Intercorallite walls 0·53—0·76 mm thick. Fine structure well preserved, epitheca wide. Tabulae horizontal, slightly uneven, 0·38—1·07 mm apart. Septal spines long, not fusing in centre of visceral chamber, numerous and densely arranged in vertical rows. Their frequency on the circumference of a corallite ranges 9—12.

Distribution. — Norway: Malmøy, Ulvøy; Stage 7a; Estonia: Wenlock, Jaani Stage.

Catenipora malmoeyensis n. sp.

(Pl. VI, Fig. 3*a-b*)

Type specimen: PMO-43615; Pl. VI, Fig. 3*a-b*.
Type horizon: Silurian, Stage 7*a*.
Type locality: Norway, Malmøy.
Derivation of the name: malmoeyensis — after type locality (Malmøy).

Diagnosis. — Lacunae polygonal, with sides composed of 1—4 corallites. In cross-section, corallites oval, 1·4—1·7 mm wide, 1—1·3 mm high. Walls 0·2—0·3 mm thick. Intercorallite walls twice as thick as side walls. Septal spines long, reaching centre of visceral chamber of a corallite.

Material. — Two colonies from Norway (PMO-43615-6); 2 thin sections of each specimen.

Description. — Colonies small, discoidal, larger one 8 cm long, 7 cm wide, 3·5 cm high. Lacunae polygonal, average 7 × 5 mm with sides composed of 1—4 corallites. Corallites oval in cross-section, with longer diameters ranging 1·4—1·7 mm, and shorter — 1·0—1·3 mm. Walls 0·2—0·3 mm thick. Intercorallite walls as thick as side walls, or somewhat thicker.

Tabulae horizontal, or slightly curved, 0·3—1·0 mm apart. Septal spines long, reaching centre of visceral chamber, but not fused.

Remarks. — The species described above differs from *C. oriens* KLAAMANN in having smaller corallites with thinner walls.

Catenipora norvegica n. sp.

(Pl. VI, Fig. 1*a-c*)

Type specimen: RM-3545; Pl. VI, Fig. 1*a-c*.
Type horizon: Silurian, Stage 7*b*.
Type locality: Norway, Malmøy.
Derivation of the name: norvegica — found in Norway.

Diagnosis. — Lacunae polygonal, elongate, with sides composed of 2—8 corallites. In cross-section, corallites oval, up to 1·4 mm long, and 1·1 mm wide. Walls 0·2—0·3 mm thick. Intercorallite walls twice as thick as side walls. Septal spines long.

Material. — Fragment of a colony from Norway (PMO-3545); 2 thin sections.

Description. — Colony discoidal, of average dimensions nearly 3 cm high. Lacunae polygonal, very often elongate, up to 1·3 mm long and 5 mm wide. Sides consist of 2—8 corallites, which are oval in cross-section. Longer diameters 1·4 mm, shorter — mostly 1·1 mm. Walls somewhat convex, 0·2—0·3 mm thick. Intercorallite walls twice as thick as side walls, well separated. Tabulae horizontal, uneven, sometimes incomplete, spaced 0·2—0·4 mm and 0·5—0·7 mm apart in places, where more loosely arranged. Septal spines numerous and long.

Remarks. — This new species differs from *C. malmoeyensis* n. sp. in having longer lacunae, composed of a greater number of corallites. The corallite diameters of *C. norvegica* are also smaller.

Catenipora llandoverensis n. sp.

(Pl. II, Figs. 3, 4)

Type specimen: PMO-43617; Pl. II, Figs. 3, 4.
Type horizon: Silurian, Llandovery, Stage 7*a*.
Type locality: Norway, Malmøy.
Derivation of the name: llandoverensis — after type horizon (Llandovery).

Diagnosis. — Lacunae polygonal, somewhat elongate, with sides composed of 3—7 corallites. In cross-section, corallites oval, even slightly rectangular. Their longer diameters ranging 0·92—1·15 mm, shorter diameters 0·63—0·76 mm. Walls 0·07—0·15 mm thick, sometimes up to 0·23 mm thick. Septal spines long and numerous.

Material. — Fragment of colony from Norway (PMO-43617); 2 thin sections.

Description. — Colony irregular in shape, its preserved fragment 8·5 cm long, 9·5 cm wide, 4·5 cm high. Lacunae polygonal, slightly elongate, composed of 3—7 corallites on each side. In cross-section corallites oval, nearly rectangular, with longer diameters 0·92—1·15 mm; shorter diameters 0·63—0·76 mm. Walls 0·07—0·15 mm thick, occasionally 0·23 mm thick. Fine structure poorly preserved, epitheca thin. Tabulae horizontal, uneven in places, 0·23—0·38 mm apart, sometimes 0·63 mm apart. Septal spines long, numerous, but only occasionally traceable because of poor preservation.

Remarks. — *C. llandoverensis* n. sp. is similar to *C. regnelli* n. sp., but differs in having smaller corallites nearly rectangular in cross-section and thinner corallite walls, as well as less elongate lacunae.

Catenipora regnelli n. sp.

(Pl. II, Fig. 2)

Type specimen: RM-Cn. 20004; Pl. II, Fig. 2.
Type horizon: Silurian, Wenlock.
Type locality: Sweden, Island of Gotland, Visby.
Derivation of the name: regnelli — in honour of Prof. GERHARD REGNÉLL, Lund.

Diagnosis. — Lacunae elongate, polygonal, with sides composed of 1—13 corallites. In cross-section, corallites oval, nearly rectangular, with longer diameters ranging 1·0—1·2 mm, shorter 0·7—0·9 mm. Walls 0·1—0·2 mm thick. Septal spines long, numerous.

Material. — Fragments of 3 colonies from Island of Gotland (RM-Cn. 20004, 20070, INB-1790); 2 thin sections of each specimen.

Description. — Judging from the preserved fragments, colonies average in size. The largest fragment 8 cm long, 4·4 cm wide, 3 cm high. Lacunae polygonal, elongate; up to 30 mm long and 8 mm wide in younger part of a colony, shorter in older parts (usually 7 × 5 mm, 12 × 3 mm, 15 × 6 mm, 20 × 5 mm). Sides of lacunae composed of 1—9 corallites in older parts, while in younger parts up to 13. In cross-sections, corallites oval, nearly rectangular, with slightly convex side walls. Longer diameters of corallites ranging 1·0—1·2 mm, shorter 0·7—0·9 mm. Walls 0·1—0·2 mm thick. Fine structure well preserved, epitheca thick. Intercorallite walls well separated, as thick as side walls. Tabulae horizontal, slightly convex or uneven, 0·2—0·8 mm apart. Septal spines numerous, long, visible in longitudinal section in form of spots, densely arranged in vertical rows.

Remarks. — The species described above is close to *C. parallela* (SCHMIDT), but differs from the latter in having larger diameters of corallites, more elongate lacunae and more convex side walls.

Distribution. — Sweden: Island of Gotland, Visby, Irevik, Högklint, Upper Visby Marl.

Catenipora piirsaluensiformis n. sp.

(Pl. VIII, Fig. 2*a-c*)

Type specimen: Z.Pal. T/III-40; Pl. VIII, Fig. 2*a-c*.
Type horizon and locality: erratic boulder from Wyszogród, Poland; horizon unknown.
Derivation of the name: piirsaluensiformis — similar to *C. piirsaluensis* (SOKOLOV).

Diagnosis. — Lacunae short, composed of 1—3 corallites. Corallites oval in cross-section; longer diameters range 1·39—1·53 mm. Walls 0·3 mm thick. Septal spines with broad bases, long.

Material. — Fragment of colony from erratic boulders, Poland (Z.Pal.T/III-40); 2 thin sections.

Description. — Colony semicircular, average in size. Nearly complete colony 5·5 cm long, 5·5 cm wide, 2·5 cm high. Lacunae rather regular, slightly rounded. Their measurements 2 × 2 mm, 3·5 × 2·0 mm, 4·5 × 3·0 mm, 5·0 × 3·0 mm. Sides of lacunae composed of 1—3 corallites. Corallites oval in cross-section. Their longer diameters range 1·39—1·53 mm, shorter 1·0—1·15 mm. Walls about 0·3 mm thick. Intercorallite walls about 0·6 mm thick. Epitheca thick, well preserved. Tabulae horizontal, comparatively even and regularly arranged, 0·15—0·2 mm or even 0·38 mm apart in zones of dense concentration, beyond these zones ranging 0·4—1·0 mm. Septal spines long, directed slightly upwards. Their bases broad in longitudinal sections, in form of well visible broad lamellae.

Remarks. — The species described above is similar to *C. piirsaluensis* (SOKOLOV), but differs from the latter in having shorter diameters of corallites, and smaller, more rounded lacunae, with side walls composed of fewer corallites. The septa are differently developed in these two species, being very broad at the base in *C. piirsaluensiformis* n. sp.

Catenipora quadrata (FISCHER-BENZON, 1871)

(Pl. III, Figs. 3, 4*a-b*)

1871. *Catenipora quadrata* FISCHER-BENZON; R. v. FISCHER-BENZON, Mikroskopische Untersuchungen..., p. 21, Pl. 3*E*, Figs. 6, 7.

Material. — Sixteen colonies from Island of Gotland (RM-19924-5, 19963; INB-700, 1770, 1771, 1774, 1783, 1799, 1804, 1896, 1921, 2019; Z.Pal.T/IV-2, 13); 2 thin sections of each specimen.

Description. — Colonies discoidal, sometimes very regular. The largest fragment 25 cm long, 20 cm wide, 5 cm high. Lacunae polygonal, in one of the specimens very regular, usually less regular, sometimes rectangular or slightly elongate. They measure: 2×2, 3×4, 6×6, 9×4 and 12×3 mm. The number of corallites on the sides of lacunae varies 1—5, in more elongate 1—10. In cross-section corallites oval, rectangular or quadrate. Longer diameters 0·84—1·0 mm. Greatest length of corallites varies 0·69—0·15 mm, occasionally attaining 1·38 mm. Width of corallites varies 0·69—0·92 mm, usually 0·76 mm, exceptionally 1·0 mm. Walls 0·07—0·15 mm thick, sometimes reaching 0·23 mm. Intercorallite walls thin, ranging 0·1—0·2 mm, sometimes 0·3 mm, uniform, not separated from the side walls. Tabulae thin, horizontal, slightly concave, regularly arranged, 0·15—0·4 mm and 0·6—0·8 mm apart. Septal spines very long, slightly directed upwards. They fuse at centre forming columella, which is spongy and elongate in cross-section. Twelve septa on circumference of a corallite.

Remarks. — Colonies described by FISCHER-BENZON (1871) as *Halysites quadrata* are without mesocorallites, therefore they should be assigned to the genus *Catenipora*. Unadequate description given by the author of the species does not permit a more detailed comparison between the material described here and that of FISCHER-BENZON. However, the main characters, very typical for this species, as well as the good illustrations in FISCHER-BENZON's paper (Pl. 3, Fig. 617), allow the present author to assign the colonies from Island of Gotland to *Catenipora quadrata*. The common characters are the long septa fused to form columella and the cross-sections of the corallites, which are nearly rectangular or quadrate in shape. Only one of the colonies from Gotland has a very regular shape, having also regular lacunae, as is the case for those described by FISCHER-BENZON. The other colonies and their lacunae are less regular. The measurements of corallites in Gotlandian colonies vary very much, but those given by FISCHER-BENZON for his material occur most commonly. All the other dimensions as the thickness of the walls, the distance between tabulae and the width of corallites are more constant. The most constant character, very typical for this species is, however, the presence of a columella, occurring in all corallites, throughout the entire length of each. Similar columella is also present in *C. escharoides*, but this species has, however, larger corallites than those found in *C. quadrata*. Both of the species mentioned are the only representatives of *Catenipora* with a columella. *C. panga* KLAAMANN, from Wenlock of Estonia, is similar to *C. quadrata*, the most essential difference being the absence of a columella in the former species. *C. delicatulus* (WILSON, 1926) resembles somewhat *C. quadrata*, but lacks long septal spines.

Distribution. — Sweden, Island of Gotland, Kopparsvik, Lower Visby Marl; Högklint, Luseklint, between Kopparsvik and Högklint, Upper Visby Marl.

Catenipora quadrataeformis n. sp.

(Pl. II, Fig. 5*a-b*)

Type specimen: PMO—52100; Pl. II, Fig. 5*a-b*.
Type horizon: Silurian, Stage 6*a*.
Type locality: Norway, Asker.
Derivation of the name: quadrataeformis — similar to *C. quadrata* (FISCHER-BENZON).

Diagnosis. — Lacunae polygonal, slightly elongate, with sides composed of 1—6 corallites. In cross-section, corallites oval, subrectangular or subquadrate. Longer diameters range 0·69—1·15 mm, usually 0·92 mm. Shorter diameters vary 0·62—0·76 mm, usually 0·69 or 0·76 mm. Walls 0·07-0·15 mm thick, sometimes 0·23 mm. Septal spines numerous, in places forming columella.

Material. — Fragments of 5 colonies from Norway (RM-52097-52100, 54651); 8 thin sections of the specimen No. 52100.

Description. — Colonies probably small, low, the largest fragment measuring 8·0 × 6·5 cm and being 3·2 cm high. Lacunae polygonal, slightly elongate, measuring 1 × 3 mm, 5 × 3 mm, 7 × 3 mm, and 9 × 2 mm. Sides of lacunae composed of 1—6, usually 4—6 corallites. In cross-section, corallites oval, nearly rectangular or quadrate. Longer diameters ranging 0·69—1·15 mm, usually 0·92 mm, shorter 0·61—0·76 mm, usually 0·69 mm. Walls 0·07—0·15 mm thick. Intercorallite walls as thick as side walls or slightly thicker. Tabulae horizontal or slightly concave 0·15—0·76 mm apart. Septa rather numerous, long; some of them often fused at centre of visceral chamber, forming thin columella.

Distribution. — Norway, Asker, Stage 6a; Holmestrand, Bjerkøy, Series 7.

Remarks. — The species described above is similar to *C. quadrata* (FISCHER-BENZON), differing from the latter in lacking a continuous and broad columella, which in *C. quadrataeformis* is thin and formed only by the fusion of some (two or three) septal spines.

Catenipora ringerikensis n. sp.

(Pl. IV, Fig. 4*a-b*)

Type specimen: PMO-61027; Pl. IV, Fig. 4*a-b*.
Type horizon: Silurian, Stage 9*a*.
Type locality: Norway, Ringerike, Storøy.
Derivation of the name: ringerikensis — after type locality (Ringerike).

Diagnosis. — Lacunae small, polygonal, with sides composed of 1—3 corallites. Corallites oval in cross-section. Their longer diameters ranging 2·5—3·5 mm, shorter 1·1—2·8 mm. Walls 0·2—0·3 mm sometimes up to 0·4 mm thick. No septal spines.

Material. — Two incomplete colonies from Norway (PMO-61027, 48322); thin sections of each specimen.

Description. — Colonies large, larger one 12 cm long, 7 cm wide, 7 cm high. Lacunae polygonal, small, with sides composed of 1—3 corallites. Corallites oval in cross-section, their longer diameters ranging 2·5—3·3 mm, shorter 1·1—2·8 mm. Walls 0·2—0·3 mm thick. Fine structure well preserved, epitheca thick. Intercorallite walls distinctly separated, as thick as side walls or thinner. Tabulae horizontal, sometimes incomplete, often concave, 0·3—1·0 mm apart. No septal spines.

Remarks. — This species is close to *C. maxima* (FISCHER-BENZON) in having a similar shape of lacunae which are also composed of a few corallites, the same cross-section of corallites, and in lacking septal spines. It differs, however, from *C. maxima* in the smaller dimensions of its corallites.

Distribution. — Norway: Ringerike, Rytteraker, Stage 7b; Storøy Tyrifjord, Stage 9a.

Catenipora spiroddensis n. sp.

(Pl. V, Fig. 1*a-b*)

Type specimen: No. 52709; Pl. V, Fig. 1*a-b*.
Type horizon: Llandovery, Stage 6*c*.
Type locality: Norway, Asker, Spirodden.
Derivation of the name: spiroddensis — after type locality (Spirodden).

Diagnosis. — Lacunae polygonal, elongate, with sides composed of 2—7 corallites. In cross-section, corallites oval, elongate, with slightly convex walls. Their longer diameters range 1·3—1·6 mm, shorter 1·0—1·1 mm. Walls 0·2—0·3 mm thick. Septal spines short, numerous.

Material. — Fragments of two colonies from Norway (PMO-52709, 52710); 6 thin sections of specimen No. 52709.

Description. — Colonies large, the larger 15 cm long, 12·5 cm wide, 5 cm high. Lacunae polygonal, elongate, up to 2 cm long, and 0·5 cm wide. Some of lacunae smaller and shorter. Sides of lacunae consist of 2—7 corallites. In cross-section, corallites oval, elongate, with slightly convex walls. Their longer diameters ranging 1·3—1·5 mm, sometimes 1·6 mm, shorter 1·0—1·1 mm. Walls 0·2—0·3 mm thick. Fine structure well preserved, epitheca thin. Intercorallite walls well separated, thick, usually twice as wide as side walls, measuring 0·3—0·4 mm. Tabulae horizontal, or slightly concave, 0·3—1·0 mm apart.

Remarks. — *C. spiroddensis* n. sp. is slightly similar to *C. hedei* n. sp. It differs from the latter in having longer lacunae, composed of a greater number of corallites, which also are smaller in cross-section.

Distribution. — Poland: erratic boulders; Norway: Asker, Spirodden, Substage 6cα.

Catenipora spiroddensiformis n. sp.

(Pl. V, Fig. 2*a-b*)

Type specimen: Z. Pal.T/IV-1; Pl. V, Fig. 2*a-b*.
Type horizon: Silurian.
Type locality: Sweden, Island of Gotland.
Derivation of the name: spiroddensiformis — similar to *C. spiroddensis* n. sp.

Diagnosis. — Lacunae polygonal, elongate. Corallites oval, elongate in cross-section. Their longer diameters up to 2·2 mm, shorter — up to 1·5 mm. Walls 0·2—0·3 mm thick. Septal spines absent.

Material. — Fragment of a colony from Island of Gotland (Z.Pal.T/IV-1); 4 thin sections.

Description. — Fragment, probably part of a young colony, because of its mostly open lacunae, which are moreover composed of a great number of corallites, up to 12 in a lacuna. Lacunae elongate, being probably in adult colony more polygonal and composed of more corallites. In cross-section, corallites elongate, oval, with longer diameters up to 2·2 mm and

shorter up to 1·5 mm. Walls 0·2—0·3 mm thick, with poorly preserved fine structure and thin epitheca. Intercorallite walls well separated from the side walls, up to 0·3 mm thick. Tabulae horizontal, concave in places, 0·3—0·8 mm apart. Septal spines not detected.

Remarks. — *C. spiroddensiformis* n. sp. shows many points of resemblance to *C. spiroddensis* n. sp., having a similar shape of corallites, well separated intercorallite walls, as well as similar shape of tabulae. The species described has, however, larger corallites, with thinner intercorallite walls, and the septal spines are lacking.

Catenipora tractabilis (Sokolov, 1951)

(Pl. VIII, Fig. 4*a-b*)

1951*a*. *Palaeohalysites tractabilis* (Sokolov); B. S. Sokolov, Tabuljaty..., p. 83. Pl. 14, Figs. 3, 4.

Material. — Fragments of two colonies from erratic boulders, Poland (Z.Pal.T/III-56, 92); 2 thin sections of each specimen.

Description. — Judging from preserved fragments, colonies probably average in size. Lacunae very elongate, curved, with sides composed of 8—14 corallites (and probably even more, because on the small fragments, the whole ranks are not preserved). In cross-section, corallites oval, elongate, their longer diameter 1·39—1·84 mm, usually 1·92 mm, sometimes up to 2 mm; shorter diameters 1·0—1·5 mm, usually 1·23 mm, exceptionally 1·30 mm. Walls 0·15—0·3 mm thick. Intercorallite walls wide up to 0·6 mm. Epitheca thin. Fine structure well preserved. Tabulae horizontal, loosely arranged, 0·7—1·0 mm apart, in zones where more closely arranged 0·3—0·38 mm apart. Septal spines long, conical, with broad bases directed slightly upwards. They sometimes reach centre of visceral chamber. On the circumference of corallite, 10—14 septal spines present.

Distribution. — Poland: erratic boulders; Estonia: Upper Ordovician.

Catenipora vespertina Klaamann, 1961

(Pl. IV, Fig. 3*a-b*)

1961. *Catenipora vespertina* Klaamann, E. Klaamann, Tabuljaty..., pp. 88-89, Pl. 10, Figs. 1, 2.

Material. — Fragments of two colonies: from Norway (PMO-49265) and from erratic boulder of Poland (Z.Pal.T/III-57); 2 thin sections of each specimen.

Description. — Fragments of colonies small. Lacunae elongate, 6—16 mm long, 3—8 mm wide, with sides composed of 6—9 corallites. In cross-section, corallites oval, more or less elongate, sometimes both diameters equally long. Longer diameters ranging 1·15—1·53 mm, mostly 1·38—1·45 mm. Shorter diameters mostly equal 1·15 mm, or ranging 1·23—1·30 mm. When both diameters of corallite equal, they mesure 1·15 mm and 1·23 mm. Walls 0·15—0·2 mm thick, usually 0·15 mm. Intercorallite walls as thick as side walls. Tabulae horizontal, thin, slightly uneven 0·23—0·63 mm apart. Usually 12 septal spines on circumference of a corallite; they are long, fusing at centre of visceral chamber to form a columella.

Remarks. — The colonies here described are very similar to *C. escharoides*. However a great difference exists between the dimensions of respective corallites, which does not permit their inclusion under the species mentioned.

Distribution. — Poland: erratic boulders; Norway: Malmøy, Stage 9a; Estonia: Wenlock, Jaani Stage.

Family HALYSITIDAE MILNE-EDWARDS & HAIME, 1850

Subfamily HALYSITINAE MILNE-EDWARDS & HAIME, 1850

Genus **HALYSITES** FISCHER V. WALDHEIM, 1813

Type species: Tubipora catenularia LINNAEUS, 1767; Sweden, Silurian.

Diagnosis. — Colonies composed of autocorallites and mesocorallites arranged in chains and forming lacunae. Mesocorallites provided with more or less horizontal tabulae.

Distribution. — Upper Ordovician—Ludlow in Europe, Asia, Australia and North America.

Halysites junior KLAAMANN, 1962

(Pl. VIII, Figs. 1, 3*a-b*)

1961. *Halysites junior* KLAAMANN; E. KLAAMANN, Tabuljaty..., pp. 93-94, Pl. 12, Figs. 1-5, Text-Fig. 6.

Material. — Fragments of two colonies from erratic boulders, Poland (Z.Pal.T/III-16, 78, 113), fragments of 44 colonies from Island of Gotland (RM-19713-33, 19799-800, 19844-47, 19857-62, 19887-89, 19892, 19921-23, 19987, 19991, 20006); two thin sections of each of following specimens: Z.Pal.T/III-16, 78, RM-19713, 19799, 19844, 19857, 19858, 19922, 19991, 20006.

Description. — Colonies irregular, rather large. Lacunae polygonal, elongate, 1×3, 5×7, 6×4, 7×3, 15×3 and 17×3 mm. Sides consist of 1—6 corallites, which are nearly circular in cross-section, with longer diameters ranging 1·84—2·61 mm, shorter 2·0—2·23 mm. Mesocorallites slit-like, 0·6 mm long, 0·07—0·15 mm wide, sometimes nearly invisible. In places where ranks bifurcate, mesocorallites are broader, trapezoidal or triangular. Walls 0·23 mm thick, often 0·3—0·38 mm. Mesocorallite walls thinner, 0·15—0·2 mm. Epitheca thin, fine structure well preserved. Tabulae mostly horizontal, sometimes slightly concave or incomplete, 0·53—0·7 mm apart, rarely 1·08 mm apart; in zones where more densely arranged, 0·3—0·38 mm apart. In mesocorallites tabulae even, 0·3—0·4 mm apart. No septal spines.

Remarks. — In the colonies from Island of Gotland, corallites are slightly wider than on the Estonian specimens.

Distribution. — Poland: erratic boulders; Sweden: Island of Gotland, Visby, Slite group; Västergarn, Fårösund, Follingbo, Martebo, Bunge; Estonia: Wenlock, Jaagarahu Stage.

Halysites senior KLAAMANN, 1961

(Pl. IX, Fig. 2*a-b*)

1961. *Halysites senior* KLAAMANN; E. KLAAMANN, Tabuljaty..., p. 93, Pl. 11, Figs. 3-5.

Material. — Fragments of 12 colonies (Z.Pal.T/IV-13-15, 34-37, RM-19844, 19875-6, 19954, 20061); 2 thin sections of each of the following specimens: Z.Pal.T/IV-13-15, 34-37, RM-19844, 19954.

Description. — Colonies large, largest fragment 10·5 cm long, 6·5 cm wide, 11 cm high. Lacunae elongate, curved, parallel, their length ranging 6—20 mm, sometimes up to 30 mm. Sides of lacunae composed of 1—5 corallites, more elongate lacunae sometimes comprise up to 10 or even 14 of them. Lacunae sometimes open. In cross-section, corallites elliptical,

sometimes circular, with longer diameters 1·92—2·3 mm, mostly 2·15 mm. Shorter diameters ranging 1·76—2·3 mm, mostly 1·92 mm. Mesocorallites rectangular 0·3—0·6 mm long, 0·1—0·39 mm wide. Walls 0·2—0·3 mm thick, sometimes 0·39 mm thick; fine structure well preserved. Tabulae horizontal, uneven, 0·2—0·7 mm apart. In mesocorallites, tabulae 0·3—0·5 mm apart. Septal spines short, usually poorly preserved.

Distribution. — Sweden: Island of Gotland, Klinteberget, Irevik, Visby, Silurian; Estonia: Wenlock, Upper Jaani Stage.

Genus **CYSTIHALYSITES** TCHERNYCHEV, 1941

Type species: Cystihalysites mirabilis TCHERNYCHEV, 1941; U.S.S.R., Jakutia, Llandovery.

Diagnosis. — Corallites and mesocorallites arranged in chains forming lacunae. Mesocorallites with vesicular tabulae.

Distribution. — Genus *Cystihalysites* occurs in Llandovery and Wenlock of Siberia, in Wenlock of Gotland and in England. It is probably also present in Silurian of North America. In the erratic boulders of Poland, one fragment of a colony has been found. Only 6 species have been described in this genus.

Cystihalysites mirabilis TCHERNYCHEV, 1941

(Pl. IX, Figs. 1*a-b*, 3*a-b*)

1871. *Halysites cavernosa* FISCHER-BENZON; R. v. FISCHER-BENZON, Mikroskopische Untersuchungen..., p. 16, Pl. 1, Figs. 1-6.

1941. *Cystihalysites mirabilis* TCHERN.; B. B. TCHERNYCHEV, O nekotorych verchnesilurijskich..., pp. 70-71, Pl. 2, Figs. 5-7; Pl. 3, Figs. 1-6.

1949. *Halysites brownsportensis* AMSDEN; W. AMSDEN, Stratigraphy..., pp. 94-95, Pl. 18, Figs. 1-3.

1955. *Halysites brownsportensis* AMSDEN; E. J. BUEHLER, The morphology..., pp. 65-66, Pl. 9, Figs. 4-6, Pl. 10, Fig. 6.

Material. — Fragments of two colonies from Island of Gotland (RM-19789) and erratic boulder, Poland (Z.Pal.T/III-16); 4 thin sections of each specimen.

Description. — Preserved fragments of colonies very small. Colonies containing corallites and mesocorallites, which form weakly elongate lacunae. Two or three corallites on one side of a lacuna. In cross-section, corallites circular, nearly oval, with longer diameters ranging 2·3 —2·5 mm, sometimes slightly larger; shorter diameters 2·0—2·46 mm. Walls 0·2—0·3 mm thick. Tabulae sometimes incomplete, spaced 0·38—0·9 mm apart; 8—12, sometimes 13 or 14 tabulae per 5 mm. Septal spines not preserved. Mesocorallites 1·5 mm long and 0·38—0·53 mm wide; inner space 0·6 × 0·2 mm, filled by vesicular tissue, sometimes extending up on the inner corallite walls. Vesicles small, convex, densely arranged, 5 in 1 mm. In convex part of vesicle, a pointed spine often present.

Remarks. — The specimens from the erratic boulders of Poland show no differences from those described by TCHERNYCHEV (1941) from East Verkhoian Mountains. The vesicular tissue occurs in one row or forms the thick layer. It depends where the section crosses the connecting tube; if in a place where it is narrow, only one row is visible, while crosses the wide part of tube, broad band of tissue can be seen. The connecting tube is always in the shape of long, narrow rectangle. *Halysites brownsportensis* AMSDEN, 1949, described by BUEHLER (1955), is probably conspecific with *Cystihalysites mirabilis* TCHERNYCHEV, 1941. The specimen described by AMSDEN comes from Brownsport Formation, West Tennessee. It seems that *Halysites cavernosa* FISCHER-

BENZON, 1871, from Silurian of Schleck on the Windae, Kurland, East Baltic Region, should be also assigned to the genus *Cystihalysites*, being probably the representative of *C. mirabilis*. *Halysites infundibuliformis* BUEHLER, 1955, which has the tabulae in mesocorallites strongly convex upwards, as is the case with species of *Cystihalysites*, should be probably also assigned to that genus.

Cystihalysites blakewayensis SUTTON, 1964

(Pl. IX, Fig. 4*a-b*)

1964. *Cystihalysites blakewayensis* SUTTON; I. D. SUTTON, The tabulate coral..., pp. 456-457, Pl. 74, Figs. 3-7.

Material. — Fragment of colony from erratic boulder, Poland (Z.Pal.T/III-7); 2 thin sections.

Description. — Lacunae composed of small number of corallites, usually 1—4. Corallites circular in cross-section, with diameters ranging 1·5—1·8 mm. Walls 0·2—0·3 mm, sometimes even up to 0·35 mm thick. Tabulae spaced 0·2—0·3 mm apart, in zones where more loosely arranged, 0·5—0·7 mm apart. No septal spines. Mesocorallites narrow, 0·3 mm wide, 0·5 mm long. In mesocorallites, vesicular tissue present. It seems that there occur short spines in the vesicles.

Remarks. — The specimen of *C. blakewayensis* here described differs from those from Wenlock of England only in having shorter lacunae. The difference can be caused, however, by the fact that the specimen from the erratic boulder of Poland is a part of an older colony, while English one comes from younger part.

Distribution. — Poland: erratic boulders; England, Wenlock.

Genus **SOLENIHALYSITES** n. gen.

Type species: Solenihalysites norvegicus n. gen., n. sp.; Norway, Langøy, Holmestrand, Wenlock, Series 8.
Derivation of the name: Gr. *solen* = tubule.

Diagnosis. — Halysitidae with mesocorallites provided with thin tubes.

Remarks. — Very characteristic for *Solenihalysites* n. gen. is the structure of mesocorallites, which are composed of very thin tubes, never found in any of the representatives of the family Halysitidae. Those tubes are very abundant in mesocorallites, sometimes penetrating the walls of autocorallites, as do the vesicular tabulae in *Cystihalysites*. In both of the known representatives of *Solenihalysites* — *S. norvegicus* n. sp. and *S. gotlandicus* n. sp. — the tubes are undulated, uneven and form a kind of a spongy tissue.

Distribution. — Norway: Holmestrand, Langøy, Wenlock, Series 8; Sweden: Island of Gotland, Eksta, Ludlow.

Solenihalysites norvegicus n. sp.

(Pl. X, Fig. 5*a-c*)

Type specimen: PMO-49378; Pl. X, Fig. 5*a-c*.
Type horizon: Wenlock, Series 8.
Type locality: Norway: Langøy, Holmestrand.
Derivation of the name: norvegicus — found in Norway.

Diagnosis. — Colony average in size, low. Lacunae polygonal, often rectangular, elongate, with sides composed of 1—7 corallites. In cross-section, corallites oval with longer diameters

1·3—1·5 mm, shorter diameters 1 mm. Walls 0·2—0·3 mm thick. Tabulae horizontal, slightly uneven, spaced 0·3—0·7 mm apart. Septal spines short, rarely preserved. Mesocorallites narrow, 0·3 mm wide, 0·5 mm long, composed of narrow, polygonal tubes, diameters of which range 0·08—0·1 mm. Tabulae in mesocorallites horizontal.

Material. — Fragment of a colony from Norway (PMO-49378); 6 thin sections.

Description. — Fragment, being probably half of entire colony, 8 cm wide, 5·5 cm high. Lacunae polygonal, of different sizes, sometimes elongate, measuring 2×3 mm, 6×3 mm, up to 10×3 mm. Between the points of bifurcation, sides of lacunae composed of 1—7 corallites. In cross-section, corallites oval, elongate, nearly rectangular. Longer diameters ranging 1·4—1·5 mm, with constant width of about 1 mm. Walls 0·2—0·3 mm thick, provided with thick epitheca. Tabulae thin, horizontal or slightly concave, sometimes uneven or incomplete, spaced 0·2—0·3 mm; in zones where more loosely arranged, 0·2—0·7 mm apart. Septal spines short, rarely preserved. Mesocorallites narrow, 0·3 mm wide, 0·5 mm long, composed of thin polygonal tubes, diameters of which range 0·08—0·1 mm. Walls thin, tabulae horizontal, rarely visible.

Distribution. — Norway: Holmestrand, Langøy, Series 8.

Solenihalysites gotlandicus n. sp.

(Pl. X, Fig. 4*a-b*)

Type specimen: RM-19917; Pl. X, Fig. 4*a-b*.
Type horizon: Silurian, Ludlow.
Type locality: Sweden: Island of Gotland, Eksta.
Derivation of the name: gotlandicus — found in Island of Gotland.

Diagnosis. — Lacunae polygonal, composed of 1—4 corallites. In cross-section corallites oval, with longer diameters ranging 1·7—2·0 mm, shorter 0·9—1·2 mm. Walls 0·2—0·4 mm thick. Tabulae horizontal, slightly convex, uneven or incomplete, 0·2—0·7 mm apart. Septal spines long, thin, densely arranged. Mesocorallites 0·5 mm wide, 0·5—0·7 mm long, composed of narrow, polygonal tubes, diameters of which measure about 0·05 mm. Tabulae in tubes very rarely visible.

Material. — Fragment of a colony from Island of Gotland (RM-19917); 10 thin sections.

Description. — Lacunae polygonal, different in sizes, measuring 4×5 mm to 10×8 mm, with sides composed of 1—4 corallites. In cross-section, corallites oval, with longer diameters ranging 1·7—2·0 mm and 0·9—1·2 mm wide. Thickness of walls varies 0·2—0·3 mm, sometimes even up to 0·4 mm. Epitheca thin. Tabulae horizontal, uneven, slightly concave, sometimes incomplete, spaced 0·2—0·3 mm apart in zones where more densely arranged, beyond them 0·5—0·7 mm apart. Septal spines long, thin, closely arranged. Mesocorallites 0·5 mm wide, 0·7 mm long, composed of thin, polygonal tubes, diameter of which measures 0·05 mm. Walls thin, tabulae rarely visible.

Remarks. — *S. gotlandicus* n. sp. differs from *S. norvegicus* n. sp. in having less elongate lacunae, the sides of which are composed of a smaller number of corallites (1—4 in *S. gotlandicus*, 1—7 in *S. norvegicus*), smaller diameters of the corallites, which are up to 2 mm long in *S. gotlandicus*, while they are only up to 1·5 mm in *S. norvegicus*. The corallites of *S. gotlandicus* are also more irregular in cross-section, their walls are thicker, septa longer and mesocorallite tubes thinner.

Order **FAVOSITIDA** Sokolov, 1962
Suborder **FAVOSITINA** Sokolov, 1950
Family ANGOPORIDAE n. fam.

Type genus: Angopora Jones, 1936.

Diagnosis. — Colonies massive. Corallites in cross-section polygonal, connected by mural pores. Septa in form of ridges ending in spines, or spines with trabecular-like structure.

Remarks. — Family Angoporidae n. fam. includes two genera: *Angopora* Jones, 1936 and *Kiaerites* n. gen. *Angopora* was at one time assigned to the family Thecidae. However, the type genus of this family, *Thecia* Milne-Edwards & Haime, has a completely different structure of septa, which are composed of two lamellae of radial structure and a thin epitheca between them. Those septa were formed by infolding of the corallite wall, while the septa of *Angopora* have septal ridges in form of lamellae, with their edges terminating in numerous spines. According to Klaamann (1962), a similar structure of septa is present in genera *Rominegerella* Amsden, 1949, *Somphopora* Lindström, 1883, and *Fossipora* Etheridge, 1903. *Kiaerites* n. gen. has its septa in the form of spines, which correspond to single trabeculae. Thus, both the genera assigned to the new family Angoporidae have in common the trabecular-like structure of their septa which is similar to that found in Tetracoralla.

Distribution. — Llandovery—Wenlock; Sweden (Island of Gotland), England, Norway, erratic boulders of Poland, Kazakhstan, China.

Genus **ANGOPORA** Jones, 1936

Type species: Angopora hisingeri Jones, 1936; Sweden, Island of Gotland, Upper Llandovery.

Diagnosis (after Klaamann, 1964). — Colony massive, discoidal or irregular in shape, composed of small, prismatic corallites. Walls of the corallites often widened. Mural pores small and rare. Tabulae horizontally arranged. Septal structure developed in form of 6—12 disconnected lamellae, terminating in spines on their axial edge.

Distribution. — Genus *Angopora* occurs in Upper Llandovery of England, in Llandovery (Stage 7c) of Norway, Wenlock of Sweden (Island of Gotland) and Estonia, in Silurian of China, as well as in erratic boulders of Poland.

Angopora hisingeri Jones, 1936

(Pl. X, Figs. 1-3)

1936. *Angopora hisingeri* Jones; C. S. Jones, The controlling effect..., pp. 18—19, Pl. 2, Figs. 4—7; Pl. 3, Figs. 1, 2.

1952 a. *Favosites multicarinatus* Sokolov; B. S. Sokolov, Tabuljaty..., pp. 41—43, Pl. 15, Figs. 1, 2.

Material. — Fourteen fragments of colonies: from the erratic boulders of Poland (Z.Pal.T/III-184), from Norway (PMO-5306) and 12 colonies from Island of Gotland (Z.Pal.T/IV-38, INB-864, 1761, 1792, 1805, 1888, 1892, 1953, 1976, 1977, 1983); 2 thin sections of each specimen.

Description. — Colonies probably large, several of them discoidal in shape, low, others irregular and high, sometimes with tubercles on the surface. Corallites polygonal, forming

separate assemblages of smaller corallites, diameters of which range 0·8—1·0 mm, and larger corallites 1·0—1·8 mm in diameters. Walls 0·1—0·2 mm, sometimes up to 0·3 mm thick. In zones where walls are nearly devoid of septa, thickness only in range 0·07—0·1 mm. Tabulae horizontal, uneven, concave or convex, 0·1—0·35 mm apart, in zones where more densely arranged, and 0·5—1·0 mm apart, where loosely spaced. Diameters of pores measuring 0·1—0·2 mm. Septa in form of short, disconnected lamellae, terminating in long spines directed upwards.

Remarks. — The colonies of *A. hisingeri* JONES, 1936, here described, have sometimes slightly larger diameters of corallites than those described by the author of the species. Besides this, the corallites with larger diameters occur in zones of protuberances on the surface of a colony, and are smaller elsewhere. The Norwegian colony differs from those from the Island of Gotland in having smaller corallites, which are not so strongly differentiated in size, and in having the tabulae more closely arranged.

Distribution. — Poland: erratic boulders; Sweden: Island of Gotland, Luseklint, Högklint, Snäckgärdsbaden, Wenlock, Upper Visby Marl; Norway: Ringerike, Vesleøy, Substage 7cβ; Estonia: Wenlock, Jaani Stage.

Angopora tenuicula KLAAMANN, 1961

(Pl. XI, Figs. 1 *a—b*, 2 *a—b*)

1961*b*. *Thecia tenuicula* KLAAMANN; E. KLAAMANN, Tabuljaty..., pp. 70—72, Pl. 1, Figs. 2, 3.
1962*a*. *Thecia tenuicula* KLAAMANN, E. KLAAMANN, Tabuljaty verchnego silura..., Text-Figs. 1-4*a-b*.
1964. *Angopora tenuicula* (KLAAMANN); E.R. KLAAMANN, Pozdneordovikskie..., pp. 80-81, Pl. 21, Figs. 6-8; Text-Fig. 13.

Material. — Six colonies from Island of Gotland (RM-18448-54); 2 thin sections.

Description. — Colonies small, low, flattened, with irregular surface. Largest colony 5·2 cm long, 4·5 cm wide, 1·5 cm high. Corallites polygonal, ranging 0·35—0·7 mm in diameter, in places assembled larger corallites with diameters 0·7—0·9 mm. Walls 0·07—0·2 mm thick. Mural pores mostly 0·1 mm in diameter, or slightly larger. Tabulae horizontal, uneven spaced 0·07—0·2 mm apart, or 0·2—0·5 mm apart, where more loosely arranged. Septa lamellar disconnected, terminating in spines. Septal spines long, directed upwards.

Remarks. — There are no differences between the specimens described above from Island of Gotland and those from Estonia.

Distribution. — Sweden: Island of Gotland, Lau, Ludlow; Estonia: Wenlock, Jaani Stage.

Genus **KIAERITES** n. gen.

Type species: Kiaerites norvegicus n. gen., n. sp.; Norway, Ringerike, Vesleøy, Llandovery, Substage 7cβ.
Derivation of the name: Kiaerites — in honour of the late Prof. JOHAN KIAER, the outstanding Norwegian geologist.

Diagnosis. — Colony large, flattened. Corallites polygonal in cross-section. Walls formed by widened septal spines. Mural and angular pores present.

Remarks. — The new genus *Kiaerites* has the corallite walls formed by widened septal spines, a character that has been never found in any other known genus. It is assigned to the family Angoporidae n. fam. because of the trabecular structure of septa. Genus *Kiaerites* is established by monotypy for the species *K. norvegicus* n. sp.

Kiaerites norvegicus n. sp.

(Pl. XI, Fig. 3*a-c*)

Type specimen: PMO-45341; Pl. XI, Fig. 3*a-c*.
Type horizon: Llandovery, Substage 7*cβ*.
Type locality: Norway: Ringerike, Vesleøy.
Derivation of the name: norvegicus — found in Norway.

Diagnosis. — Colony large, flat. Corallites perpendicular to upper surface of a colony, polygonal, 4—5 mm in diameter. Walls 0·7 mm thick, formed by widened bases of septal spines. Intercorallite suture distinct, undulate. Mural pores, rarely angular pores, 0·2—0·25 mm in diameter. Tabulae thin, usually convex, uneven, sometimes incomplete, spaced 0·3—0·7 mm and 0·8—0·9 mm apart. Septal spines very numerous, long, with broad bases, pointed and directed upwards. The latter also present on tabulae.

Material. — Fragment of a colony from Norway (PMO-45341); 4 thin sections.

Description. — Colony large. Preserved fragment, at most 1/4 of the entire colony, is 13·5 mm long. Colony flat, about 4·5 mm high. Corallites arranged perpendicularly upwards, polygonal in cross-section. Walls up to 0·7 mm thick, formed probably from widened bases of septal spines. Intercorallite suture very distinct, undulated. Mural and angular pores 0·2—0·25 mm in diameter. Angular pores few in number. Tabulae usually convex, uneven in places, or incomplete, spaced 0·3—0·7 mm and 0·8—0·9 mm apart. They are arranged in zones, where are more or less closely spaced, but zones with loose arrangement are narrow and indistinctly pronounced. Septal spines very numerous, long, sometimes reaching centre of a corallite, sharply pointed and directed upwards. Their broadened bases fused closely together for about 1/4 of their length, forming false wall. Spines also present on tabulae. Number of rows of septal spines up to 46. In places, it seems that there exists a very thin layer of a true wall. It is, however, so indistinctly separated from the bases of septal spines that its presence seems to be doubtful.

Family THECIIDAE MILNE-EDWARDS & HAIME, 1850

Subfamily THECIINAE MILNE-EDWARDS & HAIME, 1850

Genus **THECIA** MILNE-EDWARDS & HAIME, 1849

Type species: Thecia swinderniana (GOLDFUSS. 1829), Upper Silurian of England.

Diagnosis (after KLAAMANN, 1964). — Colony massive, irregular, corky and tabular. Corallites small, closely adjoining one another. Walls thin, not rarely thickened (especially in the peripheral parts of a colony). Mural pores numerous, comparatively large, arranged in rows on the corallite walls. Tabulae numerous, horizontal, or in places intersecting and uneven. Septal structures developed in form of longitudinal ridges, their number in a corallite mostly equals 6 or its multiple.

Distribution. — Upper Ordovician — Lower Ludlow of Baltic Region, Wenlock of Podolia, Upper Silurian of European sector of Arctic and Urals. Upper Silurian — Lower Devonian of West Europe, Upper Silurian of North America. In erratic boulders of Poland, genus *Thecia* is not very numerous. Only 3 species have been found: *Th. confluens* (EICHWALD, 1854), *Th. saaremica* KLAAMANN, 1961, and *Th. swinderniana* (GOLDFUSS, 1829). Last mentioned species also present on Island of Gotland.

Thecia confluens (EICHWALD, 1854)

(Pl. XII, Fig. 1*a-b*)

1854. *Diplastraea cofluens* EICHWALD; C. EICHWALD, Die Grauwackenschichten..., p. 108.
1869. *Thecia confluens* (EICHWALD); C. E. EICHWALD, Lethaea Rossica..., p. 463, Pl. 30, Fig. 10*a-b*.
1955. *Thecia confluens* (EICHWALD); B. S. SOKOLOV, Tabuljaty paleozoja..., Pl. 15, Fig. 1-4.
1961*b*. *Thecia fructicosa* KLAAMANN; E. R. KLAAMANN, Tabuljaty..., p. 72, Pl. 1, Figs. 4-5; Pl. 2, Figs. 1-4.
1962*a*. *Thecia fructicosa* KLAAMANN; E. R. KLAAMANN, Tabuljaty verchnego..., p. 28, Figs. 1-2*a-b*.
1964. *Thecia confluens* (EICHWALD); E. R. KLAAMANN, Pozdneordovikskie..., pp. 79-80, Pl. 21, Fig. 9, 10; Pl. 26, Figs. 1-2, Text-fig. 12.

Material. — Fragment of colony from erratic boulder, Poland (Z.Pal.T/III-10); 2 thin sections.

Description. — Colony small. Corallites 0·5—1·0 mm in diameter. In central part, walls 0·1 mm thick, 0·2—0·3 mm thick on periphery. Mural pores tiny, 0·15 mm in diameter. Tabulae horizontal, sometimes slightly uneven, or incomplete, spaced 0·2—0·6 mm apart. Six to eight septal spines in form of ridges.

Remarks. — No differences have been noticed between the colony described here and the specimens from Estonia.

Distribution. — Poland: erratic boulders; Estonia: Wenlock, Jaagarahu Stage.

Thecia saaremica KLAAMANN, 1961

(Pl. XII, Fig. 2*a-b*)

1961*b*. *Thecia saaremica* KLAAMANN; E. R. KLAAMANN, Tabuljaty..., p. 71, Pl. 1, Fig. 1; Pl. 2, Fig. 5.
1962. *Thecia saaremica* KLAAMANN, E. R. KLAAMANN, Tabuljaty verchnego..., p. 28, Figs. 1-3*a, b*.
1954. *Thecia saaremica* KLAAMANN, E. R. KLAAMANN, Pozdneordovikskie..., pp. 78-79, Pl. 22, Fig. 1.

Material. — Fragment of colony from erratic boulder, Poland (Z.Pal.T/III-101); 2 thin sections.

Description. — Colony very small. Corallites 0·8—1·0 mm in diameter. They are star-like in shape, because of presence of 6—12 thick, septal lamellae. Walls 0·1—0·3 mm thick, sometimes up to 0·5 mm thick. Mural pores about 0·15 mm in diameter, rarely visible, situated on the walls of corallites. Tabulae horizontal, sometimes slightly concave, spaced 0·15—0·4 mm apart.

Remarks. — The specimen from the Polish erratic boulder is nearly identical to *Th. saaremica* from Estonia.

Distribution. — Poland: erratic boulders (Oborniki); Estonia: Wenlock, Upper Jaagarahu Stage.

Thecia swinderniana (GOLDFUSS, 1829)

(Pl. XII, Fig. 3*a-b*)

1829. *Agaricia swinderniana* GOLDFUSS; G.A. GOLDFUSS, Petrefacta..., p. 109, Pl. 38, Fig. 3.
1839. *Porites expatiata* LONSDALE; W. LONSDALE, Corals..., p. 687, Pl. 15, Fig. 3.
1850. *Astropora expatiata* (LONSDALE); A. D'ORBIGNY, Prodrome..., p. 50.
1851. *Palaeopora? (Thecia) expatiata* (LONSDALE); F. MCCOY, Description..., p. 14.
1851. *Thecia swinderniana* (GOLDFUSS); H. MILNE-EDWARDS & J. HAIME, Monographie..., pp. 278—279, Pl. 65, Figs. 7, 7a.
1955. *Thecia swinderniana* (GOLDFUSS); B.S. SOKOLOV, Tabuljaty..., Pl. 16, Figs. 1—4; p. 147, Fig. 8.
1962a. *Thecia swinderniana* (GOLDFUSS); E. R. KLAAMANN, Tabuljaty..., pp. 27—29, Pl. 1, Figs. 1—8; Text-figs. 1a—1b.

Material. — Fragment of colony from erratic boulder, Poland (Z.Pal.T/III-33); 2 thin sections.

Description. — In cross-section, corallites star-like, because of presence of septal ridges. Their diameters ranging 0·6—0·8 mm, rarely up to 1 mm. Walls 0·1—0·15 mm thick. Mural pores very numerous, circular, 0·15 mm, rarely 0·2 mm in diameter, 0·2 mm apart. Tabulae thin, horizontal, sometimes incomplete, spaced 0·1—0·4 mm apart. Septal spines in form of thick ridges usually 6—8, sometimes 9—10 in number.

Remarks. — The specimen investigated is closest to the colonies of *Th. swinderniana* from Estonia.

Distribution. — Poland; erratic boulders (Mochty); Estonia: Ludlow, Paadla Stage; Sweden: Island of Gotland, Silurian; England: Wenlock; North America: Silurian.

Genus **LACERIPORA** EICHWALD, 1854

Type species: Laceripora cribrosa EICHWALD, 1854. Estonia, Upper Silurian.

Diagnosis (after SOKOLOV, 1962). — Colony dendritic, elongate. Corallite walls thickened on periphery, because of the addition of stereoplasma, and only in that part appear six conical septa. Mural pores large, in one or two rows. Tabulae horizontal.

Distribution. — Upper Wenlock—Lower Ludlow of Baltic region, Urals and Arctic. Very rarely occurring in erratic boulders of Poland.

Laceripora cribrosa EICHWALD, 1854

(Pl. XII, Fig. 4*a-b*)

1854. *Laceripora cribrosa* EICHWALD; C. E. EICHWALD, Die Grauwackenschichten..., p. 86.
1860. *Laceripora cribrosa* EICHWALD; C. E. EICHWALD, Lethaea Rossica..., pp. 490-491, Pl. 27, Fig. 17*a-c*.
1940. *Laceripora cribrosa* EICHWALD; W. D. LANG, S. SMITH & H. D. THOMAS, Index..., p. 74.
1949. *Laceripora cribrosa* EICHWALD; B. S. SOKOLOV, Tabulata..., p. 84, Pl. 7, Figs. 12-13.
1955. *Laceripora cribrosa* EICHWALD; B. S. SOKOLOV, Tabuljaty paleozoja..., Pl. 17, Figs. 1-3; Pl. 18, Figs. 1-2; Text-fig. 20.
1956. *Laceripora cribrosa* EICHWALD; D. HILL & E. C. STUMM, Tabulate..., p. 463, Text-fig. 349.
1962. *Laceripora cribrosa* EICHWALD; E. R. KLAAMANN, Tabuljaty verchnego..., pp. 30-31, Pl. 2, Figs. 1-13; Pl. 3, Figs. 1-5.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-29); 2 thin sections.

Description. — Colony cylindrical, 10 mm in diameter, 26 mm long. Corallites diverging spindle-shaped, opening perpendicularly to the surface. In axial part, diameters of corallites equal 0·5—1·0 mm. Walls straight, or curved in places, in axial part very thin, up to 0·05 mm; on the periphery 0·15—0·2 mm thick, because of addition of thick layer of stereoplasma. Mural pores very numerous, 0·1—0·2 mm in diameter, arranged in one or two rows. Tabulae horizontal, closely spaced, arranged on the same level in adjacent corallites, forming concentric zones. Tabulae 0·4—0·7 mm apart in axial parts, the distance varies 0·2—0·3 mm, sometimes up to 0·5 mm on the periphery. Septal spines absent in axial part, on the periphery in form of short ridges.

Remarks. — The specimens investigated are closest to the colony of this species from Estonia.

Distribution. — Poland: erratic boulders; Estonia: Ludlow, Paadla Stage; Kazakhstan; Middle Asia.

Family FAVOSITIDAE Dana, 1846

Subfamily FAVOSITINAE Sokolov, 1950

Genus **PALAEOFAVOSITES** Twenhofel, 1914

Type species: Favosites aspera d'Orbigny, 1850 (= *Calamopora alveolaris* Goldfuss, 1827; = *Favosites alveolaris* Goldfuss). The species is described at length by Lecompte (1936, p. 66, Pl. 11, Fig. 4). The specimen described by d'Orbigny most probably comes from Scandinavian—Baltic region, Silurian.

Diagnosis (after Klaamann, 1964). — Colony massive, convex, flat or irregular in shape. Corallites polygonal, strongly adjoined. Connecting pores (angular pores) arranged on ridges of corallites in vertical rows. Septal structure pronounced, in form of spines.

Distribution. — Middle Ordovician—Lower Ludlow of Urals, Upper Ordovician—Lower Ludlow of Baltic region, Podolia, Arctic, Siberia, Kazakhstan, Kolyma Basin; Silurian of Middle Asia; Upper Ordovician—Ludlow of West Europe, Australia, China, North America.

Genus *Palaeofavosites* occurs rarely in the erratic boulders of Poland, as well as on Island of Gotland, very widely distributed in Norway, where it occurs probably in Series 5, dominates in Series 6, and is rarely found in Series 7.

Palaeofavosites abstrusus Klaamann, 1961

(Pl. XIV, Fig. 2*a-b*)

1961*a*. *Palaeofavosites abstrusus abstrusus* Klaamann; E. R. Klaamann, Drevnejšie favositidy..., pp. 124-125, Pl. 3, Figs. 1, 2; Text-fig. 2.

1964. *Palaeofavosites abstrusus* Klaamann; E. R. Klaamann, Pozdneordovikskie..., pp. 9-11, Pl. 1, Figs. 1, 2; Text-fig. 2.

Material. — Fragment of a colony from Norway (PMO-52667); 5 thin sections.

Description. — Colony average in size and flat, judging from the small preserved fragment. Corallites polygonal in cross-section, 2·5—4·3 mm in diameter. Walls straight, 0·2—0·3 mm thick, somewhat broadened in places, where tabulae more closely spaced. Intercorallite suture fine, well visible. Angular pores 0·3 mm in diameter. Tabulae horizontal, somewhat bent, uneven, zonally arranged. They are spaced 0·2—0·4 mm apart in zones where more closely arranged, and 0·7—1·2 mm beyond these. Septal spines short, sometimes numerous.

Remarks. — The specimens from Norway and Estonia are nearly identical. However the tabulae of the Norwegian forms are more densely spaced.

Distribution. — Norway: Asker, Spirodden, Llandovery, Substage 6cα; Estonia: Upper Ordovician, Porkuni Stage.

Palaeofavosites aliquantulus Klaamann, 1962

1962*b*. *Palaeofavosites aliquantulus* Klaamann, E. R. Klaamann, Rasprostranenie..., pp. 155-157, Pl. 1, Figs. 3-4; Pl. 2, Fig. 1; Text-fig. 2.

1964. *Palaeofavosites aliquantulus* Klaamann, E. R. Klaamann, Pozdneordovikskie..., p. 26, Pl. 8, Figs. 7-9.

Material. — Fragments of a colony from Island of Gotland (INB-1948); 2 thin sections.

Description. — Colony flat, probably small, the preserved fragment 7 cm long, 4 cm wide. Corallites polygonal, 0·7—1·4 mm in diameter. Walls 0·05 mm thick, but in places associations

MORPHOLOGICALLY-COMPARATIVE TABLE OF *PALAEOFAVOSITES* TWENHOFEL AND *MESOFAVOSITES* SOKOLOV

Species	Shape of corallites in cross-section	Diameters of corallites (in mm)	Thickness of walls (in mm)	Pores	Diameters of pores (in mm)	Tabulae	Distance between tabulae (in mm)	Septal spines
Palaeofavosites aliquantulus KLAAMANN	polygonal	0·7—1·4	0·05—0·20	angular	0·1	?	?	numerous, strong, with broad bases
P. hystrix SOKOLOV	polygonal, homogeneous	1·2—1·5	0·05—0·15	angular, surrounded by ridges	0·15—0·20	horizontal, slightly bent	0·2—0·5 0·7—1·2	long, numerous, directed upwards
P. raikkuelaensis n. sp.	polygonal, differentiated in size	0·7—1·6	0·07	angular, surrounded by ridges	0·3	horizontal, uneven	0·6—1·5 1·8	short
P. balticus (RUKHIN)	polygonal	0·6—1·8	0·05	angular, surrounded by ridges	0·15—0·20	horizontal	0·2—0·5 0·7—1·5	short
P. forbesiformis SOKOLOV	polygonal, differentiated in size	0·6—2·0	0·01—0·02	angular	0·01	horizontal, thin	0·3—0·5 0·7—1·3	traces
P. tersus KLAAMANN	polygonal, with rounded angles	1—2	0·10—0·25	angular, surrounded by ridges	0·2	slightly concave	0·5—0·6 0·6—1·0	thick, directed upwards
P. schmidti SOKOLOV	polygonal, weakly differentiated in size	1·0—2·5	0·05—0·15	angular, surrounded by ridges	0·2—0·25	horizontal	0·2—0·5 0·7—2·0	short
P. spiroddensis n. sp.	polygonal, differentiated in size	2·5—3·0	0·1	angular	0·2	horizontal, slightly concave, convex, uneven	0·2—0·5 1·0—2·0	short, straight
P. alveolaris (GOLDFUSS)	polygonal, differentiated in size	2·5—3·0	0·03	angular	0·2	horizontal, slightly uneven, strongly curved	0·35—0·50 1·00—1·15	short
P. aff. *alveolaris* (GOLDFUSS)	polygonal	1·5—3·5	0·05—0·20	angular	0·25	horizontal, uneven	0·5—0·7 1·0—2·5	short
P. legibilis SOKOLOV	polygonal, regular	2·0—3·8	0·15—0·20	angular	0·2	horizontal	0·5—0·2 1·0—1·2	thin, pointed, numerous
P. oelaensis KLAAMANN	polygonal, irregular	1·5—4·2	0·01	angular, single pores on walls	0·2	horizontal, curved	0·3—0·7 1·5—2·3	short
P. abstrusus KLAAMANN	polygonal	2·5—4·3	0·2—0·3	angular	0·3	horizontal, bent, uneven	0·2—0·4 0·7—1·2	short, numerous
P. haapsaluensis KLAAMANN	polygonal, differentiated in size	1—4	0·05—0·25	angular, surrounded by ridges, single pores on walls	0·3	horizontal, slightly bent	0·4—1·0 1·0—2·5	short
P. kalvensis n. sp.	polygonal, irregular, slightly differentiated	2·0—4·7	0·15	angular, surrounded by ridges	0·2	horizontal, sometimes curved, thin	0·3—0·1 1·8—3·0	short
Mesofavosites imbellis KLAAMANN	polygonal	1·0—1·4	0·07—1·13	mural and angular, 1—2 rows	0·15	horizontal, slightly concave or convex	0·10—0·35 0·50—0·70	well developed, directed upwards
M. validus KLAAMANN	polygonal	1·5—3·0	0·1	mural and angular, 1—2 rows	0·2	horizontal, slightly concave	0·5—0·7 1·0—2·0	short
M. silicificatus KLAAMANN	polygonal	3·0—3·7	0·08—0·15	mural and angular, somewhat elliptical	0·20—0·25	horizontal, bent	0·5—1·0 1·0—2·3	not preserved

of corallites with thicker (up to 0·2 mm) walls present. Angular pores 0·1 mm in diameter. Septal spines numerous, strong, with broad bases, preserved in corallites with thicker walls.

Distribution. — Sweden: Island Gotland, Korpklint and Högklint, Upper Visby Marl; Estonia: Upper Llandovery, lower part of Adavere Stage.

Palaeofavosites alveolaris (GOLDFUSS, 1829)

(Pl. XV, Figs. 2, 3*a-b*)

1829. *Calamopora alveolaris* GOLDFUSS; G. A. GOLDFUSS, Petrefacta..., p. 75, Pl. 26, Fig. 1*a-c*.
1839. *Favosites alveolaris* LONSDALE; W. LONSDALE, Corals..., Pl. 15bis, Figs. 1*a*-1*b*, 2*a*-2*b*.
1850. *Favosites aspera* D'ORBIGNY; A. D'ORBIGNY, Prodrome..., p. 49.
1936. *Favosites alveolaris* GOLDFUSS; M. LECOMPTE, Revision..., p. 66, Pl. 11, Fig. 4.
1937. *Favosites (Palaeofavosites) asper* (GOLDFUSS); L. B. RUKHIN, Verchne-silurijskie..., p. 54, Pl. 11; Text-figs. 1-2.
1937. *Palaeofavosites asper* (D'ORBIGNY); B. B. TCHERNYCHEV, Silurijskie..., p. 82, Pl. 5, Figs. 4*a*-4*b*.
1941. *Palaeofavosites alveolaris* (GOLDFUSS); B. B. TCHERNYCHEV, Silurijskie i nižnedevonskie..., pp. 28-30, Pl. 11, Figs. 1-2.
1949. *Palaeofavosites alveolaris* (GOLDFUSS); B. S. SOKOLOV, Tabulata..., p. 81, Pl. 7, Figs. 1, 2; Text-fig. 3.
1950. *Palaeofavosites alveolaris* (GOLDFUSS); B. S. SOKOLOV, Silurijskie korally..., pp. 216-217, Pl. 2.
1951*b*. *Palaeofavosites alveolaris* (GOLDFUSS); B. S. SOKOLOV, Tabuljaty..., pp. 22-23, Pl. 4, Figs. 3-5.
1955. *Palaeofavosites alveolaris* (GOLDFUSS); B. S. SOKOLOV, Tabuljaty..., Pl. 11, Fig. 1.
1964. *Palaeofavosites alveolaris* (GOLDFUSS); E. R. KLAAMANN, Pozdneordovikskie..., pp. 8-9.

Material. — Small fragments of 6 colonies from Norway (PMO-S. 2451, 52311, 52657, 52658, 52671, 52672); 2 thin sections of each specimen.

Description. — Colonies probably average in size, preserved fragment of largest colony 14 cm long, 11 cm wide, 3·5 cm high. Shape of colonies varies from flattened to semicircular. Corallites polygonal, somewhat variegated (ranging 2·5—3·0 mm, rarely more than 3 mm) in diameter. Walls 0·03 mm thick. Intercorallite suture clearly visible. Pores 0·2 mm in diameter, arranged in regular rows at the angles of corallites and spaced 0·3—1·0 mm apart. Tabulae horizontal, slightly uneven, in places strongly curved, spaced 0·35—0·5 mm apart and 1·0—1·15 mm apart, in zones where more loosely spaced. Zones with close arrangement of tabulae narrow. Septal spines short, badly preserved.

Remarks. — The Norwegian specimens investigated are closest to those of the same species from Estonia.

Distribution. — Norway: Asker, Spirodden, Baerum, Sandviken, Hvalstad, Llandovery, Series 6; Estonia: Llandovery, Stages Juuru, Tamsalu, Raikküla.

Palaeofavosites aff. **alveolaris** (GOLDFUSS, 1829)

(Pl. XV, Fig. 1*a-b*)

1961*a*. *Palaeofavosites* aff. *alveolaris* (GOLDFUSS); E. R. KLAAMANN, Drevnejšie..., pp. 123-124, Pl. 2, Figs. 1-5; Text-fig. 1.
1964. *Palaeofavosites* aff. *alveolaris* (GOLDFUSS); E. R. KLAAMANN, Pozdneordovikskie..., p. 8, Pl. 1, Figs. 4-5.

Material. — Fragment of a colony from Norway (PMO-54788); 2 thin sections.

Description. — Size and shape of colony unknown. Corallites polygonal, ranging 1·5—3·0 mm in diameter, largest 3·5 mm. Walls 0·05—0·1 mm thick, occasionally up to 0·2 mm thick. Intercorallite suture clearly visible. Angular pores 0·25 mm in diameter, spaced 0·2–0·3 mm apart. Tabulae horizontal, uneven, arranged in zones. In zones of closer arran-

gement spaced 0·5—0·7 mm apart, sometimes up to 1 mm apart. In zones of looser arrangement, spaced 1—2 mm, rarely up to 2·5 mm apart. Septal spines short. In longitudinal sections, their traces clearly visible in form of spots.

Remarks. — The specimen described here differs from *P.* aff. *alveolaris* from Estonia in having more densely arranged tabulae. In this characteristic, it is closer to the colony described by GOLDFUSS.

Distribution. — Norway: Holmestrand, Bjerkøy, Llandovery, Series 7; Estonia: Upper Ordovician, Pirgu Stage.

Palaeofavosites balticus (RUKHIN, 1937)

(Pl. XVII, Fig. 2a-c)

1930. *Favosites aspera* D'ORBIGNY; ST. SMITH, Valentian corals..., p. 318.
1934. *Favosites asper* D'ORBIGNY; H. P. LEWIS, The occurrence..., p. 99, Pl. 15, Figs. 14*a*-14*b*.
1936. *Favosites asper* D'ORBIGNY; O. A. JONES, The controlling effect..., p. 15, Pl. 2, Figs. 1-3.
1937. *Favosites (Palaeofavosites) asper* D'ORBIGNY var. *balticus* RUKHIN; L. B. RUKHIN, Verchnesilurijskie..., p. 59, Pl. 11, Figs. 3-4.
1951*b*. *Palaeofavosites balticus* (RUKHIN); B. S. SOKOLOV, Tabuljaty..., pp. 24-25, Pl. 5, Figs 3-4.
1959. *Palaeofavosites balticus* (RUKHIN); M. S. ZHIZHINA & M. A. SMIRNOVA, Favositidy..., pp. 66-67, Pl. 3, Figs. 1-3.
1964. *Palaeofavosites balticus* (RUKHIN); E. R. KLAAMANN, Pozdneordovikskie..., pp. 20-21. Pl. 5, Figs. 7-8.

Material. — Fragment of a colony from Norway (PMO-52670); 2 thin sections.

Description. — Colony small, flattened. Corallites polygonal in cross-section, 0·6—1·7 mm in diameter, sometimes up to 1·9 mm. Walls straight, usually even in thickness (0·05 mm). Dark line mostly well visible. Tabulae mostly horizontal, zones of dense arrangement narrow. Distance between tabulae ranging 0·2—0·5 mm, usually 0·7—1·0 mm, rarely 1·5 mm. Angular pores 0·15—0·2 mm in diameter, surrounded by thin ridges spaced about 0·2 mm. Septal spines short, very rarely preserved, most clearly seen in calyces, on the surface of a colony.

Remarks. — The specimens described from Norway differ from those of the same species from Estonia in having their tabulae more loosely arranged.

Distribution. — Norway: Asker, Spirodden, Llandovery, Substage 6c; Estonia: Llandovery, Stages Juuru and Tamsalu, rarely Stages Raikküla and Adavere; East Taimyr: Llandovery; Siberian Platform; Tadzhikhstan, East Kazakhstan, Wenlock; Middle Asia (Turkestan), Silurian; England, Salopian.

Palaeofavosites forbesiformis SOKOLOV, 1951

(Pl. XVI, Fig. 1*a-b*)

1951*b*. *Palaeofavosites forbesiformis* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 28-29, Pl. 8, Figs. 1-2.
1959. *Palaeofavosites forbesiformis* var. *raritabulata* KLAAMANN; E. R. KLAAMANN, O faune tabuljat..., pp. 258-259, Pl. 1, Figs. 7-8; Pl. 2, fig. 1.
1962. *Palaeofavosites forbesiformis forbesiformis* SOKOLOV; H. FLÜGEL, Korallen..., p. 307, Pl. 21, Fig. 2.
1964. *Palaeofavosites forbesiformis* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., pp. 19-20, Pl. 6, Figs. 7-8.

Material. — Fragments of 2 colonies from erratic boulders, Poland (Z.Pal.T/III-2, 30); 2 thin sections.

Description. — Colonies probably semicircular, not large. Corallites polygonal, varying in size, 0·6—1·7 mm, some 1·9—2·0 mm in diameter. Walls straight, usually 0·01 mm thick, in places thickened up to 0·02 mm. Tabulae horizontal, thin, spaced 0·3—0·5 mm and

0·7—1·3 mm apart. Zones of more dense arrangement of tabulae narrow. Pores 0·01 mm in diameter, situated at angles of corallites. Septal spines invisible in cross-section. In longitudinal section, their traces visible in form of spots, occurring mostly in zones with denser arrangement of tabulae.

Remarks. — The specimens described above differ from those from Estonia in having tabulae more densely arranged.

Distribution. — Poland: erratic boulders; Estonia: Llandovery, Stages Juuru and Tamsulu.

Palaeofavosites haapsaluensis KLAAMANN, 1961

(Pl. XIV, Fig. 3*a-b*)

1961*a*. *Palaeofavosites abstrusus haapsaluensis* KLAAMANN; E. R. KLAAMANN, Drevnejšie favositidy..., pp. 125-126, Pl. 3, Figs. 3-5; Text-fig. 2.

1964. *Palaeofavosites haapsaluensis* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., pp. 11-12, Pl. 2, Figs. 3-4; Text-fig. 3.

Material. — Fragments of 3 colonies from Norway (PMO-42255, 52682, 52686); 3 thin sections of each specimen.

Description. — Colonies rather large, fragment of a largest one, being probably a half of a colony, 16 cm long, 8 cm wide, 5 cm high. Corallites of different sizes, 2—4 mm in diameter; young corallites 1—2 mm in diameter often found. Walls straight, in places undulated, 0·05—0·15 mm thick, sometimes up to 0·25 mm thick. Intercorallite suture well visible. Angular pores circular, 0·3 mm in diameter, nearly equally spaced, surrounded by thin ridges. Single pores on walls sporadically present. Tabulae horizontal or slightly bent, spaced 0·4—0·7 mm, sometimes up to 1 mm apart. In zones of loose arrangement 1·0—2·5 mm apart. Septal spines short, rarely preserved.

Remarks. — The differences between the specimens of *P. haapsaluensis* from Norway and Estonia lie in the arrangement of tabulae, which is more dense and with more distinct zonation in Norwegian specimens.

Distribution. — Norway: Asker, Spirrodden, Llandovery, Substage 6cα; Estonia: Upper Ordovician, Pirgu Stage, rarely Porkuni Stage.

Palaeofavosites hystrix SOKOLOV, 1951

(Pl. XVII, Fig. 3*a-b*)

1951*b*. *Palaeofavosites hystrix* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 36-38, Pl. 12, Fig. 4; Pl. 14, Figs. 1-2.

1951*b*. *Palaeofavosites hystrix* var. *raikkülensis* SOKOLOV; B. S. SOKOLOV, *Ibid.*, pp. 39-40, Pl. 15, Figs. 1-2.

1964. *Palaeofavosites hystrix* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., p. 28, Pl. 7, Figs. 1-2.

Material. — Fragments of 2 colonies from Norway (PMO-40786, 44979); 2 thin sections of each specimen.

Description. — Colony flat, average in size. In cross-section, corallites polygonal, homogeneous, alike, ranging 1·2—1·5 mm in diameter. Walls 0·05—0·15 mm thick. Tabulae horizontal, slightly bent, usually densely arranged, but zones of looser arrangement also present. They are spaced 0·2—0·5 mm and 0·7—1·2 mm apart. Angular pores 0·15—0·2 mm in diameter, surrounded by low ridges. Septal spines very numerous, long, directed upwards, densely spaced in zones with closer arrangement of tabulae. In longitudinal section visible numerous traces of spines.

Remarks. — The corallites of *P. hystrix* from Norway have their tabulae more closely spaced than those of *P. hystrix* from Estonia, though other characters of these forms are nearly identical.

Distribution. — Norway: Malmøy, Llandovery, Series 6; Ringerike; Limåstangen, Llandovery, Stage 7a; Estonia: Llandovery, upper part of Tamsulu Stage and lower part of Raikküla Stage.

Palaeofavosites legibilis SOKOLOV, 1951

(Pl. XIV, Fig. 4*a-b*)

1951*b*. *Palaeofavosites legibilis* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 19-20, Pl. 2, Figs. 7-9; Pl. 3, Figs. 1-2.
1963. *Palaeofavosites legibilis* SOKOLOV; W. L. LELESHUS, Silurijskie tabuljaty..., pp. 159-162, Pl. 1, Figs. 1-2; Pl. 2, Fig. 3.
1964. *Palaeofavosites legibilis* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., p. 17.

Material. — Fragments of colony from erratic boulder, Poland (Z.Pal.T/III-126); 2 thin sections.

Description. — Colony small, semicircular. In cross-section corallites polygonal, regular, 2·0—3·8 mm in diameter. Walls 0·15—0·2 mm thick, uniform in thickness along their whole length. Mural pores 0·2 mm in diameter, uniformly spaced at angles of corallites, 0·3—0·5 mm, sometimes up to 0·7 mm apart. Tabulae horizontal, spaced 0·5—0·8 mm apart and, in zones of closer arrangement, 1·0—1·2 mm apart. Septal spines thin, numerous, pointed.

Remarks. — The colony of *P. legibilis* from Estonia has more closely spaced tabulae than that from the Polish erratic boulders.

Distribution. — Poland: erratic boulders; Estonia, Upper Ordovician, Porkuni Stage.

Palaeofavosites kalvensis n. sp.

(Pl. XIII, Fig. 5*a-d*)

Type specimen: PMO-40814; Pl. XIII, Fig. 5*a-d*.
Type horizon: Llandovery, Series 6.
Type locality: Malmøykalven, Malmøy, Norway.
Derivation of the name: kalvensis — from the type locality (Malmøy kalven).

Diagnosis. — Corallites polygonal, irregular, 3·5—4·7 mm in diameter. Angular pores 0·2 mm in diameter. Tabulae horizontal or bent, spaced 0·07—3·0 mm apart. Septal spines short.

Material. — Fragment of a colony from Norway (PMO-40814); 4 thin sections.

Description. — Colony discoidal, average in size. Corallites polygonal, irregular, slightly differentiated, 2·0—4·7 mm in diameter, usually 3·5—4·5 mm in diameter. Walls straight, occasionally uneven in thickness, usually 0·15 mm thick. Angular pores circular, surrounded by thin ridges, 0·2 mm in diameter or slightly more. Pores spaced 0·3—0·5 mm apart. Tabulae thin, horizontal, several curved, arranged in zones of different density, spaced 0·3—1·0 mm and 1·8—3·0 mm apart. Septal spines short, rarely preserved.

Remarks. — *P. kalvensis* n. sp. is closest to *P. porkuniensis* SOKOLOV, but differs from the latter by smaller diameters of corallites, thicker walls, smaller diameters of pores and more dense arrangement of tabulae.

Distribution. — As for the type specimen.

Palaeofavosites oelaensis KLAAMANN, 1959

(Pl. XIV, Fig. 1*a-b*)

1959. *Palaeofavosites oelaensis* KLAAMANN; E. R. KLAAMANN, O faune tabuljat..., pp. 259-260, Pl. 2, Figs. 3-4.
1964. *Palaeofavosites oelaensis* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., pp. 18-19, Pl. 2, Figs. 5-6.

Material. — Fragment of a colony from Norway (PMO-52665); 6 thin sections.

Description. — Colony small, semicircular. Corallites polygonal, irregular, 1·5—4·2 mm in diameter, those with larger diameters predominating. Walls thin, straight, occasionally uneven, mostly 0·01 mm thick or somewhat more. Intercorallite suture weakly visible. Tabulae horizontal, curved and spaced according to the zone, 0·3—0·7 mm apart and 1·5—2·3 mm apart. Pores 0·2 mm in diameter, situated at the angles of corallites. Occasionally single pores present on walls. Septal spines short, not preserved in all corallites, their traces visible in longitudinal sections.

Remarks. — The colony described above does not exhibit any differences from *P. oelaensis* of Estonia.

Distribution. — Norway: Asker, Spirodden, Llandovery, Substage 6cα; Estonia: Lower Llandovery, Juuru Stage.

Palaeofavosites raikkuelaensis SOKOLOV, 1951

(Pl. XVIII, Figs. 1*a-b*, 2*a-b*)

1951*b*. *Palaeofavosites paulus* var. *raikülaensis* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 33-34, Pl. 11, Figs. 1-2.
1964. *Palaeofavosites raikkuelaensis* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., p. 25, Pl. 6, Figs. 1-2.

Material. — Fragments of 3 colonies from Norway (PMO-40810, 42257, 43503); 3 thin sections of each specimen.

Description. — Corallites polygonal, differentiated in size, 0·7—1·6 mm in diameter. Walls very thin, 0·07 mm in thickness. Angular pores up to 0·3 mm in diameter, circular, surrounded by narrow ridges, spaced 0·2—0·3 mm apart. Tabulae horizontal, occasionally uneven, spaced 0·6—1·5 mm apart; sometimes more loosely arranged, and spaced up to 1·8 mm apart. Septal spines short, occasionally preserved, visible in well-preserved calyces, and also in longitudinal sections in form of spots.

Remarks. — There exist some small differences between the specimens of *P. raikkuelaensis* from Estonia and Norway respectively, the latter having larger diameters of pores and more loosely spaced tabulae.

Distribution. — Norway: Malmøy, Malmøykalven, Llandovery, Series 6; Estonia: Llandovery, Raikküla Stage.

Palaeofavosites schmidti SOKOLOV, 1951

(Pl. XVI, Figs. 2*a-b*, 3-5)

1951*b*. *Palaeofavosites schmidti* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 25-27, Pl. 6, Figs. 4-5.
1951*b*. *Palaeofavosites schmidti* var. *borealis* SOKOLOV; B. S. SOKOLOV, *Ibid.*, pp. 27-28, Pl. 2, Figs. 1-5.
1961. *Palaeofavosites schmidti* SOKOLOV; E. R. KLAAMANN, Drevnejšie..., pp. 121-123, Pl. 10, Figs. 1-8; Text-fig. 1.
1964. *Palaeofavosites schmidti* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., pp. 5-7, Pl. 1, Figs. 1-2.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-31), and fragments of 10 colonies from Norway (PMO-40811, 42256, 52325, 52666, 52668, 52669, 52683, 52684, 52688, 63155); 2 thin sections of each from the specimens mentioned.

Description. — Colonies varying in shape: discoidal, flattened, irregular. Largest colony 12 cm long, 11 cm wide, 6·6 cm high. In cross-section corallites polygonal, weakly differentiated, 1·0—2·3 mm in diameter, usually 1·8—2·3 mm, exceptionally 2·5 mm in diameter. Walls straight, 0·05—0·15 mm thick, occasionally up to 0·3 mm thick. Intercorallite suture distinct. Angular pores 0·2—0·25 mm in diameter, surrounded by ridges. Tabulae mostly horizontal, spaced 0·2—0·5 mm apart in zones, where more closely arranged, and 0·7—2·0 mm apart beyond them. Septal spines short, rarely preserved.

Remarks. — The colonies from erratic boulder and those from Norway differ from Estonian colonies in having more loosely spaced tabulae.

Distribution. — Poland: erratic boulders; Norway: Malmøy, Llandovery, Series 6; Ulvøy, Stage 6b; Asker, Spirodden, Llandovery, Substage 6cα; Estonia: Upper Ordovician, Stages Wormsi, Pirgu, Porkuni; Llandovery, Stages Tamsalu and Adavere; East Taimyr, Llandovery; Siberian Platform, Llandovery; Tadzhikhstan, Wenlock.

Palaeofavosites spiroddensis n. sp.

(Pl. XV, Fig. 4*a-c*)

Type specimen: PMO-52685; Pl. XV, Fig. 4*a-c*.
Type horizon. Llandovery, Substage 6cα.
Type locality: Spirodden, Asker, Norway.
Derivation of the name: spiroddensis — after the type locality (Spirodden).

Diagnosis. — Corallites polygonal, 2·5—2·7 mm in diameter. Angular pores 0·2 mm in diameter, spaced 0·3—0·4 mm apart. Tabulae spaced 0·2—2·0 mm apart. Septal spines short.

Material. — One colony from Norway (PMO-52685); 4 thin sections.

Description. — Colony discoidal, comparatively large, 13 cm long, 12 cm wide, 6 cm high. Corallites polygonal, differentiated in size, 2·5—2·7 mm in diameter. Corallites with diameters ranging up to 3 mm, irregular, nearly rectangular occurring rarely. Walls even, 0·1 mm thick. Intercorallite suture clearly visible. Angular pores 0·2 mm in diameter, spaced 0·3—0·4 mm apart. Tabulae horizontal, slightly concave or convex, uneven. In zones of greater density, spaced 0·2—0·5 mm apart, beyond these distance varying 1—2 mm. Septal spines short, straight.

Remarks. — *Palaeofavosites spiroddensis* n. sp. is closest to *P. alveolaris* (GOLDFUSS) from Norway and Estonia. It differs, however, from the latter in the smaller dimensions of corallites, thicker walls and larger pores. The tabulae are also more widely spaced in the new species.

Palaeofavosites tersus KLAAMANN, 1961

(Pl. XVII, Fig. 1*a-b*)

1961*b*. *Palaeofavosites tersus* KLAAMANN; E. R. KLAAMANN, Tabuljaty..., pp. 73-74, Pl. 3, Figs. 3-4.
1964. *Palaeofavosites tersus* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., p. 39, Pl. 10, Figs. 3-4.

Material. — Fragment of a colony from Island of Gotland (RM-18237); 2 thin sections.

Description. — Shape of colony unknown. Corallites polygonal, largest of them with

somewhat rounded angles. Diameter of corallites 1—2 mm. Walls uneven along their whole length, their thickness ranging 0·1—0·25 mm. Intercorallite suture distinct. Angular pores 0·2 mm in diameter, spaced 0·5—0·8 mm apart, surrounded by thin ridges. Tabulae slightly concave, in zones of more dense arrangement 0·5—0·6 mm apart, beyond these zones varying 0·6—1·0 mm apart. Zones with dense arrangement wide. Septal spines well developed, thick, directed upwards.

Remarks. — There are no differences between the specimens of *P. tersus* from Sweden and those from Estonia.

Distribution. — Sweden: Island of Gotland, Lindeklint; Estonia, Wenlock, Jaagarahu Stage.

Genus **PRISCOSOLENIA** SOKOLOV, 1962

Type species: Priscosolenia prisca (SOKOLOV, 1951). Estonia, Upper Ordovician, Porkuni Stage.

Diagnosis (after KLAAMANN, 1964). — Colonies of different shape and size. Corallites polygonal, rounded, with walls broken at the angles because of occurrence of numerous soleniae. Together with soleniae, normal angular pores developed. Tabulae thin, not entirely horizontal, in places crossing each other. Septal apparatus strongly developed in form of numerous, thick and long spines, reaching nearly to the centre of corallites. The number of septal structures usually about 12 in a corallite.

Remarks. — SOKOLOV (1962) established the genus *Priscosolenia* on the basis of the presence of soleniae and angular pores. These morphological characters suggest a transitional position for that genus between the genera *Palaeofavosites* TWENHOFEL and *Mesofavosites* SOKOLOV. So far only two species have been assigned to this genus. They are: *Priscosolenia prisca prisca* (SOK.), *P. prisca oculta* (SOK.), *P. perarmata* (KLAAMANN), all from the Upper Ordovician, Porkuni Stage of Estonia. Here are described two new representatives of that genus: *P. rozkowskae* n. sp. and *P. kozlowskii* n. sp., found in erratic boulders from Poland.

Distribution. — Upper Ordovician of Estonia; erratic boulders in Poland.

Priscosolenia kozlowskii n. sp.

(Pl. XVIII, Fig. 4*a-b*)

Type specimen: Z.Pal./III-171; Pl. VIII, Fig. 4*a-b*.

Type horizon and locality: Erratic boulder of unknown age, found in Poland.

Derivation of the name: kozlowskii — in honour of the eminent Polish palaeontologist, Prof. Dr. ROMAN KOZŁOWSKI.

Diagnosis. — Corallites polygonal, regular, often meandroid, 1·0—1·2 mm in diameter. Soleniae 0·3—0·35 mm in diameter. Angular pores present. Tabulae spaced 1·0—1·5 mm apart. Septal spines long.

Material. — Fragment of a colony from erratic boulder (Z.Pal.T/III-171), Poland; 2 thin sections.

Description. — Colony probably small, the preserved fragment 2 cm wide, 1 cm high. In cross-section, corallites polygonal, regular, often meandroid, rather uniform in size, with diameters ranging 1·0—1·4 mm. Walls thin, of uniform thickness, 0·07—0·14 mm thick. Soleniae 0·2—0·35 mm in diameter. Besides soleniae, angular pores also present. Tabulae horizontal,

slightly concave or convex, sometimes incomplete; spaced 0·2—0·6 mm apart in zones of more close arrangement, beyond these ranging 0·9—1·5 mm apart. Septal spines rather long, occasionally visible.

Remarks. — *P. kozlowskii* n. sp. differs from the other representatives of the genus in having corallites polygonal in cross-section. The dimensions of the corallites are close to those of *P. prisca* SOKOLOV.

Priscosolenia rozkowskae n. sp.

(Pl. XVIII, Fig. 3*a-b*)

Type specimen: Z.Pal.T/III-47; Pl. XVIII, Fig. 3*a-b*.
Type horizon and locality: Erratic boulder of unknown age, Poland.
Derivation of the name: rozkowskae — in honour of Prof. Dr. MARIA RÓŻKOWSKA, Poznań, Poland.

Diagnosis. — Corallites polygonal, irregular, meandroid, with angles often rounded, different in size 0·8—1·5 mm in diameter. Soleniae closely spaced, 0·5 mm in diameter. Angular pores 0·3 mm in diameter. Tabulae horizontal, uneven, rarely incomplete, spaced 0·5—1·0 mm and 1·3—2·5 mm apart. Septal spines present.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-47); 6 thin sections.

Description. — Preserved fragment of flattened colony, 2 cm high and about 8 cm wide. Corallites polygonal, irregular, occasionally elongated, often with rounded angles, their diameters ranging 0·8—1·5 mm. Walls thin, their thickness equals about 0·07 mm, rarely 0·1 mm. Solenia numerous, closely arranged, large, 0·5 mm in diameter. Angular pores occurring more rarely than solenia, small, 0·3 mm in diameter. Tabulae thin, horizontal, slightly concave or convex, occasionally incomplete, loosely spaced. Zones of close arrangement narrow, consist of 2—3 tabulae. Tabulae spaced 0·5—1·0 mm and 1·2—2·3 mm. Septal spines not preserved, their traces visible only in several corallites on the lower surface of a colony.

Remarks. — *Priscosolenia rozkowskae* n. sp. is similar to *P. prisca* SOKOLOV. It differs, however, from the latter in the larger diameter of its corallites and pores, and more spaced tabulae.

Genus **SPARSISOLENIA** n. gen.

Type species: Sparsisolenia kiaeri n. sp. Norway, Skien, Llandovery, Series 7.
Derivation of the name: Sparsisolenia, Lat. *sparsus* = sparse, Gr. *solen* = tubule; because of sparsely distributed solenia.

Diagnosis. — Colony massive. Corallites vertically arranged, in cross-section polygonal, rarely meandroid. Soleniae not numerous, sparsely distributed, tabulae loosely spaced. Septal apparatus in form of weakly developed spines.

Genus monotypic, established for the species *Sparsisolenia kiaeri* n. sp.

Remarks. — The most important character of the genus *Sparsisolenia* n. gen. is the sparse distribution of solenia. Because of this characteristic it seems to occupy a transitional position between the genera *Priscosolenia* SOKOLOV and *Multisolenia* FRITZ. *Priscosolenia* occurs already in Upper Ordovician, and it also has angular pores preserved, as well as solenia. *Sparsisolenia* is known from the Llandovery, Series 7 of Norway and has only solenia, which however are sparse. *Multisolenia* appears in Raikküla Stage, Llandovery, of Estonia. It occurs also in Series 7, Llandovery, of Norway. It seems to be possible that *Sparsisolenia* appeared earlier, but the scarce material does not give any evidence of this.

Sparsisolenia kiaeri n. sp.

(Pl. XIX, Fig. 3*a-b*)

Type specimen: PMO-51428; Pl. XIX, Fig. 3*a-b*.
Type horizon: Llandovery, Series 7.
Type locality: Skien, Norway.
Derivation of the name: kiaeri — in honour of Prof. JOHAN KIAER, Oslo, Norway.

Diagnosis. — Corallites polygonal in cross-section, with somewhat rounded angles, 0·9—1·0 mm in diameter. Tabulae thin, horizontal, slightly concave or convex, sometimes obliquely situated, spaced 1—2 mm apart. Septal spines short and thin.

Material. — Fragment of a colony from Norway (PMO-51428); 4 thin sections.

Description. — Preserved fragment of colony, 19 cm high. Corallites rising vertically upwards and arranged parallelly to each other, connected by rarely occurring solenia. In cross-section, corallites polygonal. Angles rounded occasionally, especially in the biggest corallites. Sometimes corallites meandroid. Walls 0·03—0·07 mm thick. Intercorallite suture distinct. Tabulae thin, horizontal, slightly concave or convex, occasionally obliquely oriented. Septal spines thin and short, rarely preserved.

Genus **MULTISOLENIA** FRITZ, 1937

Type species: Multisolenia tortuosa FRITZ, Canada, north part of Ontario State, Island of Mann, Wenlock, Lockport Formation.

Diagnosis (after KLAAMANN, 1964). — Colony massive, formed by corallites closely adjoining, polygonal, or rounded and polygonal in cross-section. Connecting structures in form of large and numerous solenia. Septal spines rare, arranged on ribs of corallites. Tabulae, as in other favositid corals, polygonal, uneven or occasionally intersecting each other.

Distribution. — Lower Llandovery—Lower Ludlow of Baltic Region, Urals, Kazakhstan, Middle Asia; Silurian: Kolyma Basin, Tuva, Arctic; Lower Silurian of Canada. Very rarely occurring in Llandovery of Norway, and in Wenlock of Island of Gotland.

Multisolenia tortuosaeformis KLAAMANN, 1962

(Pl. XIX, Fig. 1*a-b*)

1962*a*. *Multisolenia tortuosaeformis* KLAAMANN, E. R. KLAAMANN, Rasprostranenie..., pp. 158-159, Pl. 3, Figs. 1-2; Text-fig. 4.
1964. *Multisolenia tortuosaeformis* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., p. 44, Pl. 13, Figs. 1-2.

Material. — Fragments of two colonies from Norway (PMO-45144, 45145); 3 thin sections of each specimen.

Description. — Colony semicircular, 10·5 cm long, 10 cm wide, 5 cm high. In cross-section, corallites polygonal, slightly rounded, or elongate, meandroid, 0·5—0·8 mm in diameter. Walls 0·05—0·1 mm thick. Solenia very numerous, 0·3—0·35 mm in diameter, spaced 0·25—0·3 mm apart. Tabulae horizontal, sometimes oblique, rarely incomplete, spaced 0·3—0·7 mm apart. Septal spines short, thick, not numerous, probably up to six in one corallite.

Remarks. — The colonies from Norway do not differ from those of Estonia.

Distribution. — Norway: Ringerike, Limåstangen, Llandovery, Series 7; Estonia: Llandovery, upper part of Raikküla Stage.

Multisolenia excelsa KLAAMANN, 1961

(Pl. XIX, Fig. 2*a-b*)

1961*a*. *Multisolenia excelsa* KLAAMANN; E. R. KLAAMANN, Tabuljaty..., pp. 78-79, Pl. 6, Figs. 4-6; Text-fig. 1.
1964. *Multisolenia excelsa* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., p. 45, Pl. 12, Fig. 5.

Material. — Fragment of 2 colonies from Island of Gotland (INB-1892, 1982); 2 thin sections of each specimen.

Description. — Colonies small. Corallites polygonal, rounded, 0·5—1·2 mm in diameter. Walls 0·05—0·15 mm thick. Intercorallite suture distinct, wide. Numerous soleniae, 0·4—0·5 mm in diameter, spaced densely, 0·2—0·3 mm apart. Tabulae uneven, usually oblique, occasionally horizontal, spaced 0·3—0·7 mm apart. Septal spines short, triangular, with broad bases, not numerous. In some corallites, 1—3 septal spines visible.

Remarks. — The specimens from Sweden do not show any differences from those of Estonia.

Distribution. — Sweden: Island of Gotland, Suderbys, Slite, Wenlock; Estonia: Wenlock, Jaagarahu Stage.

Genus **MESOFAVOSITES** SOKOLOV, 1951

Type species: Mesofavosites dualis SOKOLOV, 1951, Estonia, Upper Ordovician, Porkuni Stage.

Diagnosis (after SOKOLOV, 1951b). — Colony massive, composed of closely adjoining prismatic corallites of *Favosites*-type. Its diagnostic character is the presence of well-developed both angular and mural pores. This genus shows simultaneously the characters of genera *Palaeofavosites* and *Favosites*.

Distribution. — Lower Llandovery—Wenlock of Baltic region, Siberia, Arctic; Wenlock-Ludlow of Urals, Salair, Middle Asia; Upper Ordovician—Llandovery of North America. Genus *Mesofavosites* occurs rarely in erratic boulders of Poland. Most probably its occurrence in Norway is also rare. The scanty material does not permit the determination of when the genus has appeared. It is definitely known that *M. silicificatus* KLAAMANN occurs in Series 6, Llandovery. In this species, mural pores are very sparse, which could be the evidence for its more recent appearance. In Series 7, there already occurs the typical representative of this genus — *M. imbellis* KLAAMANN. Genus *Mesofavosites* ranges to Series 8, Wenlock, where in Norway *M. validus* KLAAMANN was found. In Estonia the latter species occurs at the end of Llandovery, in the Adavere Stage.

Mesofavosites imbellis KLAAMANN, 1961

(Pl. XX, Figs. 5, 8)

1961. *Mesofavosites imbellis* KLAAMANN; E. R. KLAAMANN, Tabuljaty..., pp. 80—81, Pl. 7, Figs. 4-5.
1964. *Mesofavosites imbellis* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., p. 58, Pl. 15, Figs. 7-8.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-31); 2 fragments of colonies from Norway (PMO-45030, 45031); 2 thin sections of each specimen.

Description. — Colony semicircular, 13 cm long, 7 cm high. Corallites vertically situated, polygonal in cross-section, 1·0—1·4 mm in diameter. Walls 0·07—0·13 mm thick. Intercorallite suture occasionally undulate. Mural and angular pores 0·16 mm in diameter, arranged in one or two rows, spaced 0·2—0·5 mm apart. Tabulae horizontal, slightly concave or convex, in zones of closer arrangement 0·1—0·35 mm apart, while beyond these 0·5—0·7 mm apart. Septal spines well developed, directed somewhat upwards.

Remarks. — The specimens from the erratic boulders and from Norway, differ only a little from those of the same species from Estonia in the dimensions of their corallites, the thickness of walls, as well as the arrangement of tabulae.

Distribution. — Poland: erratic boulders; Norway: Ringerike, Limåstangen, Llandovery, Series 7; Estonia: Wenlock, upper part of Jaani Stage.

Mesofavosites silicificatus KLAAMANN, 1957

(Pl. XX, Fig. 7)

1959. *Mesofavosites silicificatus* KLAAMANN; E. R. KLAAMANN, O faune tabuljat..., p. 261, Pl. 3, Figs. 3-4.
1964. *Mesofavosites silicificatus* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., pp. 47-48, Pl. 13, Figs. 3-4.

Material. — Fragment of a colony from Norway (PMO-40808).

Description. — Colony flat. Corallites polygonal in cross-section, 3·0—3·5 mm, rarely up to 3·7 mm in diameter. Walls 0·08—0·15 mm thick, occasionally 0·2 mm thick. Mural and angular pores somewhat elliptical, 0·2—0·25 mm in diameter. Mural pores rarely occurring. Tabulae horizontal, somewhat bent, in zones of close arrangement 0·5—1·0 mm apart and beyond these 1·0—2·3 mm apart. Septal spines not preserved.

Remarks. — There exist no differences between the specimens of *M. silicificatus* from Norway and those from Estonia.

Distribution. — Norway: Malmøy, Llandovery, Series 6; Estonia, Llandovery, rare in lower part of Juuru Stage.

Mesofavosites validus KLAAMANN, 1964

(Pl. XX, Fig. 6)

1964. *Mesofavosites validus* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., pp. 51-53, Pl. 16, Figs. 6-7; Text-fig. 7.

Material. — A colony from Norway (PMO-54433).

Description. — Colony small, incomplete, 3·5 cm wide, 2·3 cm high. Corallites radially arranged, 1·5—3·0 mm in diameter. Walls 0·1 mm thick. Mural and angular pores present. Mural pores 0·2 mm in diameter, arranged in one or two rows. Tabulae horizontal, slightly concave, 0·5—0·7 mm apart, or 1·2 mm apart. Wide zones with loosely arranged tabulae. Septal spines short, pointed, only occasionally occurring.

Remarks. — The colony of *M. validus* differs from the Estonian representatives of the species in having slightly smaller corallites.

Distribution. — Norway: Holmestrand, Kommersøy, Wenlock, Stage 8b; Estonia: Upper Llandovery, lower part of Adavere Stage.

Subfamily FAVOSITINAE DANA, 1846

Genus **FAVOSITES** LAMARCK, 1816

Type species: Favosites gothlandicus LAMARCK, 1816 (MILNE-EDWARDS & HAIME, 1850, p. 60), Island of Gotland, Silurian.

Diagnosis (after KLAAMANN, 1964). — Colony massive, semicircular, nodular, flat or irregular. Composed of polygonal corallites with closely adjoining walls and nearly always with distinct suture. Walls pierced by usually vertical rows of pores. Tabulae thin, complete, horizontal. Reproduction by budding.

Remarks. — In the present paper, representatives of genus *Favosites* are described, occurring in Series 7 of Norway, in Sweden (Island of Gotland), as well as in erratic boulders of Poland, where they are very often found. All of the species described here occur also in Llandovery, Wenlock and Ludlow of Estonia. Two common species were found for Norway and the Polish erratic boulders, one such species for the Island of Gotland and the erratic boulders of Poland. However, there is no common species known simultaneously for Norway, Island of Gotland and the Polish erratic boulders, probably owing to the scanty material available.

Distribution. — Silurian of Baltic region; U.S.S.R.: Podolia, Siberia; Silurian—Middle Devonian of Urals, Timan, Kazakhstan, Middle Asia, Salair, Verkhoyan, Kolyma Basin, Chukotka, Arctic; Silurian—Devonian of Western Europe, China, India, Korea, Australia, North America, Greenland; Lower—Middle Devonian of North Africa, Burma, Vietnam; ?Carboniferous—Permian of South Europe, Timor.

Favosites adaverensis SOKOLOV, 1951

(Pl. XXII, Fig. 4*a-b*)

1951*b*. *Favosites adaverensis* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 92-94, Pl. 37, Figs. 1-3.
1964. *Favosites adaverensis* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., pp. 66-67.

Material. — Two thin sections of fragment of a colony from Island of Gotland (INB-865).

Description. — Corallites irregular, polygonal in cross-section, 1—3 mm in diameter. Walls about 0·14 mm thick, even. Pores 0·15 mm in diameter, arranged in two rows. Tabulae usually loosely spaced; in zones, where more closely arranged, 0·38—0·6 mm apart, beyond these zones 1—2 mm apart. Zones of close arrangement narrow. Septal spines short, occasionally visible.

Remarks. — The colony investigated is the closest to those of the same species described from Estonia.

Distribution. — Sweden: Island of Gotland; Estonia: Llandovery, Adavere Stage; East Kazakhstan, Wenlock.

Favosites exilis SOKOLOV, 1952

(Pl. XXVI, Fig. 3*a-b*)

1952*a*. *Favosites exilis* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 38-39, Pl. 14, Figs. 1-2.
1964. *Favosites exilis* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., p. 72.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-5); 2 thin sections.

MORPHOLOGICALLY-COMPARATIVE TABLE OF *FAVOSITES* LAMARCK

Species	Shape of corallites in cross-section	Diameters of corallites (in mm)	Thickness of walls (in mm)	Pores	Diameters of pores (in mm)	Tabulae	Distance between tabulae (in mm)	Septal spines
Favosites lichenarioides SOKOLOV	polygonal, semilunate	0·5—1·0	0·15	mural	0·2	horizontal, uneven, oblique	0·5—2·0 3·0	?
F. exilis SOKOLOV	polygonal, slightly differentiated	0·5—1·5	0·1	mural, elliptical	0·2	horizontal, slightly bent	0·1—0·3 0·4—1·0	not preserved
F. mirandus SOKOLOV	polygonal, with rounded angles	1·0—1·5	0·15—0·20	mural	0·15	concave, uneven	0·3—0·6 0·8—2·0	short
F. similis SOKOLOV	polygonal, differentiated in size	0·5—1·8	0·05—0·10	mural, 1—2 rows	0·2	horizontal, bent out	0·02—0·50	short, numerous
F. pseudoforbesi ohesaarensis KLAAMANN	polygonal, differentiated in size	0·8—1·8	0·05—0·2	mural, 1—2 rows	0·15	horizontal, slightly concave	0·2—0·5 0·5—1·0	short, thick, with broad bases
F. vicinalis KLAAMANN	polygonal, slightly elongate	0·7—2·0	0·05—0·15	mural, 1—2 rows	0·15—0·25	horizontal, slightly uneven	0·2—0·5 0·5—1·0	long, numerous, thick, with broad bases
E. pseudoforbesi pseudoforbesi SOKOLOV	polygonal	2·0—2·2	0·10—0·25	mural, very numerous, 2—3 rows	0·20—0·25	horizontal, uneven	0·2—0·5 0·5—1·0	short, numerous, directed upwards
F. opinabilis KLAAMANN	polygonal	0·5—2·5	0·5—1·0	mural, 1—2 rows	0·20—0·25	horizontal	0,20—0·25 0·50—1·20	short
F. subgothlandicus SOKOLOV	polygonal, regular	1·5—2·5	0·1	mural, 1—2 rows	0·3	horizontal, concave	0·3—0·7 0·7—1·0	very long
F. adaverensis SOKOLOV	polygonal, irregular	1—3	0·14	mural, 2 rows	0·15	horizontal	0·38—0·60 1·00—2·00	short
F. kogulaensis SOKOLOV	polygonal, differentiated, large surrounded by smaller	1—3	0·10—0·15	mural, 2 rows	0·25—0·30	horizontal, uneven	0·5—1·0 0·2—0·6	well developed, pointed
F. gothlandicus LAMARCK	polygonal, regular	2·5—3·0	0·1—0·2	mural, 1—3 rows	0·2	horizontal, slightly bent, thin	0·2—0·6 0·8—1·0	short
F. norvegicus n. sp.	polygonal, regular	3	0·2	mural, 1—3 rows	0·2	uneven, incomplete	0·3—0·7 0·8—1·0	very long, pointed, directed upwards, numerous
F. subfavosus KLAAMANN	polygonal, uniform	3·0—3·7	0·10—0·15	mural, surrounded by ridges, 1—2 rows	0·25—0·35	horizontal	0·5—1·0 1·0—2·0	short, thin
F. favosus (GOLDFUSS)	polygonal, regular	2·2—4·0	0·1—0·3	mural, 2 rows	0·3	horizontal, thin	0·5—1·0	not preserved
F. staermeri n. sp.	polygonal	3·5—4·0	0·20—0·35	mural, 1—2 rows	0·2	horizontal, convex, elevated	0·2—0·4 0·5—0·7	short, numerous, pointed, on walls and tabulae
F. kjerulfi n. sp.	polygonal	3·5—4·0	0·2	mural	0·20—0·25	horizontal, slightly concave or convex	0·3—0·5 0·7—2·0	short, pointed, numerous
F. favosiformis SOKOLOV	polygonal	2—5	0·10—0·15	mural	0·4	horizontal, uneven, thin	0·2—0·5 0·7—2·5	short
F. ingens KLAAMANN	polygonal	5—8	0·07—0·30	mural, 2—3 rows	0·5	horizontal, slightly concave, thin	0·5—1·0 1·3—3·5	short

Description. — Colony average in size, semicircular. Corallites polygonal, slightly differentiated, 0·5—1·5 mm in diameter. Walls about 0·1 mm thick. Pores somewhat elliptical, up to 0·2 mm in diameter, arranged in one row. Tabulae horizontal, occasionally slightly bent, spaced 0·1—0·3 mm and 0·4—1·0 mm apart. Septal spines not preserved.

Remarks. — *F. exilis* from the Polish erratic boulder differs from the specimens of the same species from Estonia in having more densely arranged tabulae and more distinctly pronounced zonation in their arrangement.

Distribution. — Poland: erratic boulders; Estonia: upper part of Llandovery or lower part of Wenlock.

Favosites favosiformis SOKOLOV, 1951

(Pl. XXI, Fig. 3 *a-b*)

1951*b*. *Favosites favosiformis* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 86-87, Pl. 33, Figs. 3-4.
1951*b*. *Favosites favosiformis* var. *globosa* SOKOLOV; B. S. SOKOLOV, *Ibid.*, pp. 88—89, Pl. 35, Figs. 3-4.
1964. *Favosites favosiformis* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., pp. 64-65, Pl. 18, Figs. 3-6.

Material. — Fragment of a colony from the erratic boulder of Poland (Z.Pal.T/III-7), fragment of a colony from Norway (PMO-58568); 2 thin sections of each specimen.

Description. — Corallites polygonal, 2—4 mm in diameter, largest of them reaching more than 5 mm. Walls 0·1—0·15 mm thick. Tabulae thin, horizontal, occasionally uneven, spaced 0·2—0·5 mm and 0·7—2·5 mm apart, depending of the zone. Zones of close arrangement narrow, composed of several tabulae only. Pores 0·4 mm in diameter. Septal spines short, not always preserved.

Remarks. — The investigated specimens from Norway and from the erratic boulders of Poland do not differ from the representatives of the species from Estonia.

Distribution. — Poland: erratic boulders; Norway: Malmøy, Wenlock, Stage 8b; Estonia: Upper Llandovery, Adavere Stage.

Favosites favosus (GOLDFUSS, 1826)

(Pl. XXI, Fig. 2*a-c*)

1826. *Calamopora favosa* GOLDFUSS; G. A. GOLDFUSS, Petrefacta Germaniae, p. 77, Pl. 27, Fig. 2.
1860. *Calamopora favosa* GOLDFUSS; F. ROEMER, Die silurische Fauna..., p. 18, Pl. 2, Fig. 8.
1881. *Favosites favosus* (GOLDFUSS); F. A. QUENSTEDT, Petrefactenkunde..., p. 6, Pl. 143, Fig. 1.
1937. *Favosites favosus* (GOLDFUSS); C. TEICHERT, Ordovician and Silurian..., p. 130, Pl. 7, Fig. 1.
1952*a*. *Favosites favosus* (GOLDFUSS); B. S. SOKOLOV, Tabuljaty..., pp. 31-32, Pl. 10, Figs. 3-5.
1955. *Favosites favosus* (GOLDFUSS); B. S. SOKOLOV, Tabuljaty..., pp. 31-32, Pl. 3, Figs. 1-2.
1963. *Favosites favosus* (GOLDFUSS); W. L. LELESHUS, Silurijskie tabuljaty..., pp. 168-169, Pl. 4, Figs. 1-4.
1964. *Favosites favosus* (GOLDFUSS); E. R. KLAAMANN, Pozdneordovikskie..., pp. 62-64, Pl. 16, Figs. 5-8.

Material. — Fragments of two colonies from Norway (PMO-42504, 45156); 2 thin sections of each specimen.

Description. — Colony flattened, oval. The preserved fragment 9 cm long, 8·5 cm wide, 3 cm high. Corallites polygonal, regular and rather uniform in shape, measuring 2·2—3·5 mm in diameter, occasionally up to 4 mm in diameter. Walls 0·1—0·3 mm thick. Pores arranged in two rows, 0·3 mm in diameter. Tabulae thin, horizontal, spaced 0·5—1·0 apart. Septal spines not preserved.

Remarks. — The colony investigated from Norway in all details resembles the specimens of *F. favosus* from Estonia. It differs only in having slightly thicker walls.

Distribution. — Norway: Ringerike, Vakerdal, Llandovery, Series 7; Malmøy, Llandovery, Series 7; Estonia: Upper Llandovery, Adavere Stage; Siberia: Llandovery; Pamir: Wenlock; Seravshanian—Gisarian Region: Wenlock; North America: Niagarian.

Favosites gothlandicus LAMARCK, 1816

(Pl. XXIII, Fig. 3*a-c*)

1816. *Favosites gothlandicus* LAMARCK; J. B. LAMARCK, Histoire..., p. 206.
1951*b*. *Favosites gothlandicus* LAMARCK; B. S. SOKOLOV, Tabuljaty..., pp. 78-86, Pl. 31, Figs. 4-6; Pl. 32, Figs. 1-3.
1952*a*. *Favosites gothlandicus* LAMARCK; B. S. SOKOLOV, Tabuljaty..., pp. 29-31, Pl. 10, Figs. 1-2.
1964. *Favosites gothlandicus* LAMARCK; E. R. KLAAMANN, Pozdneordovikskie..., pp. 5960, Pl. 18, Figs. 3-4.

Material. — Fragments of two colonies from the erratic boulders of Poland (Z.Pal. T/III-5,100), 4 colonies from Norway (PMO-54618-21), 6 thin sections of specimens Z.Pal. T/III-5,100, PMO-54620, 54621.

Description. — Colonies discoidal, low, average in size or large. The largest fragment 32 cm long, 29 cm wide, 14 cm high. Corallites polygonal, regular in shape, 2·5—3·0 mm in diameter. Walls straight, 0·1—0·2 mm thick. Intercorallites suture distinct, rather wide. Pores 0·2 mm in diameter, arranged in one or usually in two, but rarely in three rows. Distance between rows ranging 0·2—0·5 mm. Tabulae thin, horizontal or slightly bent, spaced 0·2—0·6 mm apart, in zones where closely arranged, beyond these zones 0·8—1·0 mm apart. Septal spines short.

Remarks. — Colonies from Norway and from the Polish erratics differ from those of Estonia in having smaller pores, which range up to 0·25 mm in diameter. Besides this, in the small colonies from Poland, angular pores are occasionally present. The occurrence of those pores may indicate the relatively recent differentiation of the *Favosites* species from genus *Mesofavosites*.

Distribution. — Poland: erratic boulders of Niechorze, near Kołobrzeg; Norway: Holmestrand, Bjerkøy, Llandovery, Stage 7a; Sweden: Silurian Island of Gotland; Estonia: Llandovery, upper part of Raikküla and Adavere Stages; Lower Wenlock of Novaya Zemlya; Vaigach, Taimyr, Severnaya Zemlya, Kazakhstan, Middle Asia, Urals, Podolia; Silurian of Czechoslovakia; England, North America and Australia.

Favosites ingens KLAAMANN, 1962

(Pl. XX, Figs. 1-4)

1962. *Favosites ingens* KLAAMANN; E. R. KLAAMANN, Rasprostranenie..., pp. 162-163, Pl. 5, Figs. 1-2.
1964. *Favosites ingens* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., p. 69, Pl. 18, Figs. 7-8.

Material. — Fragments of 5 colonies from Norway (PMO-42502, 43356, 44920, 44994-5); 2 thin sections of each specimen.

Description. — Colonies small, Corallites arranged radially from the centre and irregular in cross-section. Diameters of corallites ranging 5—8 mm, usually 4·5—6·0 mm. Large corallites very rarely occurring. Walls bent in places, 0·07—0·2 mm, occasionally 0·3 mm thick. Intercorallite suture distinct. Pores about 0·5 mm in diameter, arranged in two, rarely three rows,

spaced 0·9—1·0 mm apart. Tabulae thin, horizontal or slightly concave, spaced 0·5—1·0 mm apart in zones of close arrangement, beyond them spaced 1·3—2·5 mm, sometimes up to 3·5 mm apart. Zones of close arrangement rather wide. Septal spines short, rarely preserved.

Remarks. — Only one colony from Norway, Series 7, differs from the specimen known from Estonia, in having smaller diameters of corallites. All the other colonies from Norway have dimensions of corallites typical for the described species.

Distribution. — Norway: Ringerike, Rytteraker, Llandovery, Series 7; Malmøy, Ulvøy, Llandovery, Series 7; Malmøy, Malmøykalven, Llandovery, Substage 7bβ; Estonia: Upper Llandovery, lower part of Adavere Stage.

Favosites kogulaensis SOKOLOV, 1952

(Pl. XXIII, Fig. 1*a-b*)

1962. *Favosites kogulaensis* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 52-53, Pl. 20, Figs. 1-2.

Material. — Fragments of 4 colonies from erratic boulders, Poland (Z.Pal.T/III-20, 21, 111, 123); 2 thin sections of each specimen.

Description. — Colonies small, only one of them average in size, and semiglobular. Corallites polygonal, differentiated, 1·0—1·5 mm and 2·0—2·5 mm in diameter, occasionally reaching up to 3 mm in diameter, but usually 2·5 mm. Large corallites mostly polygonal, rather regular, often surrounded by smaller corallites. Small corallites usually triangular or quadrilateral, but when increasing in size reaching up to nine-sided. Walls 0·1 mm or 0·15 mm thick. Tabulae horizontal, slightly uneven, spaced 0·5—1·0 mm apart, in zones of close arrangement, beyond these zones 0·2—0·6 mm apart. Pores 0·25—0·3 mm in diameter, arranged in two rows. Septal spines well developed, pointed, not always preserved.

Distribution. — Poland: erratic boulders; Estonia: Ludlow, Paadla Stage.

Favosites lichenarioides SOKOLOV, 1952

(Pl. XXVI, Fig. 2*a-b*)

1952*a*. *Favosites lichenarioides* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 39-40, Pl. 14, Figs. 3-4.
1964. *Favosites lichenarioides* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., pp. 72-73.

Material. — Fragment of a colony from Island of Gotland (INB-1911); 4 thin sections.

Description. — Colony small. In cross-section, corallites polygonal, often semilunate in shape, as in genus *Alveolites*. Their diameters ranging 0·5—0·8 mm, occasionally up to 1 mm. Walls about 0·15 mm thick. Pores up to 0·2 mm in diameter. Tabulae horizontal, uneven, oblique, very loosely and not uniformly arranged, spaced 0·5—2·0 mm and up to 3 mm or more in zones where more loosely arranged.

Remarks. — The specimen from Island of Gotland is most close to the colony of this species from Estonia.

Distribution. — Sweden: Island of Gotland, Korpklint, Irevik, Wenlock; Estonia: Wenlock, lower part of Jaani Stage.

Favosites kjerulfi n. sp.

(Pl. XXI, Fig. 1*a-c*)

Type specimen: PMO-42506; Pl. XXI, Fig. 1*a-c*.
Type horizon: Silurian.
Type locality: Norway, Malmøy.
Derivation of the name: kjerulfi — in honour of Prof. THEODOR KJERULF, Oslo, Norway.

Diagnosis. — Colony large. Corallites polygonal, 3·5—4·0 mm in diameter. Walls up to 0·2 mm thick. Pores 0·2—0·25 mm in diameter. Tabulae horizontal, somewhat uneven, closely arranged in zones spaced 0·3—0·5 mm and 0·7—1·2 mm apart. Septal spines short, numerous.

Material. — Fragment of a colony from Norway (PMO-42506); 4 thin sections.

Description. — Fragment of colony 15 cm long and 6·5 cm high. Colony irregular in shape. Corallites perpendicular to surface of colony, in cross-section polygonal, 3·5—4·0 mm in diameter, rarely more. Walls even, usually 0·2 mm thick. Intercorallite suture distinct, wide. Pores 0·2—0·3 mm in diameter. Tabulae horizontal, slightly concave or convex, densely arranged, spaced in zones 0·3—0·5 mm and 0·7—1·2 mm apart. Septal spines short, pointed, numerous.

Remarks. — *F. kjerulfi* n. sp. resembles *F. jaaniensis* SOKOLOV, from Jaani Stage in Estonia, but differs from the latter in having smaller corallites, with thicker walls, more densely arranged tabulae, and more numerous septal spines.

Favosites mirandus SOKOLOV, 1952

(Pl. XXV, Fig. 1*a-b*)

1952*a*. *Favosites mirandus* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 44-45, Pl. 15, Figs. 1-4.
1964. *Favosites mirandus* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., p. 74.

Material. — Fragment of a colony from Island of Gotland (INB-867); 3 thin sections.

Description. — Corallites polygonal, with rounded angles, measuring 1·0—1·5 mm in diameter. Walls straight, 0·15—0·2 mm thick. Intercorallite suture distinct, emphasizing roundness of angles. Tabulae thin, usually concave, uneven, spaced in zones 0·3—0·6 mm apart and 0·8—2·0 mm apart. Pores 0·15 mm in diameter. Septal spines short; rarely preserved.

Remarks. — The specimen investigated from Island of Gotland does not differ from the colonies of *F. mirandus* from Estonia.

Distribution. — Sweden: Island of Gotland, Kopparsvik, Wenlock, Tofta Limestone with *Spongiostroma holmi*; Estonia: Wenlock, Jaagarahu Stage.

Favosites norvegicus n. sp.

(Pl. XXIII, Fig. 2*a-b*)

Type specimen: PMO-42505; Pl. XXIII, Fig. 2*a-b*.
Type horizon: Llandovery, Series 7 (?).
Type locality: Norway, Malmøy, Malmøykalven.
Derivation of the name: norvegicus — found in Norway.

Diagnosis. — Colony semiglobular, average in size. In cross-section corallites polygonal, up to 3 mm in diameter. Walls somewhat crenulated, 0·14 mm thick. Pores 0·2 mm in diameter, arranged in one or two rows. Tabulae horizontal, strongly uneven and incomplete, spaced

0·3—0·7 mm and 0·8—1·0 mm apart. Septal spines very long, reaching nearly at the centre of corallite, sharply pointed and bent upwards.

Material. — Fragment of a colony from Norway (PMO-42505); 3 thin sections.

Description. — Colony average in size, probably semiglobular in shape. The preserved fragment 7 cm long, 4 cm high. In cross-section, corallites polygonal, regular, up to 3 mm in diameter. Walls rather uneven, slightly undulated, up to 0·2 mm thick. Pores about 0·2 mm in diameter, sparse, arranged in one to three rows on the walls of corallites. Tabulae very uneven, often incomplete, spaced in zones 0·3—0·7 mm apart and 0·8—1·0 mm apart. Septal spines numerous, long, pointed, directed slightly upwards and reaching nearly to the centre of a corallite.

Remarks. — The most noteworthy character of *F. norvegicus* n. sp. is the presence of exceptionally long and numerous septal spines. Similar structures are known in *Palaeofavosites luxuriosus* KLAAMANN, from Adavere Stage of Estonia.

Favosites opinabilis KLAAMANN, 1962

(Pl. XXIV, Fig. 1*a-b*)

1962*a*. *Favosites opinabilis* KLAAMANN; E. R. KLAAMANN, Tabuljaty..., pp. 35-36, Pl. 4, Figs. 3-4; Text-fig. 4.

Material. — Fragment of a colony from the erratic boulder of Poland (Z.Pal.T/III-23); 2 thin sections.

Description. — Corallites polygonal, 0·5—1·0 and 2·0—2·2 mm in diameter; largest of them, rarely present, attaining 2·5 mm. Walls straight, occasionally slightly bent outwards, 0·5—1·0 mm thick. Intercorallite suture well visible. Pores 0·2—0·25 mm in diameter, arranged in one or two rows. Tabulae mostly horizontal, spaced 0·2—0·25 mm and 0·5—1·2 mm apart. Zones with more dense arrangement of tabulae, distinctly marked. Septal spines short, occasionally well preserved.

Remarks. — Colony of *F. opinabilis* from the Polish erratic boulder is nearly identical with those from Estonia.

Distribution. — Poland: erratic boulders; Estonia: Ludlow, Kaarma Stage (?); Novaya Zemlya: Ludlow.

Favosites pseudoforbesi pseudoforbesi SOKOLOV, 1952

(Pl. XXIV, Fig. 4*a-b*)

1952*a*. *Favosites pseudoforbesi* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 50-51, Pl. 19, Figs. 1-4.

Material. — Fragment of a colony from Island of Gotland (INB-1802); 3 colonies from the erratic boulders of Poland (Z.Pal.T/III-9, 49, 50); 2 thin sections of each specimen.

Description. — Colonies average in size, semicircular, irregular. Largest fragment 11 cm long, 10 cm wide, 7 cm high. Corallites polygonal, 2·0—2·2 mm in diameter. Young corallites about 0·5 mm in diameter. Intercorallite suture distinct, especially in colony from Island of Gotland. Walls 0·1—0·25 mm thick. Tabulae horizontal or uneven, spaced 0·2—0·5 mm apart and 0·5—1·0 mm apart. Zones with more dense arrangement of tabulae, wide. Colony from Island of Gotland has tabulae more uneven and occasionally more loosely spaced (up to 1—5 mm). Pores very numerous, up to three rows on the wall, 0·2—0·25 mm in diameter. Septal spines well developed, numerous, not very long, bent somewhat upwards.

Remarks. — The colony from Island of Gotland shows more uneven tabulae, which are occasionally provided with spines. In the latter characteristic, it differs from the colonies from Estonia.

Distribution. — Poland: erratic boulders; Sweden: Island of Gotland, Silurian; Estonia: Ludlow, Paadla Stage.

Favosites pseudoforbesi ohesaarensis KLAAMANN, 1962

(Pl. XXV, Fig. 3*a-b*)

1962*a*. *Favosites pseudoforbesi ohesaarensis* KLAAMANN, E. R. KLAAMANN, Tabuljaty..., pp. 41-42, Pl. 9, Figs. 1-4; Pl. 10, Figs. 1-2; Text-figs. 7-8.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-67); 2 thin sections.

Description. — Corallites differentiated in size, 0·8—1·0 mm and 1·5—1·8 mm in diameter. Walls straight, 0·2—0·3 mm thick. Pores 0·15 mm in diameter, arranged in one or two rows. Tabulae horizontal or slightly concave, spaced in zones 0·2—0·5 mm and 0·5—1·0 mm apart. Zones with dense arrangement, wide. Septal spines with broad bases, short and thick, occasionally preserved.

Remarks. — The specimen described above differs only a little from the colonies from Estonia, having its pores somewhat smaller in diameter.

Distribution. — Poland: erratic boulders; Estonia: Ludlow, probably Ohesaare Stage.

Favosites similis SOKOLOV, 1952

(Pl. XXV, Fig. 2*a-b*)

1952. *Favosites forbesi* var. *similis* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., pp. 49-50, Pl. 18, Figs. 3-4.
1962. *Favosites similis* SOKOLOV; E. R. KLAAMANN, Tabuljaty..., pp. 36-38, Pl. 6, Figs. 1-6; Text-fig. 5.

Material. — Fragments of 3 colonies from erratic boulders, Poland (Z.Pal.T/III-18, 22, 161); 2 thin sections of each specimen.

Description. — Colonies small. Corallites polygonal, differentiated in size, 0·5—1·7 mm, rarely 1·8 mm in diameter. Walls straight, 0·05—0·1 mm thick. Pores 0·2 mm in diameter, arranged in one or two rows. Tabulae horizontal or bent outwards spaced 0·02—0·5 mm apart. Zones with dense arrangement, wide. Septal spines short, numerous; traces of spines visible on longitudinal sections, in zones where tabulae are more densely arranged.

Remarks. — The specimens described here differ from the representatives of this species from Estonia in having larger pores and more densely arranged tabulae.

Distribution. — Poland: erratic boulders; Estonia: Ludlow, Kaarma and Paadla Stages.

Favosites stoermeri n. sp.

(Pl. XXII, Fig. 1*a-c*)

Type specimen: PMO-S 3610; Pl. XXII, Fig. 1*a-c*.
Type horizon: Llandovery, Substage 7$c\alpha$.
Type locality: Norway, Ringerike, Garnstangen.
Derivation of the name: stoermeri — in honour of Prof. LEIF STØRMER, Oslo, Norway.

Diagnosis. — Colony low. Corallites polygonal in cross-section, 3·5—4·0 mm in diameter. Walls 0·2—0·35 mm thick. Intercorallite suture distinct. Pores 0·2 mm in diameter, arranged in one or two rows. Tabulae horizontal, slightly convex, spaced 0·2—0·4 mm apart and 0·5—0·7 mm apart. Septal spines numerous, short, present both on walls and tabulae.

Material. — Fragment of a colony from Norway (PMO-S 3610); 4 thin sections.

Description. — Fragment of colony small. Colony low. Corallites vertically situated, polygonal, 3·5—4·0 mm in diameter. Walls straight, with well marked suture, 0·2—0·35 mm thick. Pores 0·2 mm in diameter, arranged in one or two rows. Tabulae horizontal, slightly convex, somewhat elevated, or often lowered at the walls, spaced 0·2—0·4 mm apart and 0·5—0·7 mm apart. Septal spines short, pointed, very numerous, present both on walls and on tabulae.

Remarks. — *F. stoermeri* n. sp. is close to *F. kalevi* KLAAMANN from Estonia, in having very numerous septal spines on the walls and on the tabulae. It differs, however, from the latter species in having smaller corallites and pores, as well as in the more dense arrangement of tabulae.

Favosites subfavosus KLAAMANN, 1962

(Pl. XXII, Figs. 2-3)

1962*a*. *Favosites subfavosus* KLAAMANN; E. R. KLAAMANN, Rasprostranenie..., pp. 160-161, Pl. 4, Figs. 3-4.
1964. *Favosites subfavosus* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., p. 62, Pl. 18, Figs. 1-2.

Material. — Fragments of 2 colonies from erratic boulders, Poland (Z.Pal.T/III-15,36); 2 thin sections of each specimen.

Description. — Corallites uniform, polygonal, 3·0—3·5 mm in diameter, rarely up to 3·7 mm. Walls straight, 0·1—0·15 mm thick. Intercorallite suture distinct. Pores surrounded by ridges, 0·25—0·35 mm in diameter, arranged in one or two rows, spaced 0·4—0·8 mm, sometimes as much as 2 mm apart. Tabulae horizontal, spaced 0·5—1·0 mm and 1—2 mm apart. Zones with dense arrangement of tabulae, narrow. Septal spines thin, poorly developed, their traces visible occasionally in longitudinal sections.

Remarks. — The specimens investigated are very similar to the representatives of the species from Estonia, but they show smaller pores.

Distribution. — Poland: erratic boulders; Estonia: Llandovery, upper part of Raikküla Stage.

Favosites subgothlandicus SOKOLOV, 1952

(Pl. XXIV, Figs. 2-3)

1952*a*. *Favosites subgothlandicus* SOKOLOV; B. S. SOKOLOV, Tabuljáty..., pp. 45-47, Pl. 17, Figs. 1-2.

Material. — Fragments of 4 colonies from erratic boulders, Poland (Z. Pal.T/III-6, 17, 31, 35); 1 thin section of specimens Nos. 17 and 31, 2 thin sections of each specimen No. 6 and No. 35.

Description. — Colony small. Corallites polygonal, regular, 1·5—2·5 mm in diameter, rarely somewhat larger. Walls about 0·1 mm thick, with distinct intercorallite suture. Pores up to 0·3 mm in diameter, arranged in one or two rows. Tabulae horizontal, or somewhat

concave, spaced 0·3—0·7 mm and 0·7—1·0 mm apart. Septal spines comparatively long, only occasionally visible.

Remarks. — The specimens from the erratic boulders of Poland are very close to the representatives of *F. subgothlandicus* from Estonia, but its corallites are somewhat larger.

Distribution. — Poland: erratic boulders; Estonia: Ludlow, Paadla Stage; Podolia. Close forms are also known from Middle Asia.

Favosites vicinalis KLAAMANN, 1962

(Pl. XXV, Fig. 4*a-b*)

1962. *Favosites vicinalis* KLAAMANN; E. R. KLAAMANN, Tabuljaty..., pp. 44-45, Pl. 10, Figs. 3-4; Text-fig. 11.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-12); 2 thin sections.

Description. — Fragment of colony very small; judged to have been irregular in shape. Corallites polygonal 0·7—1·7 mm in diameter, some of them slightly elongate and attaining 2 mm in diameter. Walls straight, occasionally slightly bent outwards, 0·05—0·15 mm thick. Intercorallite suture well visible, in places empasizes uneveness of walls. Pores 0·15—0·25 mm in diameter, arranged in one or two rows on wall of corallite. Tabulae horizontal, or slightly uneven, spaced 0·2—0·5 mm and 0·5—1·0 mm apart, sometimes up to 1·5 mm apart. Zones with close arrangement of tabulae, wide. Septal spines very numerous, thick and long, with broad bases.

Remarks. — The specimens from Poland and Estonia are nearly identical, but the form from the erratic boulder has its tabulae somewhat more loosely spaced.

Distribution. — Poland: erratic boulders; Estonia: Ludlow, upper part of Kaugatuma Stage.

Family SYRINGOLITIDAE WAAGEN & WENZEL, 1886

Genus **SYRINGOLITES** HINDE, 1879

Type species: Syringolites huronensis HINDE, 1879, Canada, Wenlock.

Diagnosis (after KLAAMANN, 1964). — Colonies massive, composed of closely adjoining, prismatic corallites. Connections between corallites in form of mural pores, arranged in vertical rows. Tabulae strongly bent downwards, mesially funnel-like, often with pronounced axial tubules. Septal apparatus in form of spines, situated also often on tabulae.

Distribution. — Wenlock—Ludlow. Wenlock of Baltic region and Island of Gotland; Silurian of Canada. So far, no representative of this genus has been found in the erratic boulders of Poland. On Island of Gotland only one species, *S. kunthianus* (LINDSTRÖM), was found.

Syringolites kunthianus (LINDSTRÖM, 1896)

(Pl. XXVI, Fig. 1*a-b*)

1896. *Roemeria kunthiana* LINDSTRÖM; G. LINDSTRÖM, Beschreibung..., pp. 14-17, Pl. 2, Figs. 19-25; Pl. 3, Figs. 26-29.
1933. *Roemeria kunthiana* LINDSTRÖM; K. TRIPP, Favositiden..., (part), pp. 130-131, Pl. 16, Fig. 3; Text-fig. 48.
1949. *Roemeria kunthiana* (LINDSTRÖM); B. S. SOKOLOV, Tabuljata..., p. 87, Pl. 8, Figs. 13-14.

1955. *Syringolithes kunthianus* (LINDSTRÖM); B. S. SOKOLOV, Tabuljaty..., Pl. 11, Figs. 1-5.
1961*b*. *Syringolites kunthianus* (LINDSTRÖM); E. R. KLAAMANN, Tabuljaty..., pp. 82-83, Pl. 8, Figs. 3-4; Text-fig. 2.
1964. *Syringolites kunthianus* (LINDSTRÖM); E. R. KLAAMANN, Pozdneordovikskie..., pp. 75-76, Pl. 11, Figs. 1-5.

Material. — Fragment of a colony from Island of Gotland (Z.Pal.T/IV-5); 4 thin sections.

Description. — Colony flat. Corallites polygonal, 1·7—2·4 mm in diameter. Walls 0·2—0·3 mm thick, occasionally 0·4 mm thick. Intercorallite suture very distinct. Pores 0·2—0·25 mm in diameter, arranged in one or two rows. Tabulae concave or funnel-like, visible sometimes on cross-sections, up to 0·5 mm in diameter, in form of a ring, which is not always centrally situated. Tabulae spaced 0·2—0·5 mm. Septal spines well developed, numerous, long, occurring both on walls as on tabulae.

Remarks. — The colony here described has slightly larger diameters of corallites than *S. kunthianus* from Estonia. However, it is most probable that the forms are conspecific.

Distribution. — Sweden: Island of Gotland, Visby Marl; Estonia: Wenlock, upper part of Jaani Stage.

Suborder **THAMNOPORINA** SOKOLOV, 1950

Family PACHYPORIDAE GERTH, 1921

Subfamily PARASTRIATOPORINAE TCHUDINOVA, 1959

Genus **PARASTRIATOPORA** SOKOLOV, 1949

Type species: Parastriatopora rhizoides SOKOLOV, 1949; Siberia, Llandovery.

Diagnosis (after TCHUDINOVA, 1959). — Colony composed of corallites with calyces widely conical. In axial parts of a colony, the thickenings of skeletal elements present, they are absent, however, on the periphery. Stereoplasma thickens strongly walls and tabulae and fills the space between them, forming stereozone. Mural and angular pores present. Number of the rows of pores up to 5. Septal spines well developed or absent. Tabulae horizontal, complete.

Distribution. — Llandovery—Upper Devonian, Llandovery—Wenlock of Siberia Baltic region, Timan, Arctic, Kolyma Basin; Ludlow—Couvinian of Urals, Kuznetsk Basin, Salair; Lower Silurian of Sweden (Island of Gotland); Lower Devonian of North America. Genus *Striatopora* occurs rarely in the erratic boulders of Poland.

Parastriatopora sokolovi SMIRNOVA, 1959

(Pl. XXVII, Fig. 1*a-b*)

1959. *Parastriatopora sokolovi* SMIRNOVA; M. S. ZHIZHINA & M. A. SMIRNOVA, Favositidy..., pp. 87-88, Pl. 12, Figs. 5-6.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-205); 2 thin sections.

Description. — Colony cylindrical, 4 cm in diameter. The preserved fragment, being a part of a branch, 7·5 cm long. In axial part of colony, corallites polygonal; triangular, 0·5 mm in diameter, quadrilateral 0·7 mm in diameter, but 7—8-sided 1·0—1·4 mm, or even up to 2 mm in diameter. Corallites trending gradually away from the axis of colony, their polygonal calyces, 2—3 mm in diameter, opening on to the surface. In central part of colony, walls of corallites 0·07 mm thick, but on the periphery thickened with stereoplasma — up to 0·7 mm. Thickness of stereoplasmatic ring occasionally reaching 1·3 mm, while the diameter of central

part of a colony, with thin walled corallites, reaches 0·8 mm. Pores fine, sparse, 0·14 mm in diameter. Tabulae very loosely spaced, horizontal, peripherally strongly thickened by deposition of stereoplasma. Septal spines developed only in peripheral part of a colony.

Remarks. — The specimen described above is very close to *P. sokolovi* from Taimyr, but has a much broader ring of stereoplasma.

Distribution. — Poland: erratic boulders; East Taimyr: Llandovery.

Subfamily PACHYPORINAE GERTH, 1921

Genus **PACHYPORA** LINDSTRÖM, 1873

Type species: Pachypora lamellicornis LINDSTRÖM, 1873; Sweden, Island of Gotland, Wenlock.

Diagnosis (after SOKOLOV, 1962). — Colony branched out, often in form of flat corks. Corallites directed obliquely to surface and opening by means of small calyces. Stereoplasma very characteristically developed: in peripheral zone compact, lamellar, with stratification parallel to the surface.

Distribution. — Wenlock of Baltic region, Sweden; Island of Gotland.

Pachypora lamellicornis LINDSTRÖM, 1873

(Pl. XXVII, Figs. 2*a-b*, 3)

1873. *Pachypora lamellicornis* LINDSTRÖM; G. LINDSTRÖM, Några..., p. 14.
1936. *Pachypora lamellicornis* LINDSTRÖM; M. LECOMPTE, Revision..., pp. 24-30, Pl. 4. Figs. 1-17; Pl. 5, Figs. 1-11.

Material. — Fragments of 4 colonies from Island of Gotland (INB-1786, 1819, 1840, 1925); 1 thin section of each specimen 1819, 1925, 2 thin sections of specimen 1786, 4 thin sections of specimen 1840.

Description. — Colony in form of flat and ramifying branches. Preserved fragment of large colony, 7 cm high, 2·5 cm wide, 3 mm thick. In cross-section, corallites polygonal, with thin walls. On the surface of a colony calyces 0·6—0·2 mm in diameter, with thick walls. Pores about 0·12 mm in diameter, spaced 0·5—1·0 mm apart. Tabulae thin, flat or slightly convex, spaced 0·2—2·0 mm apart.

Distribution. — Sweden: Island of Gotland, Högklint, Upper Visby Marl.

Subfamily THAMNOPORINAE SOKOLOV, 1950

Genus **THAMNOPORA** STEININGER, 1831

Type species: Thamnopora madreporacea STEININGER, 1831; Germany, Middle Devonian.

Diagnosis (after TCHUDINOVA, 1959). — Colony ramifying, composed of free, or fused cylindrical branches, sometimes massive. In cross-section, corallites polygonal, very rarely roundly-polygonal. Calyces cup-like, deep, with rounded or sharp lips. Stereoplasmatic thickening of corallite walls expanding gradually, from axial part of a colony to its periphery.

Pores well developed, usually arranged in one row on the corallite wall. Septal spines developed or absent. Tabulae complete, horizontal, occasionally oblique.

Distribution. — Silurian—Permian of Baltic region, Podolia, Siberia, Timan; Silurian, Upper Devonian of Urals, Arctic, Kazakhstan, Middle Asia, Kolyma Basin, Amur-river Basin, Chukotka; Carboniferous of Middle Asia; Silurian-Devonian of West Europe, Australia, China, South-West Asia, North America; Permian of Australia, Island of Timor, ?Japan.

Thamnopora? undvaensis KLAAMANN, 1961

(Pl. XXVII, Figs. 4-5)

1961. *Thamnopora? undvaensis* KLAAMANN; E. R. KLAAMANN, Tabuljaty..., pp. 84-85, Pl. 9, Figs. 3-4.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-158), fragment of a colony from Island of Gotland (INB-1852); 2 thin sections of each specimen.

Description. — Colonies elongate, about 15 mm in diameter. Corallites arranged radially, bent abruptly upwards and opening on the surface at an acute angle. In axial part, colony narrow (only 3—4 mm in diameter). In that part of colony, corallites 0·4—1·0 mm in diameter, while on periphery they reach 1·5 mm in diameter. Walls 0·05—0·1mm thick, or slightly more. Thickening of walls on peripheral part 0·4—0·5 mm. Intercorallite suture well visible. Tabulae horizontal, slightly concave, spaced 0·3—0·9 mm apart. Pores arranged in one row, 0·2 mm in diameter. In axial part, septal spines not visible, while numerous and arranged in vertical rows on periphery.

Remarks. — The material of *Thamnopora? undvaensis* is very scarce both in Estonia as in Poland. Therefore at the present time, it is not possible to decide whether the mentioned species should be assigned to the genus *Thamnopora.*

Distribution. — Poland: erratic boulders; Sweden: Island of Gotland, Högklint, Wenlock; Estonia: Wenlock, Jaani Stage.

Suborder **ALVEOLITINA** SOKOLOV, 1950

Family ALVEOLITIDAE DUNCAN, 1872

Genus **SUBALVEOLITES** SOKOLOV, 1955

Type species: Subalveolites panderi SOKOLOV, 1955; Estonia, Wenlock, Jaani Stage.

Diagnosis (after KLAAMANN, 1964). — Colonies tubercular, loaf-like, pear-shaped, or in form of thick cork. Corallites small, curving, usually strongly inclined, coming out on the surface of a colony at an acute angle. In cross-section, strongly flattened, semilunate or elliptical. Walls thin along the whole length. Septal spines short, well developed, present only on the lower wall; in central row, spines usually larger. Pores situated at the angles of corallites. Tabulae thin, horizontal.

Distribution. — Silurian—Devonian; Silurian of Baltic region, Sweden (Island of Gotland), Podolia, Siberia, Middle Asia; rarely occurring in Devonian.

Subalveolites callosus KLAAMANN, 1964

(Pl. XXVIII, Fig. 5)

1962*a*. *Alveolites* sp.; E. R. KLAAMANN, Tabuljaty..., p. 51, Pl. 13, Figs. 5-6.
1964. *Subalveolites callosus* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., pp. 87-88, Pl. 25, Figs. 9-10.

Material. — Fragment of a colony from Island of Gotland (Z.Pal.T/IV-34); 2 thin sections.

Description. — Preserved fragment of colony small, in form of plate, about 4 cm thick. In cross-section, corallites elliptical or circular, flattened, coming out on the surface at an acute angle. Calyces narrow, elongate, pocket-shaped, with thin, overlapping lips. Corallites 0·2—0·3 mm high, 0·5—0·7 mm in diameter. Walls uniform, usually 0·15 mm thick, occasionally reaching 2 mm. Angular pores 0·1 mm in diameter. Tabulae thin, horizontal, spaced 0·2—0·7 mm apart. Septal spines short, mostly only one present in centre of lower wall.

Remarks. — The specimen investigated does not show any differences from the colony of the same species from Estonia.

Distribution. — Sweden; Island of Gotland; Estonia; Upper Wenlock, Lower Ludlow, Jaagarahu, Paadla and probably Ohesaare Stages.

Subalveolites panderi SOKOLOV, 1955

(Pl. XXVIII, Fig. 4*a-b*)

1955. *Subalveolites panderi* SOKOLOV; B. S. SOKOLOV, Tabuljaty..., p. 186, Pl. 31, Figs. 1-2, Text-fig. 185.
1961*b*. *Subalveolites panderi* SOKOLOV; E. R. KLAAMANN, Tabuljaty..., pp. 85-86, Pl. 8, Fig. 5.
1964. *Subalveolites panderi* SOKOLOV; E. R. KLAAMANN, Pozdneordovikskie..., pp. 85-86, Pl. 25, Figs. 1-3.

Material. — Seven fragments of colonies from Island of Gotland (RM-45599, INB-1826, 1881, 1947, Z.Pal.T/IV-1, 30, 35); 2 thin sections of each specimen.

Description. — Corallites strongly flattened, in cross-section bent, elliptical, 0·8—1·0 mm in diameter, 0·3—0·5 mm high. Walls 0·05—0·1 mm thick, usually 0·1 mm. Intercorallite suture well pronounced. Angular pores about 0·1 mm in diameter. Tabulae horizontal, or oblique, spaced 0·3—0·8 mm apart. Septal spines short, situated on lower convex walls.

Remarks. — The specimens described do not differ from the colonies of the same species from Estonia.

Distribution. — Sweden: Island of Gotland, Korpklint; Estonia: Upper Llandovery-Wenlock, Adavere and Jaani Stages; Siberia, Wenlock.

Subalveolites sokolovi KLAAMANN, 1961

(Pl. XXVIII, Fig. 3)

1961*b*. *Subalveolites sokolovi* KLAAMANN; E. R. KLAAMANN, Tabuljaty..., pp. 86-87, Pl. 9, Figs. 1-2.
1964. *Subalveolites sokolovi* KLAAMANN; E. R. KLAAMANN, Pozdneordovikskie..., p. 87, Pl. 25, Figs. 7-8.

Material. — Fragments of 3 colonies from Island of Gotland (Z.Pal.T/IV-2,INB-2012, 2029); 2 thin sections of each specimen.

Description. — Corallites opening obliquely on the surface, flattened, small, 0·8—1·0 mm in diameter and 0·2—0·25 mm high. Walls about 0·05 mm thick. Pores 0·1 mm in diameter. Septal spines in form of short projections on the convex wall, only preserved in some corallites. Tabulae horizontal, or slightly oblique, spaced 0·2—0·8 mm apart.

Remarks. — The specimens described do not differ from colonies of the same species from Estonia.

Distribution. — Sweden: Island of Gotland; Estonia: Wenlock, upper part of Jaani Stage.

Genus **SUBALVEOLITELLA** Sokolov, 1955

Type species: Subalveolitella repentina Sokolov (Sokolov, 1955, p. 186), north edge of Siberian platform, Moiero river, Llandovery.

Diagnosis (after Klaamann, 1964). — Colonies elongate, finger-shaped or twig-like, occasionally somewhat swollen, tubercular. Corallites small coming out perpendicularly onto the surface, or in twig-like colonies, at an acute angle. In axial part of a colony, walls slightly thicker than on periphery, and corallites sometimes more regular, polygonal. In outer part of a colony, corallites slightly flattened, what causes their alveolitid appearance. Pores fine; tabulae thin, horizontal, oblique or concave. Septal spines short and usually sparse.

Distribution. — Upper Llandovery, Adavere Stage of Estonia; Llandovery—Wenlock of Siberia; Silurian of Sweden (Island of Gotland); erratic boulders of Poland.

Subalveolitella majuscula Klaamann, 1962

(Pl. XXVIII, Fig. 2*a-b*)

1962*b*. *Subalveolitella majuscula* Klaamann; E. R. Klaamann, Rasprostranenie..., pp. 168-169, Pl. 8, Figs. 4-5.
1964. *Subalveolitella majuscula* Klaamann; E. R. Klaamann, Pozdneordovikskie... pp. 89-90, Pl. 26, Figs. 7-8.

Material. — Fragment of colony from erratic boulder, Poland (Z.Pal.T/III-203), fragment of 4 colonies from Island of Gotland (Z.Pal.T/IV-3, INB-1820, 1857, 1876); 1 thin section of each specimen: 3 and 1876; 2 thin sections of each of the remaining specimens.

Description. — Colonies branch-shaped, small, more than 4 cm high, about 1·5 cm wide. Corallites radially arranged, in cross-section polygonal, rather regular, 0·5—0·8 mm in diameter, some of them attaining 1 mm. Intercorallite suture well visible. Tabulae thin, bent outwards or oblique, spaced 0·3—0·7 mm apart, sometimes up to 1·5 mm apart. Pores about 0·1 mm in diameter, sparse. Septal spines short (poorly preserved).

Remarks. — The specimens described above do not differ from colonies of the same species from Estonia.

Distribution. — Poland: erratic boulders; Sweden: Island of Gotland; Estonia: Llandovery, lower part of Adavere Stage.

Family COENITIDAE Sardeson, 1896

Subfamily COENITINAE Sardeson, 1896

Genus **COENITES** Eichwald, 1829

Type species: Coenites juniperinus Eichwald, 1829; erratic boulders of Lithuania.

Diagnosis (after Klaamann, 1964). — Colonies in form of thin branches. Corallites in abaxial part of a colony polygonal, with clearly visible intercorallite suture. Walls rapidly and uniformly thickening during growth of corallite. Corallites opening onto the surface at an acute angle, forming arched, bent, sickle-shaped or slit-like outlets. Pores sparse. Tabulae horizontal and oblique. Septal projections usually arranged along a row on lower edge of calyx and corresponding side of corallite.

Distribution. — Wenlock-Upper Devonian; Silurian of Baltic region; ?Wenlock of Sweden (Island of Gotland; Wenlock of Norway; Silurian-Devonian of Urals, Siberia, Middle Asia, Kazakhstan, Devonian of Russian platform, Transcaucasus; Silurian—Devonian of West Europe, Australia, North America.

Coenites juniperinus EICHWALD, 1829

1829. *Coenites juniperinus* EICHWALD; C. E. EICHWALD, Zoologia..., p. 179.
1839. *Linaria clathrata* LONSDALE; W. LONSDALE, Corals..., p. 692, Pl. 16bis, Fig. 7 (non STEININGER).
1851. *Coenites juniperinus* EICHWALD; H. MILNE-EDWARDS & J. HAIME, Monographie..., pp. 301—302.
1854. *Coenites juniperinus* EICHWALD; H. MILNE-EDWARDS & J. HAIME, A monograph..., p. 276, Pl. 65, Figs. 4, 4*a*.
1860. *Coenites juniperinus* EICHWALD; C. E. EICHWALD, Lethaea..., p. 457.
1879. *Coenites juniperinus* EICHWALD; H. A. NICHOLSON, On the structure..., p. 134, Pl. 6, Figs. 5, 5*b*.
1897. *Coenites juniperinus* EICHWALD; F. ROEMER, Lethaea..., pp. 444-445; Text-fig. 105.
1899. *Coenites juniperinus* EICHWALD; L. LAMBE, A revision..., pp. 27-28.
1915. *Coenites juniperinus* EICHWALD; R. S. BASSLER, Bibliographie..., p. 255.
1964. *Coenites juniperinus* EICHWALD; E. R. KLAAMANN, Pozdneordovikskie..., pp. 92-94, Pl. 27, Figs. 3-5; Text-fig. 15.

Material. — Several colonies from Norway embedded in sediment consolidated (PMO-39367); 2 thin sections.

Description. — Colonies in form of thin branches dichotomously diverging, 1·5—4·0 mm in diameter, more than 14 mm long. Corallites opening on the surface at an acute angle, in cross-section corallites polygonal in axial part, 0·25—0·3 mm in diameter. Intercorallite suture clearly visible. Outlets on the surface of a colony narrowed slit-likely, forming characteristic shape, described as „bird in flight". Outlets up to 0·6 mm wide, 0·2 mm high. Septal structure present only inside outlets in form of two triangular teeth, situated on lower lip and a longer tooth on upper lip. Mural pores sparse and fine, less than 0·1 mm in diameter. Tabulae horizontal or inclined, loosely spaced.

Remarks. — There exist no differences between the colonies described here and those of the same species known from Estonia.

Distribution. — Norway: Ringerike, Sønsterud, Series 8; Estonia: Upper Wenlock, upper part of Jaagarahu Stage; England: Wenlock; North America: Wenlock.

Order **SYRINGOPORIDA** SOKOLOV, 1962

Family SYRINGOPORIDAE NICHOLSON, 1879

Genus **SYRINGOPORA** GOLDFUSS, 1826

Type species: Syringopora ramulosa (GOLDFUSS, 1826, p. 76, Pl. 25, Fig. 7), Germany, Carboniferous (designated by EDWARDS and HAIME, 1850, p. 62).

Diagnosis (after SOKOLOV and TESAKOV, 1963). — Colony bushy, composed of cylindrical corallites, with walls average in thickness. Corallites connecting by tubules, which lack definite orientation; tabulae numerous and exclusively funnel-shaped. Septal spines arranged in vertical rows and usually well developed.

Remarks. — Genus *Syringopora* often occurs in erratic boulders. Some species, described from erratic boulders of Poland, are known from Wenlock and Ludlow of Estonia, while the others are new. This genus is rather rare in the Upper Visby Marl, Wenlock, of Island of Gotland. In Norway, it was found in Series 8 and 9.

MORPHOLOGICALLY-COMPARATIVE TABLE OF *SYRINGOPORA* GOLDFUSS AND *MULTITHECOPORA* YOH

Species	Diameters of corallites (in mm)	Distance between corallites (in mm)	Thickness of walls (in mm)	Diameters of connecting tubules (in mm)	Tabulae	Diameters of axial tubules (in mm)	Distance between tabulae (in mm)	Septa
Syringopora parviformis n. sp.	0·8—1·0	0·3—1·0	0·20—0·38	0·4—0·5	funnel-shaped	0·3	0·2—0·5	short
S. parva n. sp.	1·0—1·1	0·2—1·3	0·1—0·2	0·5	funnel-shaped	0·2—0·3	0·2—0·5	numerous
S. schmidtiformis n. sp.	1·2—1·3	0·1—1·0	0·1—0·2	0·4—0·5	funnel-shaped	0·3	0·2—0·6	short
S. schmidti TCHERNYCHEV	1·2—1·5	0·2—2·0	0·15—0·30	0·6—1·0	funnel-shaped	?	0·2—0·6	long
S. crassa n. sp.	1·3—1·5	0·6—1·6	0·38	0·6	funnel-shaped	0·3	0·1—0·3	thick
S. blandaeformis n. sp.	1·5—1·7	0·2—1·0	0·07—0·10	0·3—0·7	funnel-shaped	0,3	0·2—0·7	short, densely arranged
S. multifaria KLAAMANN	1·5—1·8	0·1—1·5	0·2—0·3	1·0	funnel-shaped	0·5	0·5—0·7	well developed, on walls and tabulae
S. polonica n. sp.	1·7—1·9	0·5—1·3	0·2—0·7	0·7	funnel-shaped	0·3	0·2—0·5	short, densely arranged
S. blanda KLAAMANN	1·8—2·0	0·1—1·5	0·1—0·2	0·8—1·0	funnel-shaped	0·5	0·2—0·7	short, on walls and tabulae
S. novella KLAAMANN	1·8—2·0	1·0—3·0	0·3—0·38	0·9	funnel-shaped	0·5	0·3—0·7	long, numerous, on walls and tabulae
S. norvegica n. sp.	2·4—2·6	0·0—3·0	0·2—0·3	1·5	funnel-shaped	0·8	1·6—1·3	fairly long
S. lindstroemiformis n. sp.	2·3—2·7	1·5—7·0	0·2—0·3	1·0	funnel-shaped	0·5—0·7	0·3—1·1	short
S. maxima n. sp.	2·6—3·2	0·2—1·5	0·3—0·5	1·0—1·2	funnel-shaped	0·8	0·3—0·5 0·9—1·2	short, densely arranged, with broad bases
Multithecopora norvegica n. sp.	2·6—3·0	0·1—2·3	2·0	0·6—1·0	slightly concave	—	rare	long, numerous

Distribution. — Upper Ordovician of Urals; Silurian of Baltic region, Podolia, Siberia; Wenlock of Sweden (Island of Gotland); Wenlock—Ludlow of Norway; Silurian-Carboniferous of Urals, Kuznetsk Basin, Kazakhstan, Middle Asia, Kolyma Basin, Arctic; Devonian of Russian platform, Transcaucasus; Carboniferous of Moscow Basin, Donetz Basin; Lower Permian of Timan and Urals; Silurian—Carboniferous of West Europe, North America, China, South-west Asia, Australia; erratic boulders of Poland.

Syringopora blanda KLAAMANN, 1962

(Pl. XXX, Fig. 1*a-b*)

1962. *Syringopora blanda* KLAAMANN, E. R. KLAAMANN, Tabuljaty..., pp. 56-58, Pl. 20, Figs. 1-6; Text-fig. 19.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-134), 5 colonies from Norway (PMO-48280, 48281, 48301, 49359, 49379); 2 thin sections of each specimen.

Description. — Colonies bushy, semicircular. The largest fragment preserved 8·2 wide, 7·8 cm high. Corallites 1·8—2·0 mm in diameter. Distance between them 0·1—1·0 mm, rarely 1·5 mm. Walls 0·1—0·2 mm thick. Tubules connecting corallites 0·8—1·0 mm in diameter, densely arranged. Tabulae funnel-shaped with axial tubule, which is about 0·5 mm in diameter. Tabulae passing into tubules connecting corallites. Tabulae spaced 0·2—0·7 mm apart. Septal spines short, often present on walls and sometimes on tabulae.

Remarks. — The colonies from Norway, from the Polish erratic boulders and from Estonia are nearly identical; in Norwegian colonies, however, corallites are not so densely arranged.

Distribution. — Poland: erratic boulders; Norway: Ringerike, Storøy, Ludlow, Stage 9a, Malmøy, Langøy, Llandovery, Stage 7a; Estonia: Ludlow, Kaugatuma Stage.

Syringopora blandaeformis n. sp.

(Pl. XXX, Fig. 3*a-b*)

Type specimen: Z.Pal.T/III-166; Pl. XXX, Fig. 3*a-b*.
Type horizon and locality: Erratic boulder of indetermined age (Ordovician or Silurian), Oborniki, Poland.
Derivation of the name: blandaeformis — similar to *S. blanda* KLAAMANN.

Diagnosis. — Corallites 1·5—1·7 mm in diameter, spaced 0·2—1·0 mm apart. Walls 0·07—1·7 mm thick. Tubules connecting corallites 0·3—0·7 mm in diameter. Tabulae funnel-shaped, with axial canal up to 0·3 mm wide. Septal spines short, densely arranged.

Material. — Fragments of 2 colonies from the erratic boulders of Poland (Z.Pal.T/III-166, 188); 3 thin sections of each specimen.

Description. — Corallites 0·5—0·7 mm in diameter, cylindrical, slightly bending, spaced densely 0·2—0·3 mm apart, rarely 0·5—0·7 mm apart, and exceptionally 0·8—1·0 mm apart. Walls 0·07—0·1 mm thick, provided with thin epitheca. Tubules connecting corallites short, 0·3—0·7 mm in diameter. Tabulae thick, funnel-shaped, with axial canal about 0·3 mm wide, in places slightly wider. Tabulae 0·2—0·7 mm apart, at the walls. Septal spines short (poorly preserved) in longitudinal sections visible in form of rows of densely arranged points.

Remarks. — The new species described here is most similar to *S. blanda* KLAAMANN, but differs, however, in having smaller and more densely arranged corallites, thinner walls and connecting tubules, as well as a narrower axial canal.

Distribution. — Poland: erratic boulders from Oborniki and Śrem.

Syringopora crassa n. sp.

(Pl. XXXII, Fig. 4*a-b*)

Type specimen: Z.Pal.T/III-1962; Pl. XXXII, Fig. 4*a-b*.
Type horizon and locality: Erratic boulder of indetermined age (Ordovician or Silurian) from Mochty, Poland.
Derivation of the name: crassa, Lat. *crassus* = thick; having thick walls.

Diagnosis. — Colony small, low. Corallites cylindrical 0·3—1·5 mm in diameter, spaced 0·6—1·6 mm apart. Walls 0·38 mm thick, Epitheca thin. Tubules connecting corallites 0·6 mm in diameter. Tabulae thick, funnel-like, spaced 0·1—0·3 mm apart at the walls, with axial canal 0·3 mm wide. Septal spines rather thick, of average length.

Material. — Fragments of 2 colonies from the erratic boulders of Poland (Z.Pal.T/III-168, 1962); 2 thin sections of each specimen.

Description. — Colony small, low. Corallites cylindrical, bending, 1·3—1·5 mm in diameter, loosely arranged, 0·6—1·6 mm apart. Walls up to 0·38 mm thick, sometimes slightly thinner. Epitheca thin, rarely visible. Fine structure of walls well preserved. Connecting tubules thick-walled, 0·5 mm in diameter. Tabulae thick, funnel-like, forming axial canal 0·3 mm wide. They are densely spaced, 0·1—0·3 mm apart at the walls. Septal spines thick, comparatively long, rarely preserved.

Remarks. — *Syringopora crassa* n. sp. is in some ways similar to *S. schmidti* TCHERNYCHEV. It differs, however, from the latter in having more densely arranged corallites, thicker walls, septal spines and tabulae, which are also more closely spaced.

Distribution. — Poland: erratic boulders from Oborniki and Mochty.

Syringopora maxima n. sp.

(Pl. XXIX, Fig. 1*a-b*)

Type specimen: Z.Pal.T/III-112; Pl. XXIX, Fig. 1*a-b*).
Type horizon and locality: Erratic boulder of indetermined age (Ordovician or Silurian), Oborniki, Poland.
Derivation of the name: maxima, Lat. *maximus* = *species* with largest corallites.

Diagnosis. — Corallites 2·6—3·2 mm in diameter, spaced 0·2—1·5 mm. Walls 0·3—0·5 mm thick. Epitheca thin. Connecting tubules 1·0—1·2 mm in diameter. Tabulae funnel-like, with axial canal 0·5 mm in diameter, at the walls 0·3—1·2 mm apart. Septal spines short, with broad bases, densely arranged in vertical rows.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-112); 3 thin sections.

Description. — The preserved fragment is too small for the original size and shape to be estimated. Corallites cylindrical, 2·6—3·2 mm in diameter, usually very closely situated, sometimes in contact or spaced 0·2—0·5 mm, even 1·5 mm apart. Epitheca very thin, fine structure well preserved, wall-margin occasionally undulate. Connecting tubules rather wide, thick-walled, with tabulae passing through them. Tabulae funnel-like, with canal 0·8 mm in diameter, spaced 0·3—0·5 mm apart at the wall, sometimes 0·9—1·2 mm apart. Septal spines short, with broad bases, densely arranged in vertical rows, visible in longitudinal sections.

Remarks. — *Syringopora maxima* n. sp. has larger diameters of its corallites than all other species. Also, the corallites are crowded and their walls are very thick.

Syringopora lindstroemiformis n. sp.

(Pl. XXIX, Fig. 2*a-b*)

Type specimen: Z.Pal.T/III-114; Pl. XXIX, Fig. 2*a-b*.
Type horizon and locality: Erratic boulder of indetermined age (Ordovician or Silurian), Puck, Poland.
Derivation of the name: lindstroemiformis — species similar to *S. lindstroemi* TCHERNYCHEV, 1938.

Diagnosis. — Corallites 2·3—2·7 mm in diameter, 1·2—4·0 mm apart. Walls 0·2—0·3 mm thick. Connecting tubules 0·1 mm wide. Epitheca thin. Tabulae funnel-like with axial canal, 0·5—0·7 mm wide. Tabulae 0·3—1·1 mm apart at the walls. Septal spines short.

Material. — Fragments of 2 colonies from the erratic boulders of Poland (Z.Pal.T/III-114); 2 thin sections of each specimen.

Description. — Shape and size of colonies indeterminate because of small dimensions of fragments. Corallites cylindrical 2·3—2·7 mm in diameter, spaced loosely 1·5—2·0 mm or 3·3—3·7 mm apart, sometimes 7 mm apart. Epitheca thin. Walls more or less uniformly thick 0·2—0·3 mm. Fine structure poorly preserved. Connecting tubules broad, up to 1 mm. Tabulae funnel-like, with canal 0·5 mm or sometimes 0·6—0·7 mm wide. Tabulae at the walls 0·3—1·1 mm apart. Septal spines short, badly preserved, rarely visible.

Remarks. — The species described above is close to *S. lindstroemi* TCHERNYCHEV, but differs from the latter in its considerably looser arrangement of corallites, smaller diameters of the connecting tubules, shorter septal spines and more crowded tabulae.

Syringopora polonica n. sp.

(Pl. XXXI, Fig. 2*a-b*)

Type specimen: Z.Pal.T/III-73, Pl. XXXI, Fig. 2*a-b*.
Type horizon and locality: Erratic boulder of indetermined age, Oborniki, Poland.
Derivation of the name: polonica — found in Poland.

Diagnosis. — Corallites 1·7—1·9 mm in diameter, spaced 0·5—1·3 mm apart. Walls variably thick, ranging 0·2—0·7 mm. Tabulae funnel-like, with axial canal, 0·3 mm wide. Septal spines short, densely arranged in vertical rows.

Material. — Fragment of a colony from erratic boulder, Poland (Z.Pal.T/III-73); 2 thin sections.

Description. — Preserved fragment of colony very small. Corallites cylindrical, 1·5—1·7 mm in diameter, spaced 0·5—0·6 mm apart, often more loosely (1·0—1·3 mm apart). Walls exceptionally variable in thickness, ranging 0·2—0·7 mm, as do the walls in *Multithecopora*; at the same time, central canal narrows to a thin slit, 0·2 mm in diameter. Epitheca also variable in thickness, depending on thickness of walls. Connecting tubules 0·7 mm in diameter. Tabulae funnel-like, with axial canal, 0·3 mm in diameter. Tabulae 0·2—0·5 mm apart at the walls. Septal spines short, densely arranged in vertical rows.

Remarks. — The new species described above differs from all the other known species in having a wall-structure similar to that found in the genus *Multithecopora*, having at the same time a structure of tabulae typical for *Syringopora*.

Syringopora multifaria KLAAMANN, 1962

(Pl. XXXI, Fig. 1*a-b*)

1962. *Syringopora multifaria* KLAAMANN; E. R. KLAAMANN, Tabuljaty..., pp. 53-55, Pl. 15, Figs. 3-7; Text-fig. 17.

Material. — Fragment of a colony from Island of Gotland (INB-726), fragments of 6 colonies from Norway (PMO-S. 3675, S. 3676, S. 3678, S. 3679, 42506, 47008), fragments of 7 colonies from the erratic boulders of Poland (Z.Pal.T/III-1, 21, 28, 29, 106, 113, 167); 2 thin sections of each specimen.

Description. — Colony average in size, semicircular or bushy. Corallites 1·5—1·8 mm in diameter, spaced 0·1—1·5 mm apart. Walls 0·2—0·25 mm thick, sometimes up to 0·3 mm. Connecting tubules 1 mm in diameter. Tabulae funnel-shaped, spaced 0·5—0·7 mm apart at the walls. Axial canal 0·5 mm in diameter. Septal spines well-developed, situated on walls, and sometimes on tabulae.

Remarks. — The colonies investigated are nearly identical with those from Estonia.

Distribution. — Poland: erratic boulders; Sweden: Island of Gotland; Norway: Ringerike Bragsøy, Stage 8c; Estonia: Ludlow, Paadla Stage, possibly also Kaugatuma Stage.

Syringopora novella KLAAMANN, 1961

(Pl. XXX, Fig. 2*a-b*)

1961. *Syringopora novella* KLAAMANN; E. KLAAMANN, Tabuljaty..., pp. 95-96, Pl. 13, Figs. 1-2.

Material. — Fragment of colony from erratic boulder, Poland (Z.Pal.T/III-113), and 4 colonies from Island of Gotland (INB-1766, 1782, 1784, 2006); 2 thin sections of each specimen.

Description. — Colonies small, bushy. In cross-section, corallites circular, 1·8—2·0 mm in diameter, spaced 1—3 mm apart. Walls 0·3—0·38 mm thick, well-preserved, with thick epitheca. Connecting tubules 0·9 mm in diameter, spaced 1—3 mm apart. Tabulae funnel-like, 0·3—0·7 mm apart at the walls. Axial canal 0·5 mm in diameter. Septal spines long, rather numerous, positioned on walls and tabulae.

Remarks. — The specimens investigated do not differ from representatives of the same species from Estonia.

Distribution. — Poland: erratic boulders; Sweden: Island of Gotland, Wenlock, between Kopparsvik and Högklint, Upper Visby Marl; Luseklint, Wenlock, Upper Visby Marl; Estonia: Wenlock, upper part of Jaani Stage, Jaagarahu Stage.

Syringopora norvegica n. sp.

(Pl. XXIX, Fig. 3*a-b*)

Type specimen: PMO-49492, Pl. XXIX, Fig. 3*a-b*.
Type horizon: Ludlow, Series 9.
Type locality: Langøy, Holmestrand, Norway.
Derivation of the name: norvegica — found in Norway.

Diagnosis. — Corallites 2·4—2·6 mm in diameter, 0·3 mm apart. Walls 0·2—0·3 mm thick. Connecting walls about 1·5 mm in diameter. Tabulae funnel-like, with axial canal up to 0·8 mm in diameter. Septal spines fairly long.

Material. — Fragment of a colony from Norway (PMO-49492); 6 thin sections.

Description. — Colony bushy, average in size. It is nearly complete, 11 cm long, 5 cm wide, 10 cm high. Corallites curving, cylindrical, 0·4—2·6 mm in diameter, spaced variably 0·0—0·15 mm, 0·6—1·5 mm, 2·7—3·0 mm. Walls 0·2—0·3 mm thick, sometimes slightly thicker. Epitheca thin. Edge of wall occasionally crenulated. Connecting tubules up to 1·5 mm in diameter. Tabulae funnel-like, thin, forming axial canal usually 0·8 mm in diameter. Tabulae spaced at the walls 0·6—1·3 mm apart, maximal distance prevailing. Septal spines fairly long, densely arranged in vertical rows. Their bases often visible in longitudinal sections.

Remarks. — *Syringopora norvegica* n. sp. is somewhat similar to *S. blanda* KLAAMANN, but differs, however, in having larger diameters of corallites, which are also more loosely spaced, thicker connecting tubules, and more loosely spaced tabulae, which form wider canal.

Syringopora parva n. sp.

(Pl. XXXII, Fig. 3 *a-b*)

Type specimen: Z.Pal.T/III-43; Pl. XXXII, Fig. 3*a-b*.
Type horizon and locality: Erratic boulder of indetermined age (Ordovician or Silurian), Ustka, Poland.
Derivation of the name: parva, Lat. *parvus* = species with small corallites.

Diagnosis. — Corallites 1·0—1·1 mm in diameter, 0·3—1·3 mm apart. Walls 0·1—0·2 mm thick. Connecting tubules 0·5 mm in diameter, 1·0—1·5 mm apart. Tabulae funnel-shaped with axial canal, 0·2—0·3 mm in diameter.

Material. — Fragments of 5 colonies from the erratic boulders of Poland (Z.Pal.T/III-1, 9, 43, 44, 110, 164); 3 thin sections of each specimen.

Description. — Colony small, bushy. Best preserved fragment is 4·5 cm wide, 3 cm thick, 14·3 cm high. Corallites cylindrical, slightly curving, 1·0—1·1 mm in diameter, 0·2—1·3 mm apart. Walls 0·1—0·2 mm thick, with thin epitheca. Connecting tubules 0·5 mm thick, 1·0—1·5 mm apart. Tabulae thin, funnel-like, with axial canal 0·2—0·3 mm wide, 0·2—0·3 mm apart at the walls, sometimes up to 0·5 mm apart. Septal spines pointed, densely arranged in vertical rows, clearly visible in the longitudinal sections.

Remarks. — The new species described above is in some ways similar to *S. affabilis* KLAAMANN, bur differs from the latter in having larger and more densely spaced corallites, thicker walls, more densely spaced connecting tubules, but looser tabulae. The septal spines in *S. parva* are more densely packed as well.

Distribution. — Poland: erratic boulders from Ustka, Oborniki and Puck.

Syringopora parviformis n. sp.

(Pl. XXXII, Fig. 1 *a-b*)

Type specimen: Z.Pal.T/III-147; Pl. XXXII, Fig. 1*a-b*.
Type horizon and locality: Erratic boulder of indetermined age (Ordovician or Silurian), Oborniki, Poland.
Derivation of the name: parviformis — similar to *Syringopora parva* n. sp.

Diagnosis. — Corallites 0·8—1·0 mm in diameter, 0·3—1·0 mm apart. Walls 0·2—0·38 mm thick. Connecting tubules 0·4—0·5 mm wide, spaced at 0·8—1·0 mm. Tabulae funnel-like, with axial canal about 0·3 mm in diameter.

Material. — Colony from erratic boulder, Poland (Z.Pal.T/III-147); 2 thin sections.

Description. — Colony small, 5·5 cm long, 4 cm wide, 4 cm high. Corallites radially arranged, 0·8—0·9 mm, rarely up to 1 mm in diameter. Distance between corallites ranging 0·2—0·5 mm, occasionally 1 mm. Walls 0·2—0·3 mm thick, often even up to 0·38 mm thick, and in such a case, lumena of corallites narrow. Epitheca fairly thick. Fine structure well-preserved. Tubules connecting corallites 0·4—0·5 mm in diameter, spaced more or less uniformly, 0·8—1·0 mm apart. Tabulae funnel-like, with axial canal 0·3 mm in diameter. Tabulae 0·2—0·3 mm apart at the walls, occasionally 0·5 mm apart. Septal spines short, poorly preserved in longitudinal sections, bases of septal spines visible, in form of points arranged in vertical rows.

Remarks. — *Syringopora parviformis* n. sp. is similar to *S. parva* n. sp. It differs, however, from the latter in the smaller diameters of its corallites, which are also more closely arranged, as well as in its thicker walls, which are similar to those of *S. polonica* n. sp.

Syringopora schmidti TCHERNYCHEV, 1937

(Pl. XXXI, Fig. 3*a-b*)

1937. *Syringopora schmidti* TCHERNYCHEV; B. B. TCHERNYCHEV, Verchnesilurijskie..., pp. 93-94, Pl. 9, Figs. 2*a*, 2*b*.
1938. *Syringopora schmidti* TCHERNYCHEV; B. B. TCHERNYCHEV, O nekotorych..., p. 123, Pl. 6, Figs. 4*a*, 4*b*.
1962. *Syringopora schmidti* TCHERNYCHEV; E. R. KLAAMANN, Tabuljaty..., pp. 52-53; Text-fig. 16.

Material. — Fragments of 7 colonies from erratic boulders, Poland (Z.Pal.T/III-4, 12, 19, 24, 131, 1953, 1958); 2 thin sections of each specimen.

Description. — Colonies bushy, small. Corallites cylindrical 1·2—1·5 mm in diameter, 0·2—1·0 mm, occasionally up to 2 mm apart. Walls 0·15—0·3 mm thick. Walls covered with fairly thick epitheca. Connecting tubules 0·6—0·9 mm in diameter, occasionally up to 1 mm, spaced 0·8—3·0 mm apart. Tabulae funnel-like, with axial tubule, 0·2—0·6 mm apart at the walls. Septal spines long, often arranged in vertical rows, occasionally well preserved.

Remarks. — The colonies here described are very similar to Silurian specimens from Novaya Zemlya, described by TCHERNYCHEV. Colonies of the same species, known from Estonia, have slightly thinner walls than those of the specimens from the Polish erratic boulders.

Distribution. — Poland: erratic boulders; Estonia: Ludlow, Paadla Stage, Novaya Zemlya, Island of Dolgoy, Bolshezemelskaya Tundra, Silurian.

Syringopora schmidtiformis n. sp.

(Pl. XXXII, Fig. 2*a-b*)

Type specimen: Z.Pal.T/III-72, Pl. XXXII, Fig. 2*a-b*.
Type horizon and locality: Erratic boulder of indetermined age (Ordovician or Silurian), Oborniki, Poland.
Derivation of the name: schmidtiformis — similar to *Syringopora schmidti* TCHERNYCHEV.

Diagnosis. — Corallites 1·2—1·3 mm in diameter, radially arranged, spaced 0·1—1·0 mm apart. Walls 0·1—0·2 mm thick. Connecting tubules 0·4—0·5 mm in diameter, spaced 0·5—1·0 mm apart, at most 1·5 mm apart. Tabulae funnel-shaped, forming axial canal. Septal spines short, densely arranged in vertical rows.

Material. — Fragments of 2 colonies from erratic boulders, Poland (Z.Pal.T/III-72, 5130); 2 thin sections of each specimen.

Description. — Colony bushy, 9 cm long, 6·5 cm wide, 9·5 cm high. Corallites cylindrical, 1·2—1·3 mm in diameter, rarely slightly larger. Walls fairly uniform in thickness, ranging 0·1—0·2 mm, with thin epitheca. Connecting tubules 0·4—0·5 mm, occasionally 0·6 mm in diameter, spaced variably 0·5—1·0 mm, rarely up to 1·5 mm apart. Tabulae funnel-like, with axial canal up to 0·3 mm in diameter. Tabulae spaced 0·2—0·3 mm at the walls, occasionally 0·5—0·6 mm apart. Septal spines short, perfectly preserved, their bases arranged closely in vertical rows.

Remarks. — The new species described here is close to *Syringopora schmidti* TCHERNYCHEV. It differs in having smaller, more closely arranged and thinner walls, and connecting tubules, which are more loosely arranged. The septal spines of *S. schmidtiformis* n. sp. are also shorter than those in the other species.

Family MULTITHECOPORIDAE SOKOLOV, 1950

Genus **MULTITHECOPORA** YOH, 1927

Type species: Multithecopora penchiensis YOH, 1927; China, Middle Carboniferous.

Diagnosis. — Corallites cylindrical, connected by thin and scarce tubules. Walls very thick, with layered structure, which limits the central cavity to a narrow channel, the diameter of which equals from a half up to one fifth of the total corallite diameter. Tabulae thin, concave, not funnel-like. Septal spines faintly developed.

Remarks. — The genus *Multithecopora* YOH occurs in Norway, at Series 7, as well as in erratic boulders in Poland. Up to now it was known only from the Carboniferous. The genus is widely distributed in Eurasia.

Distribution. — Silurian, Llandovery of Norway, upper part of Lower Carboniferous—Upper Carboniferous of Donetz Basin, Moscow Basin, Urals, Timan, Middle Asia, Taimyr; Middle Carboniferous—Upper Carboniferous of China, Iran, South Europe, Spitsbergen, North America; erratic boulders, Poland.

Multithecopora norvegica n. sp.

(Pl. XXXIII, Figs. 1 *a,b*, 2)

Type specimen: PMO-61028, Pl. XXXIII, Fig. 2.
Type horizon: Llandovery, Stage 7*b*.
Type locality: Rytteraker, Ringerike, Norway.
Derivation of the name: norvegica — found in Norway.

Diagnosis. — Colony bushy, large. Corallites cylindrical, 2·6—3·0 mm in diameter, spaced 0·1—2·3 mm apart. Connecting tubules 0·6—1·0 mm in diameter, without tabulae. Walls up to 2 mm thick. Epitheca 0·15 mm thin. Tabulae slightly concave. Septal spines numerous, arranged in vertical rows, not reaching central cavity of corallite.

Material. — Colony from erratic boulder, Poland (Z.Pal.T/III-89), 2 colonies from Norway (PMO-61028, 72259); 3 thin sections of specimen 89, 2 sections of specimen 61028, 5 sections of specimen 72259.

Description. — Colonies bushy, large, the largest of them, incomplete, 18 cm long, 10 cm wide, 12·5 cm high. Corallites slightly curving, cylindrical, 2·6—3·0 mm in diameter, occasionally

slightly broader. Walls thick, with concentrical structure typical for this genus. Thickness of walls mostly 1·2 mm, the lumen of corallite being at the same time limited to a narrow slit, only 0·3 mm in diameter. Epitheca 0·15 mm thin, with radial structure. Connecting tubules 0·6—1·0 mm in diameter, loosely spaced, without tabulae. Tabulae slightly concave, fairly thick, only occasionally visible. Septal spines long, though probably not reaching centre of visceral chamber. They are thick and clearly visible on walls. Their bases visible at epitheca. In longitudinal section, septal spines distinct, in form of densely arranged, vertical rows of spots.

Remarks. — Up to now, the genus *Multithecopora* was recorded exclusively from the Carboniferous. There is no doubt, that the colonies described above should be assigned to *Multithecopora*. This genus was for the first time found in the Silurian.

Distribution. — Poland: erratic boulders; Norway: Ringerike, Rytteraker Stages 7a-b.

Order **AULOPORIDA** Sokolov, 1962

Family ROMINGERIIDAE Sokolov, 1950

Genus **FAVOSIPORA** n. gen.

Type species: Favosipora clausa (Lindström, 1865), Sweden, Island of Gotland, Visby; Wenlock.

Derivation of the name: Favosipora — Lat. *favus* = honey comb; *porus* = pore; pores occurring in intercorallite walls.

Diagnosis — as for the type species. Genus by monotypy.

Favosipora clausa (Lindström, 1865)

(Pl. XIII, Figs. 1-4)

1865. *Favosites clausus* Lindström; G. Lindström, Några..., p. 12.
1879. *Vermipora clausa* (Lindström); H. A. Nicholson, On the structure..., pp. 13-14, Pl. 6, Figs. 1*a-b*.
1896. *Favosites clausus* Lindström; G. Lindström, Beschreibung..., pp. 7-14, Pl. 1, Figs. 9-12; Pl. 2, Figs. 13-18.

Diagnosis. — Colony small, in places ramose, in others massive. Corallites loosely arranged, or connected together as in the genus *Favosites*. Walls 0·1—0·4 mm thick. Angular pores 0·1 mm in diameter, present only in corallites, the walls of which are connected together. Septal spines short and numerous.

Material. — Fragments of 19 colonies (RM-Cn. 18031-35, 18038-40, 18043, 18044, 18046, 18048-50, 18088-92); 2 thin sections of specimen Cn. 18035, 3 thin sections of specimen Cn. 18041, 4 thin sections of specimen Cn. 18044.

Description. — Colony ramose, massive in places, irregular, comparatively small; largest form of all described in the present paper is 5 cm high, 5 cm wide, 2·5 cm thick. Colony begins with a corallite of auloporid type. Corallites loosely arranged or connected closely together, forming assemblages similar to those found in *Favosites*. According to their arrangement within a colony, they are rounded or polygonal in cross-section. Corallites up to 1·6 mm in diameter, with uneven walls, 0·1—0·3 mm thick. Fine structure of walls radial, epitheca thin, dark line between connected corallites clearly visible. Tabulae uneven, convex, occasionally incomplete, often visible in calyces with concentric structure, having small convexity in centre. Sometimes, in middle of a tabula, other, incomplete tabula arise, which is present on the surface in form of small elevation. Tabulae 0·2—0·4 mm apart. Angular pores round, 0·1 mm in dia-

meter, absent in corallites loosely arranged. Septal spines numerous, short, pointed, not always preserved.

Remarks. — HALL (1874) established a bryozoan genus *Vermipora*, to which some representatives of Tabulata had also been assigned, which were close to *Romingeria* NICHOLSON, 1879. HALL assigned to *Vermipora* the species *V. clausa*, which had been earlier described by LINDSTRÖM (1865, 1896) as *Favosites clausus*. The latter writer regarded the calcareous, concentric structures with a convexity in the middle, visible inside the damaged calyces, as lids covering them. The present author, while investigating the numerous colonies of this species, has shown that they are tabulae, visible in calyces, when their walls are damaged. They can be seen also in well preserved calyces, after the removal of the infilling sediment. These tabulae have a concentric structure and a small convexity at the centre, which can also be seen in longitudinal sections.

The structure of a colony shows that *Favoipora clausa* is close to the representatives of Romingeriidae, in which the corallites in places form assemblages similar to colonies of *Favosites*.

In both species, pores are present in corallites connected with their walls, but are absent in the corallites, which are loosely arranged. The presence of pores is characteristic for the representatives of this family.

The occurrence of loosely arranged corallites lacking pores calls for the assignment of Romingeriidae to within the Auloporida. On the other hand, however, the fine structure of the walls, and of the septal spines which are their extensions, as well as an occurrence of angular pores, puts *Favosipora* n. gen. close to *Palaeofavosites* TWENHOFEL.

Distribution. — Sweden: Island of Gotland, Visby, Östergarn; Wenlock.

Family FLETCHERIIDAE ZITTEL, 1876

Genus **FLETCHERIA** MILNE-EDWARDS & HAIME, 1851

Type species: Fletcheria tubifera MILNE-EDWARDS & HAIME, 1851, Sweden, Island of Gotland; Silurian.

Diagnosis (after SOKOLOV). — Colony ramose; corallites strongly differentiated, cylindrical, closely attached in places, becoming irregularly polygonal; walls thin, sclerenchyme lamellar. Septal apparatus in form of thin, sometimes incontinuous lamellae. Tabulae horizontal. Budding usually of calycal type; it can be tetrameric.

Distribution. — Upper Ordovician—Silurian of Urals, Arctic, Kolyma Basin, Tchukotka; Silurian of Sweden.

Fletcheria tubifera MILNE-EDWARDS & HAIME, 1851

(Pl. XXXIII, Figs. 3*a-b*, 4)

1837. *Syringopora?*; W. HISINGER, Lethaea..., p. 96, Pl. 27, Fig. 3.
1851. *Fletcheria tubifera* MILNE-EDWARDS & HAIME; H. MILNE-EDWARDS & J. HAIME; Monographie..., p. 300, Pl. 14, Fig. 5.
1897. *Fletcheria tubifera* MILNE-EDWARDS & HAIME; F. ROEMER, Lethaea..., p. 488-489, Pl. 9, Fig. 10.
1955. *Fletcheria tubifera* MILNE-EDWARDS & HAIME; B. S. SOKOLOV, Tabuljaty..., p. 228.
1962. *Fletcheria tubifera* MILNE-EDWARDS & HAIME; B. S. SOKOLOV, Osnovy..., p. 247.

Material. — Fragments of 3 colonies from Island of Gotland (RM-19099, 21081, 21082); 3 thin sections of specimen No. 19099, 2 thin sections of specimen 21082.

Description. — Colonies ramose, small, fragment of largest one 7 cm high, 5 cm wide, 2·3 cm thick. Corallites cylindrical, loosely arranged, or connected together. Corallites usually oval, sometimes more rounded in cross-section. Young corallites, developing in maternal calyces, are at first round in cross-section. Later they fill up the calyx completely and the cross-section becomes oval. Adult corallites usually retain this shape, and only occasionally become round. Longer diameters of corallites ranging up to 5 mm, shorter ones 3·5 mm. Walls up to 0·8 mm thick; where connected with adjoining corallites much thinner, only 0·2 mm thick. Fine structure of wall radial, epitheca thin. Tabulae thin, horizontal slightly concave, occasionally incomplete, spaced 0·5—1·5 mm. No septal spines. Budding of intracalycal type with five offsets formed in one calyx. Maternal calyx gradually disappears.

Remarks. — MILNE-EDWARDS and HAIME (1851) assigned genus *Fletcheria* to the subfamily Halysitinae. Later on, its systematic position was a subject of controversy. Some writers, such as BILLINGS (1859), FROMENTEL (1861), ROMINGER (1876), ROEMER (1897) and WEISSERMEL (1939), regarded *Fletcheria* as a representative of the Tabulata, close to *Syringopora*, *Halysites*, or to the family Favositidae. However, LINDSTRÖM (1876), KIAER (1930), OKULITCH (1937), RUKHIN (1938), LANG, SMITH and THOMAS (1940) assigned *Fletcheria* to within the Tetracoralla. More recently, LECOMPTE (1952) placed this genus in the family Lichenariidae, while SCHIMER and SHROCK (1944) included it in the Schizocoralla.

ZITTEL (1867) established the new family Fletcheriidae for genus *Fletcheria*, and IVANOV (1950) and SOKOLOV (1950) confirmed his view.

SOKOLOV (1955, 1962), in his consideration of the systematic position of *Fletcheria*, stated that this „genus" comprises at least three different genera. Thus, this family clearly needs revision.

A detailed investigation of colonies of *Fletcheria tubifera* from Gotland has proved that their structure is that typical for the Tabulata. The lack of pores and the small size of the colonies show that the species in question is close to representatives of order Auloporida. In the colonies described in the present paper, septa were not preserved. Judging, however, from descriptions of MILNE-EDWARDS & HAIME (1851), and ROEMER (1897), it seems that they are typical for the Tabulata but not for Tetracoralla. The only doubtful feature is intracalycal budding, never found in Tabulata. It follows that revision of all known species appears necessary.

Distribution. — Sweden, Island of Gotland, Stora Carlsö and Lilla Carlsö, Wenlock, Slite Group.

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ALPHABETICAL INDICES

I. INDEX OF AUTHORS

II. PALAEONTOLOGICAL INDEX

Systematic names cited only are indicated by *italic*, and names accompanied by descriptions are indicated by roman letters.

Numerals which indicate the page, on which the species is cited only, are standart; numerals, which indicate pages with descriptions, are **bold.**

Numerals denoted with asterisks (*) indicate pages with figures.

PLATES

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE I

Page

Fig. 1. *Sarcinula rakverense* SOKOLOV (INB-1758): *a* cross-section, ×10; *b* tangential section, ×10; *c* longitudinal section, ×10. Sweden, Island of Gotland 41

Fig. 2. *Catenipora arctiformis* n. sp. (INB-1800): longitudinal section, ×5. Sweden, Island of Gotland, Högklint, Upper Visby Marl. Holotype. 42

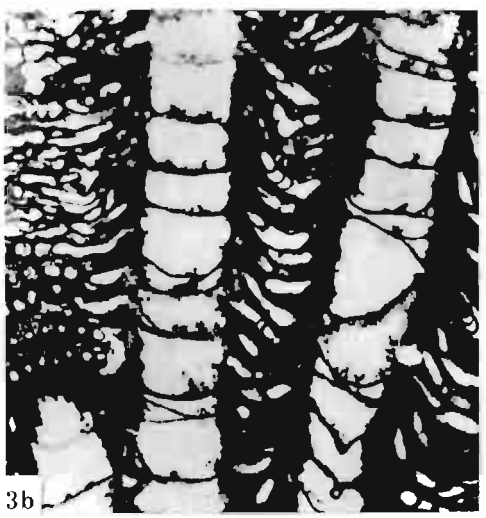
Fig. 3. *Sarcinula luhai* SOKOLOV (Z.Pal.T/III-108): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, Obor-niki, erratic boulder 40

Fig. 4. *Sarcinula organum* (LINNAEUS) (Z.Pal.T/III-55): cross-section, ×5. Poland, erratic boulder 41

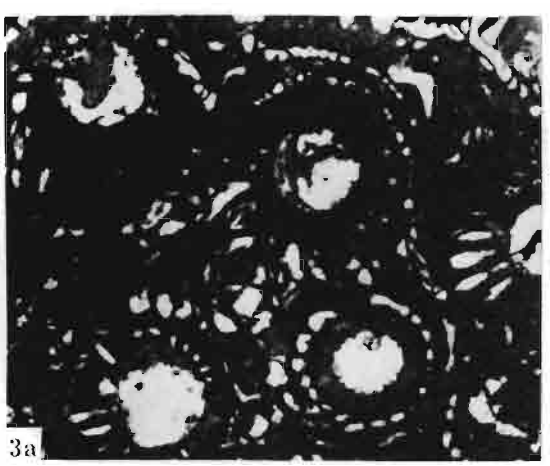

1c


1b


2


3b


1a


3a


4

PLATE II

Page

Fig. 1. *Catenipora jarviki* n. sp. (RM-19997): *a* cross-section, ×10; *b* longitudinal section, ×10. Sweden, Island of Gotland, Visby. Holotype 47

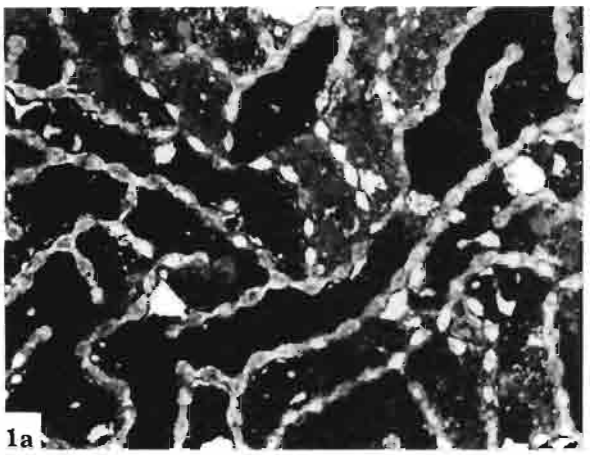
Fig. 2. *Catenipora regnelli* n. sp. (RM-Cn. 20004): *a* surface of colony, ×4; *b* cross-section, ×4; *c* longitudinal section, ×5. Sweden, Island of Gotland, Visby, Wenlock. Holotype. 52

Figs. 3-4. *Catenipora llandoverensis* n. sp. (PMO-43617). Norway, Malmøy, Substage $7a_3$ 51

Fig. 3. Cross-section, ×10. Holotype.

Fig. 4. Longitudinal section, ×10.

Fig. 5. *Catenipora quadrataeformis* n. sp. (PMO-52100): *a* cross-section, ×5; *b* longitudinal section, ×4. Norway, Asker, Stage 6*a*. Holotype. 54


1a

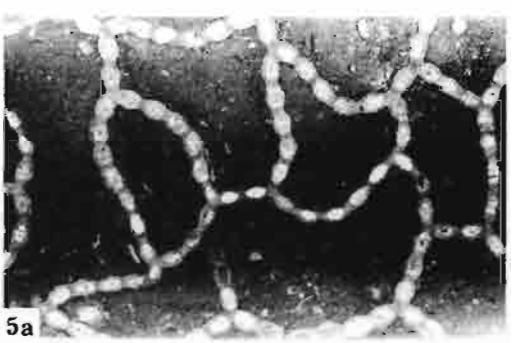

1b


2c


3


4


5b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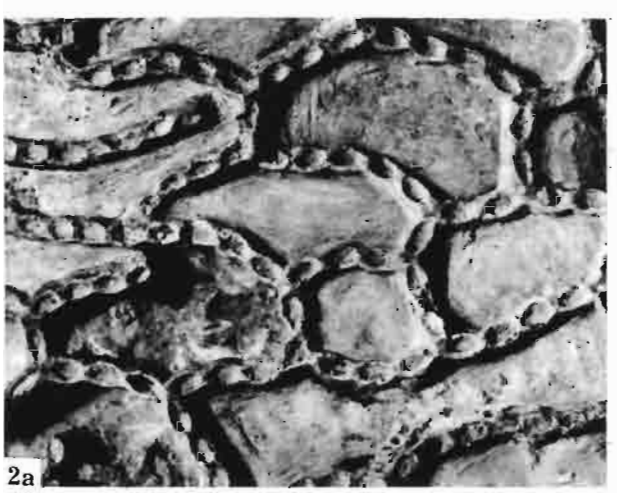
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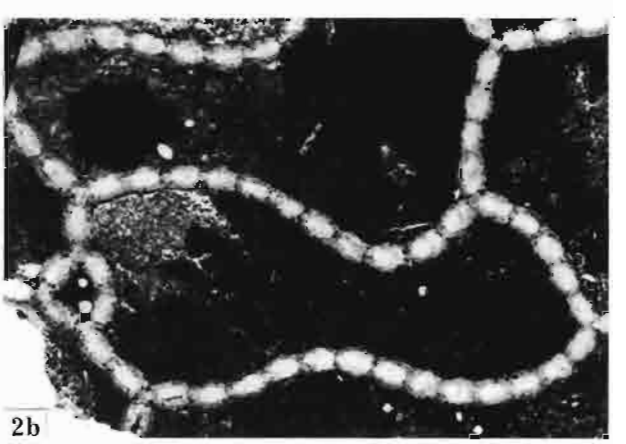

2b

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE III

Page

Figs. 1-2. *Catenipora heintzi* n. sp. 45

Fig. 1. Cross-section (PMO-47481), ×10. Norway, Ringerike, Sønsterud, Substage 8d. Holotype.

Fig. 2. Longitudinal section (Z.Pal.T/III-79), ×12. Poland, erratic boulder.

Figs. 3-4. *Catenipora quadrata* (FISCHER-BENZON) 53

Fig. 3. Longitudinal section (INB-1804), ×10. Sweden, Island of Gotland, Wenlock, Upper Visby Marl.

Fig. 4. *a* upper surface of colony, ×4; *b* cross-section, ×10; (INB-1779). Sweden, Island of Gotland, Kopparsvik, Lower Visby Marl.

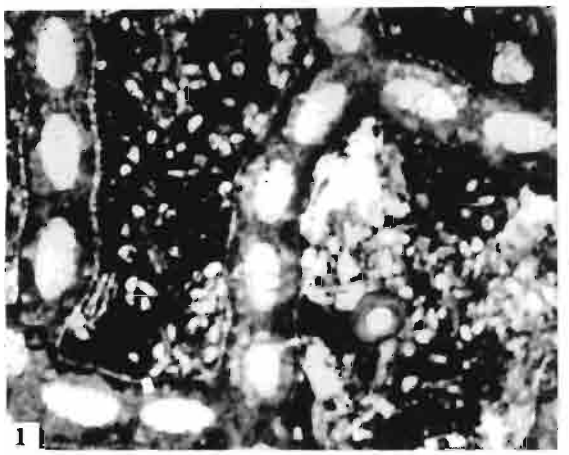
Figs. 5-8. *Catenipora escharoides* LAMARCK 44

Fig. 5. Cross-section (Z.Pal.T/III-90), ×10. Poland, erratic boulder.

Fig. 6. Cross-section (Z.Pal.T/III-49), ×10. Poland, erratic boulder.

Fig. 7. Longitudinal section (RM-19964), ×10. Sweden, Island of Gotland, Tofta, Nyrivsudden.

Fig. 8. Upper surface of colony (Z.Pal.T/IV-4), ×3. Sweden, Island of Gotland, Visby, Wenlock.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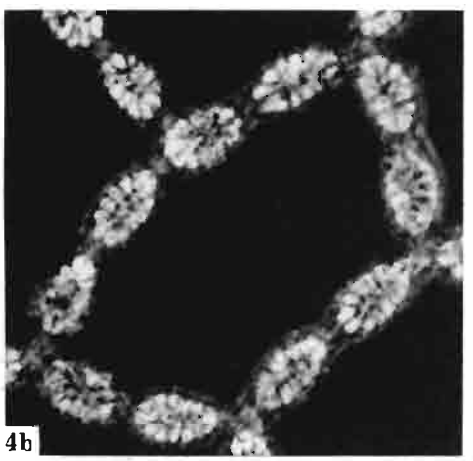
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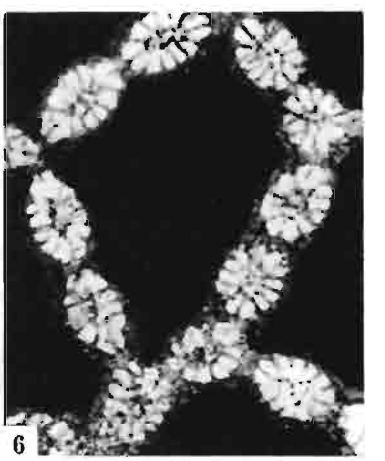
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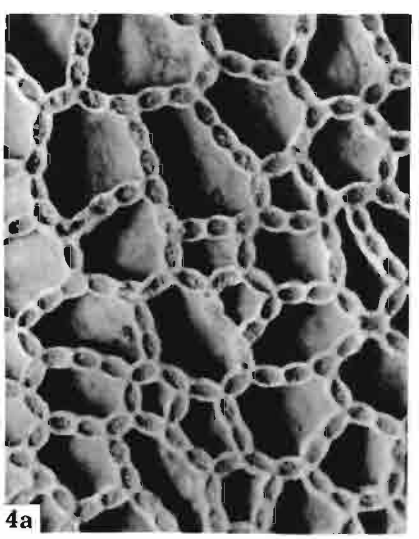
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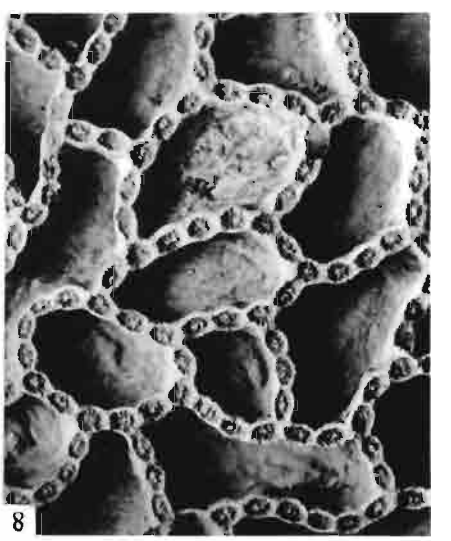
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE IV

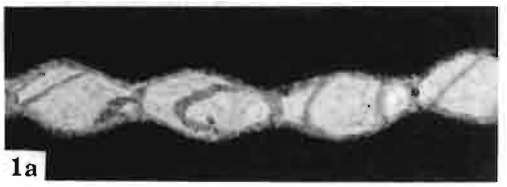
Page

Fig. 1. *Catenipora hedei* n. sp. (INB-1924): *a* cross-section, ×5; *b* longitudinal section, ×10. Sweden, Island of Gotland, Silurian. Holotype 46

Fig. 2. *Catenipora maxima* (FISCHER-BENZON) (Z.Pal.T/III-116): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, erratic boulder 48

Fig. 3. *Catenipora vespertina* KLAAMANN (Z.Pal.T/III-57): *a* cross-section, ×5; *b* longitudinal section (oblique), ×10. Poland, Oborniki, erratic boulder. 56

Fig. 4. *Catenipora ringerikensis* n. sp. (PMO-61027): *a* cross-section, ×5; *b* longitudinal section, ×5. Norway, Ringerike, Rytteraker, Substage 7b. Holotype 54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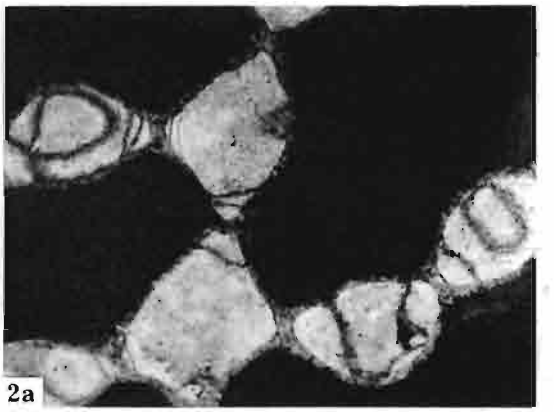
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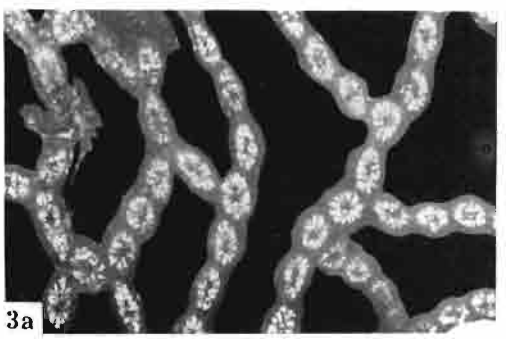
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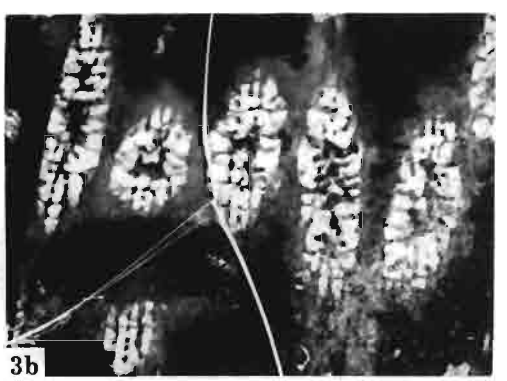
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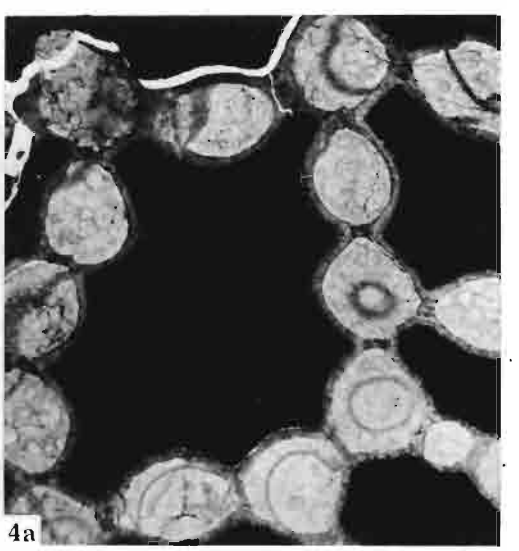
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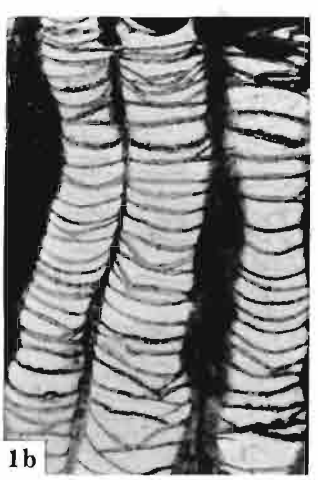
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

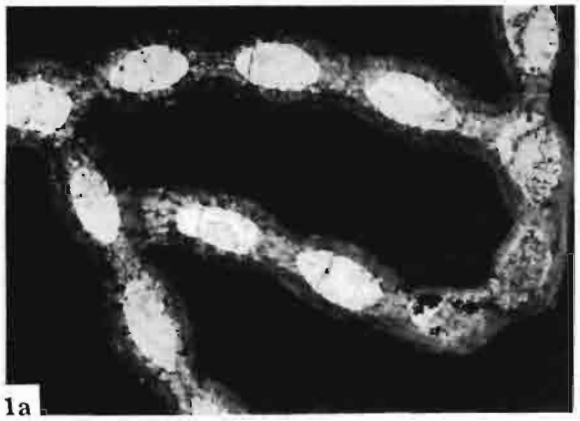
PLATE V

Page

Fig. 1. *Catenipora spiroddensis* n. sp. (PMO-52709): *a* cross-section, ×10; *b* longitudinal section, ×5. Norway, Asker, Spirodden, Substage 6cα. Holotype 55

Fig. 2. *Catenipora spiroddensiformis* n. sp. (Z.Pal.T/IV-1): *a* cross-section, ×5; *b* longitudinal section, ×5. Sweden, Island of Gotland, Wenlock. Holotype 55

Fig. 3. *Catenipora oriens* KLAAMANN (PMO-42944): *a* cross-section, ×5; *b* longitudinal section, ×10. Norway, Malmøy, Ulvøy, Substage $7a_3$ 50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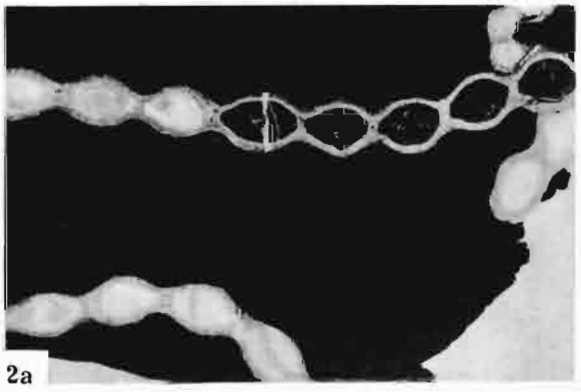
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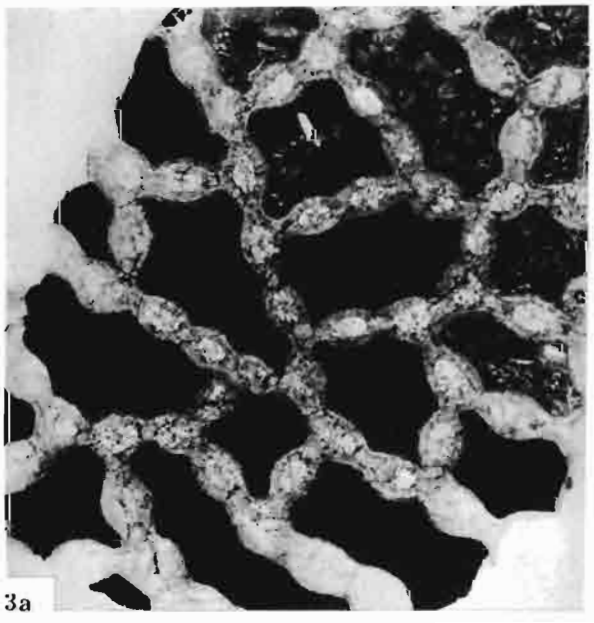
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

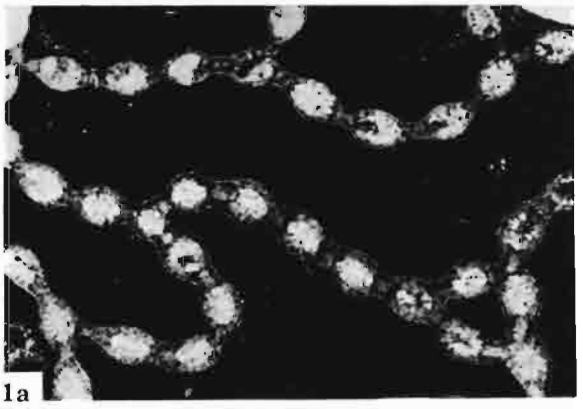
PLATE VI

Page

Fig. 1. *Catenipora norvegica* n. sp. (PMO-3545): *a* cross-section, ×5; *b* cross-section, ×10; *c* longitudinal section, ×5. Norway, Malmøy, Substage 7b. Holotype 51

Fig. 2. *Catenipora minuta* n. sp. (PMO-45294): *a* cross-section, ×5; *b* longitudinal section, ×5. Norway, Ringerike, Series 7. Holotype 48

Fig. 3. *Catenipora malmoeyensis* n. sp. (PMO-43615): *a* cross-section, ×10; *b* longitudinal section, ×10. Norway, Malmøy, Substage $7a_3$. Holotype 50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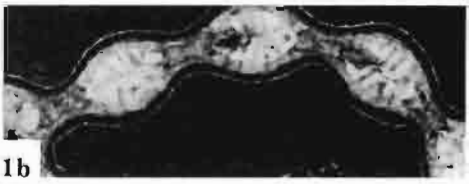
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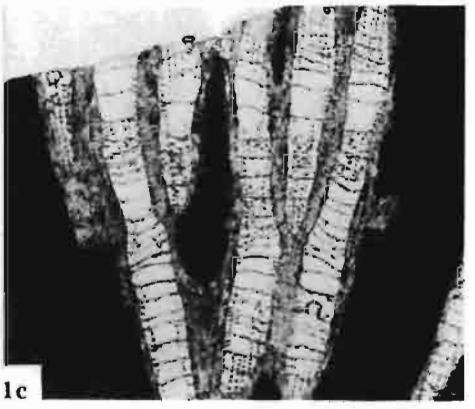
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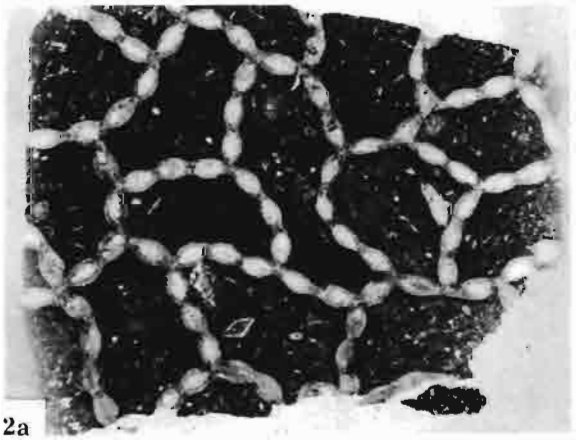
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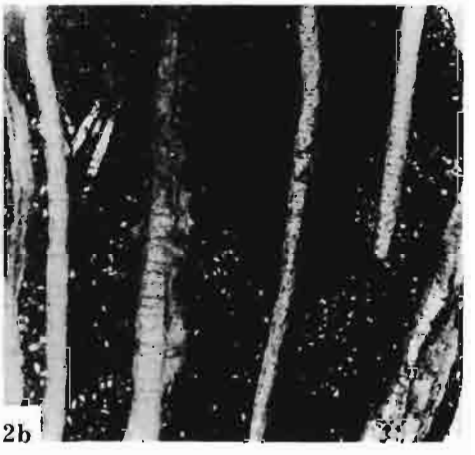
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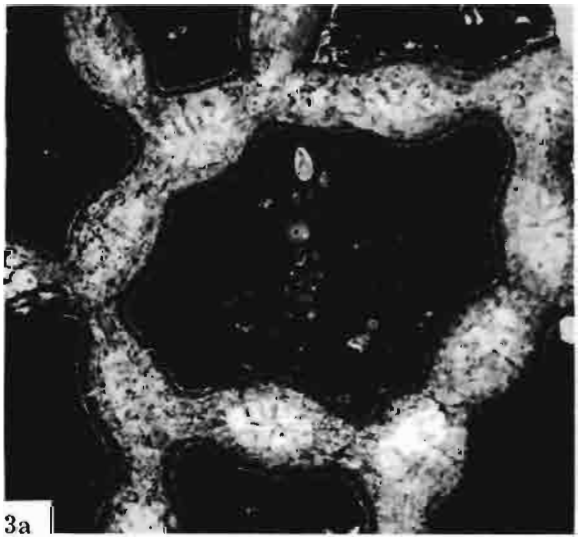
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE VII

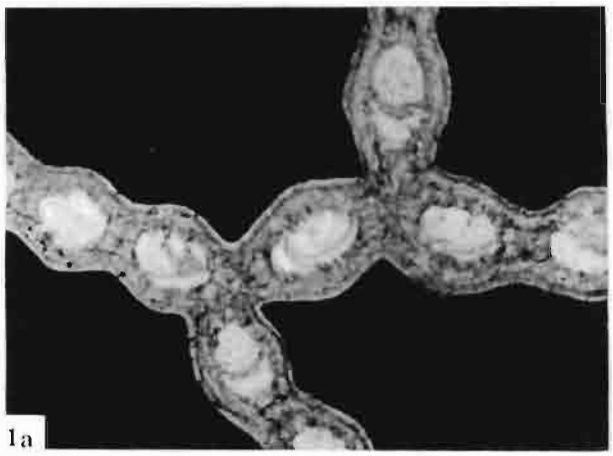
Page

Fig. 1. *Catenipora crassa* n. sp. (RM-19873): *a* cross-section, ×10; *b* longitudinal section, ×10. Sweden, Island of Gotland, Lilla Rone, Silurian. Holotype 53

Fig. 2. *Catenipora exilis* EICHWALD (Z.Pal.T/III-135): longitudinal section, ×2.5. Poland, erratic boulder . 47

Figs. 3-4. *Catenipora carlsoensis* n. sp. Sweden, Island of Gotland, Stora Karlsö, Silurian 44
Fig. 3. Longitudinal section, ×10 (RM-19951).
Fig. 4. *a* Cross-section, ×5; *b* cross-section, ×10 (RM-19778). Holotype.

Fig. 5. *Catenipora obliqua* (FISCHER-BENZON) (Z.Pal.T/III-133): cross-section, ×5. Poland, erratic boulder. . . 49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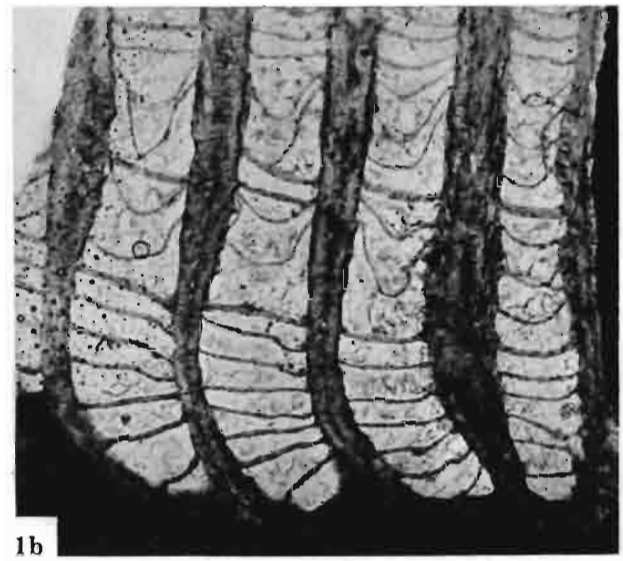
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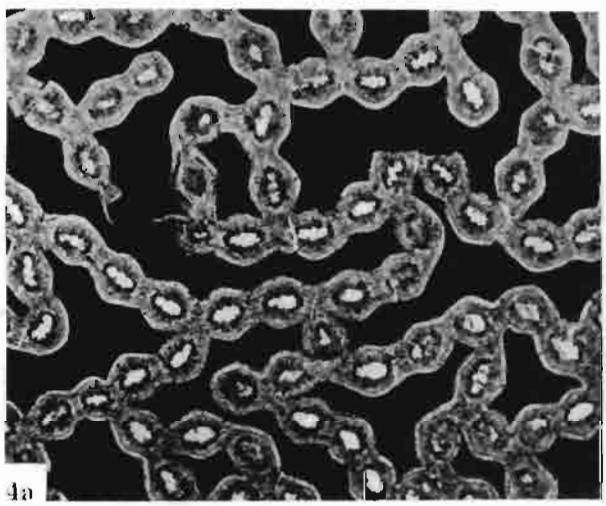
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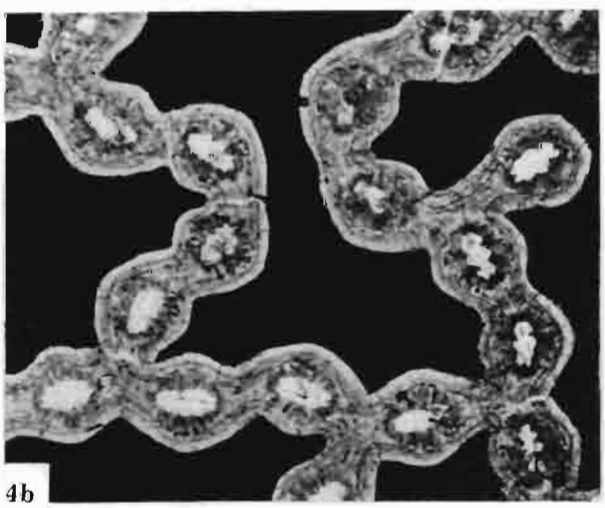
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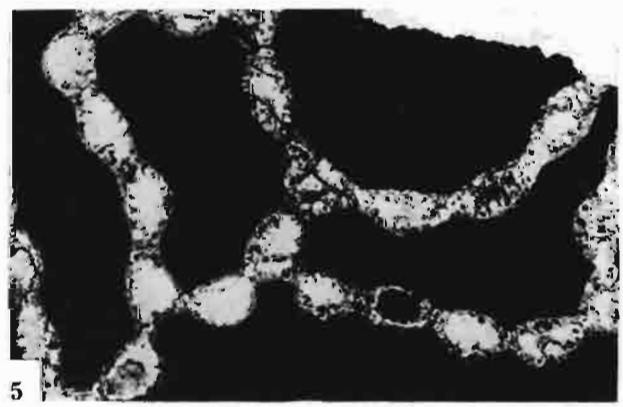
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Palaeontologia Polonica, No. 18, 1967

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

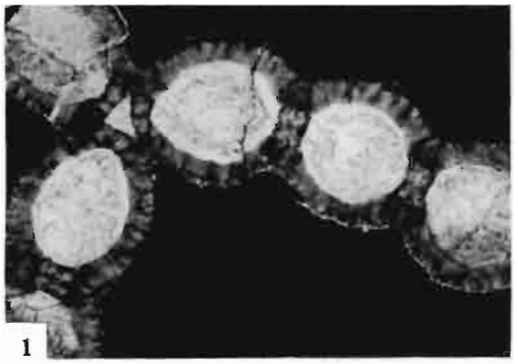
PLATE VIII

Page

Figs. 1, 3. *Halysites junior* KLAAMANN 57
Fig. 1. Cross-section, ×10. Poland, erratic boulder (Z.Pal.T/III-113).
Fig. 3. *a* cross-section, ×5; *b* longitudinal section, ×5. Sweden, Island of Gotland, Grötlingbo (RM-19991).

Fig. 2. *Catenipora piirsaluensiformis* n. sp. (Z.Pal.T/III-40): *a* cross-section, ×5; *b* cross section, ×10; *c* longitudinal section, ×10. Poland, erratic boulder. Holotype 52

Fig. 4. *Catenipora tractabilis* (SOKOLOV) (Z.Pal.T/III-56): *a* cross-section, ×10; *b* longitudinal section, ×10. Poland, erratic boulder 56



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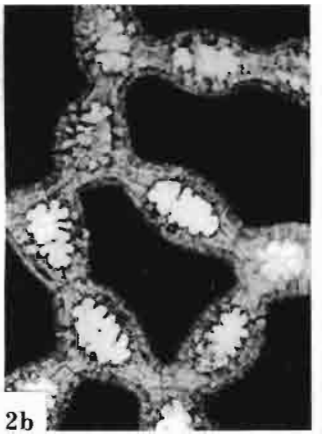

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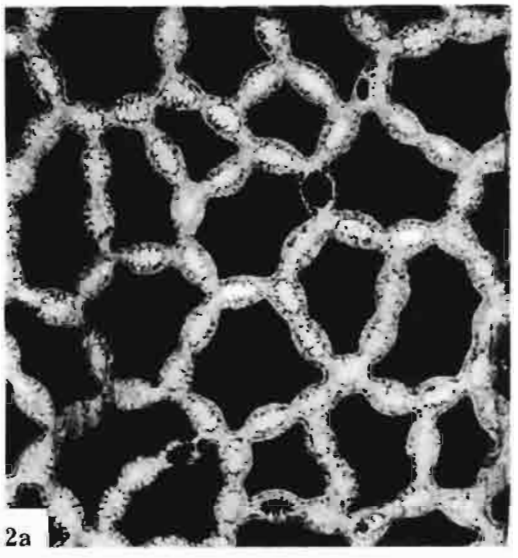

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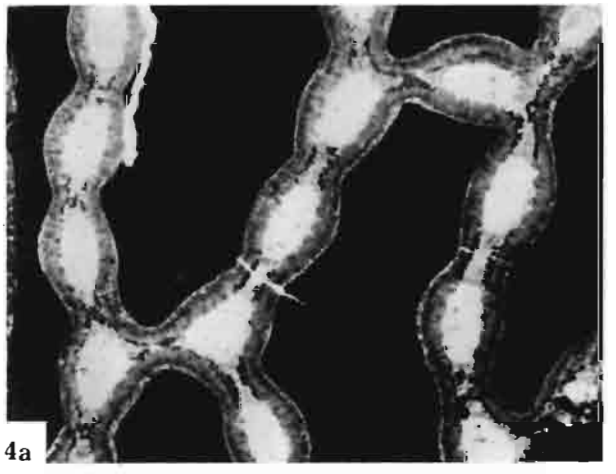

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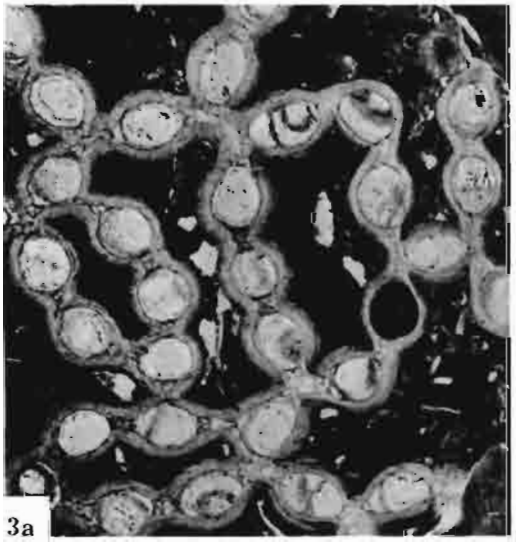

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Palaeontologia Polonica, No. 18, 1967

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE IX

Page

Figs. 1, 3. *Cystihalysites mirabilis* TCHERNYCHEV 58

Fig. 1. *a* cross-section, ×5; *b* longitudinal section, ×5. Sweden, Island of Gotland, Silurian (RM-19789).

Fig. 3. *a* cross-section, ×10; *b* longitudinal section, ×10. Poland, Dębiec, erratic boulder (Z.Pal. T/III-16).

Fig. 2. *Halysites senior* KLAAMANN (Z.Pal.T/IV-13): *a* cross-section, ×10; *b* longitudinal section, ×10. Sweden, Island of Gotland, Klinteberget, Wenlock 57

Fig. 4. *Cystihalysites blakewayensis* SUTTON (Z.Pal.T/III-7): *a* cross-section, ×7; *b* longitudinal section, ×7. Poland, erratic boulder 59


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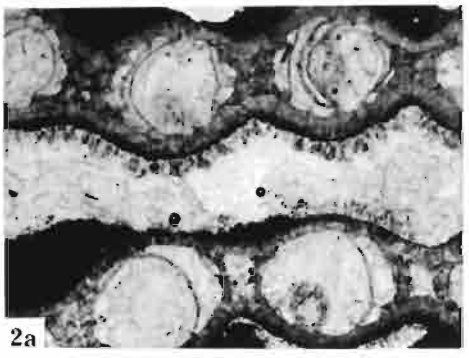
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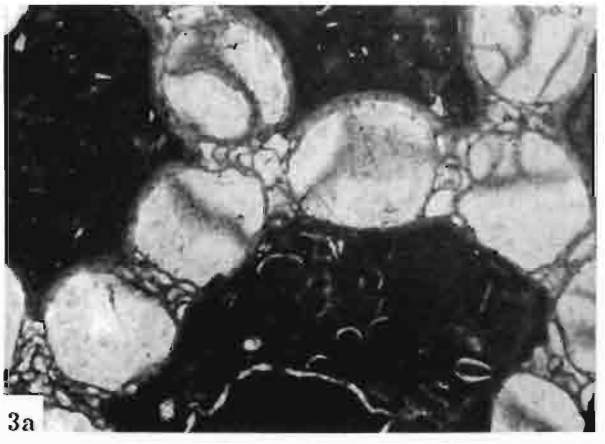
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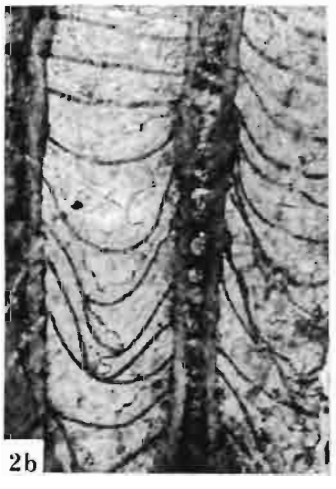
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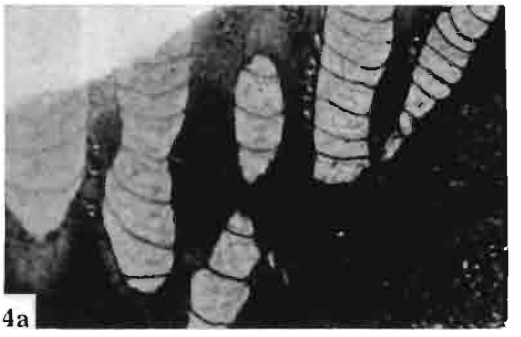
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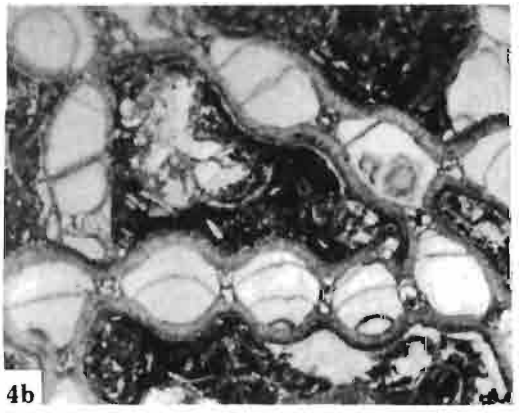
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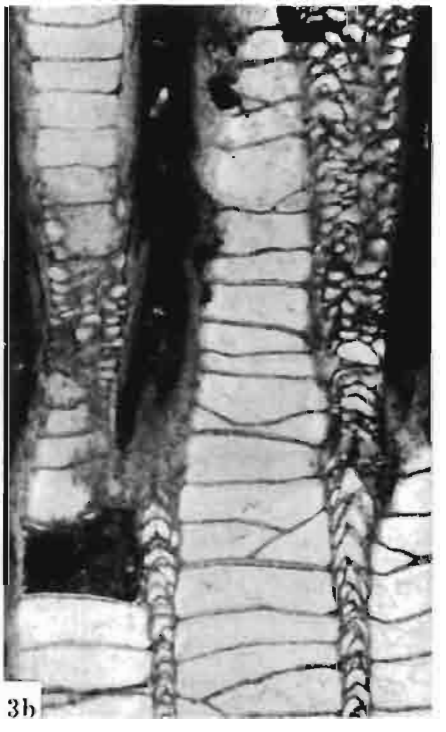
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

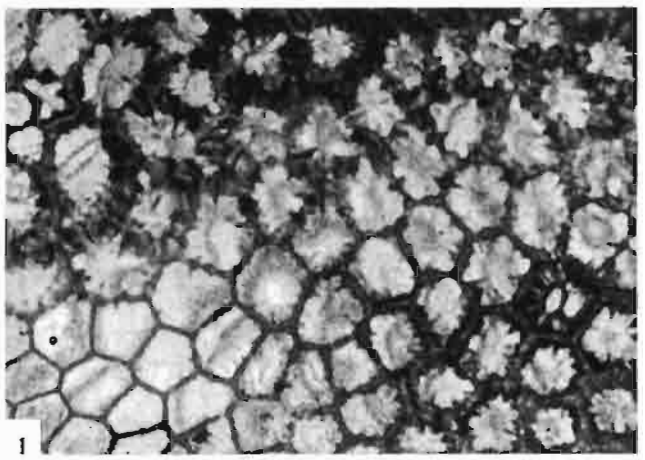
PLATE X

Page

Figs. 1-3. *Angopora hisingeri* JONES, Sweden, Island of Gotland, Silurian 61
Fig. 1. Cross-section, ×10 (INB-1892).
Fig. 2. Upper surface of colony, ×10 (INB-864).
Fig. 3. Longitudinal section, ×10 (INB-1792).

Fig. 4. *Solenihalysites gotlandicus* n. gen., n. sp. (RM-19917): *a* cross-section, ×10; *b* longitudinal section, ×10. Sweden, Island of Gotland. Holotype. 60

Fig. 5. *Solenihalysites norvegicus* n. gen., n. sp. (PMO-49378): *a* upper surface of colony, ×6·5; *b* cross-section, ×10; *c* longitudinal section, ×15. Norway, Holmestrand, Langøy, Series 8. Holotype. 59



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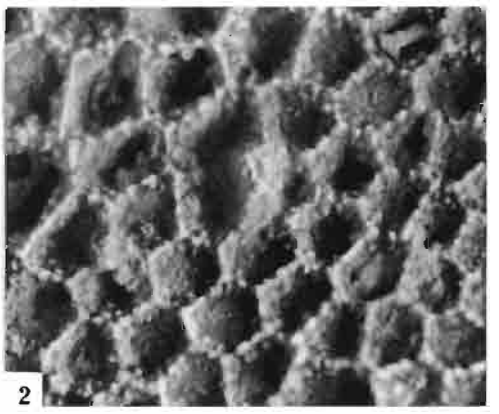

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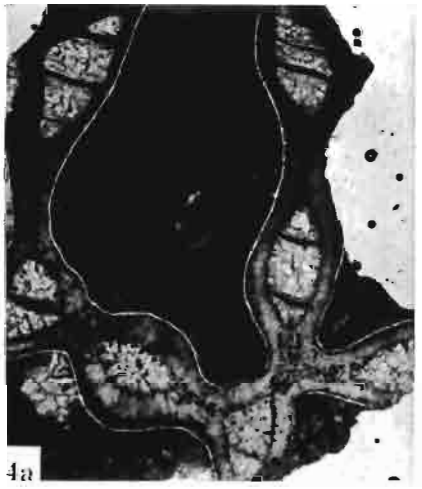

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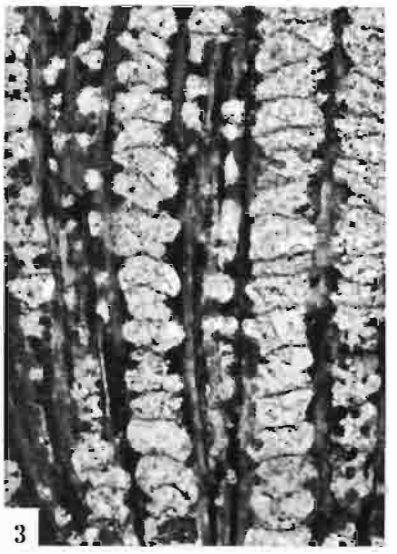

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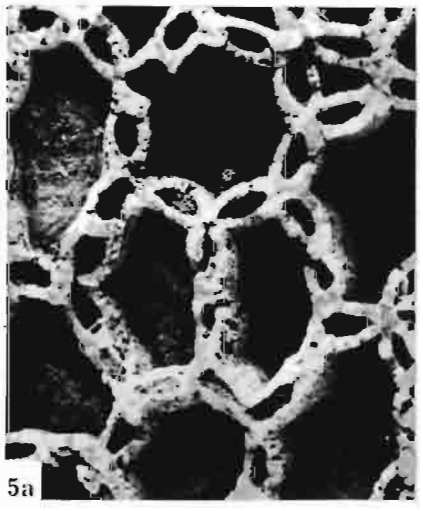

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PLATE XI

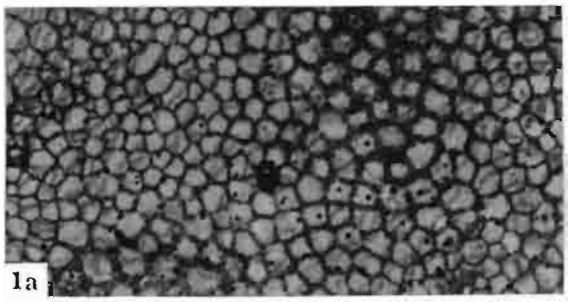
Page

Figs. 1, 2. *Angopora tenuicula* (KLAAMANN), Sweden, Island of Gotland, Lauber, Silurian 62

Fig. 1. *a* cross-section, ×5; *b* longitudinal section, 5 (RM-18448).

Fig. 2. *a* top-view of colony, ×1·4; *b* view of lower part of colony, ×1·4 (RM-18449).

Fig. 3. *Kiaerites norvegicus* n. gen., n. sp. (PMO-45341): *a* cross-section, ×4; *b* cross-section, ×10; *c* longitudinal section, ×10. Norway, Ringerike, Vesleøy, Substage 7cγ. Holotype. 63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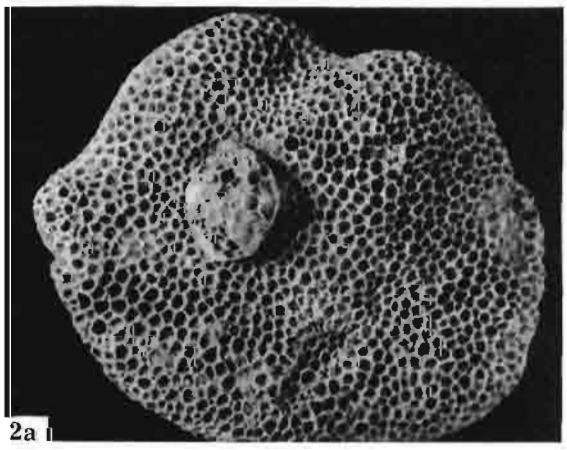
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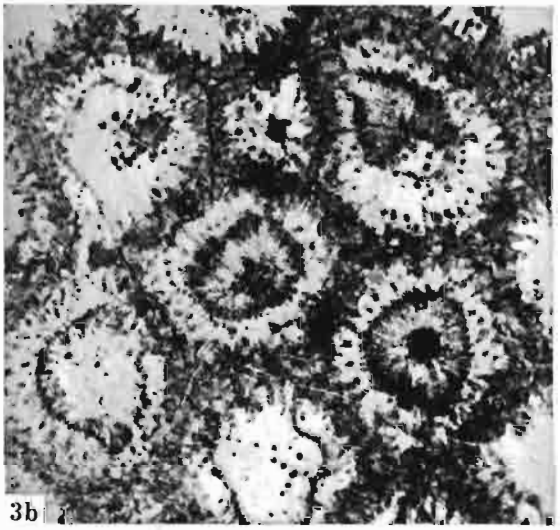
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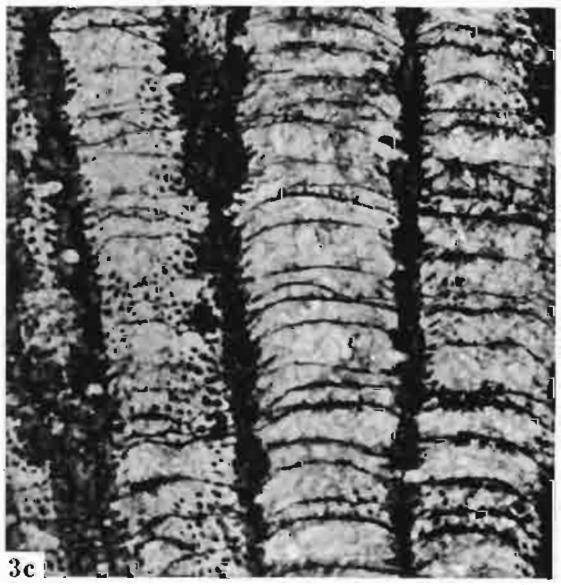
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XII

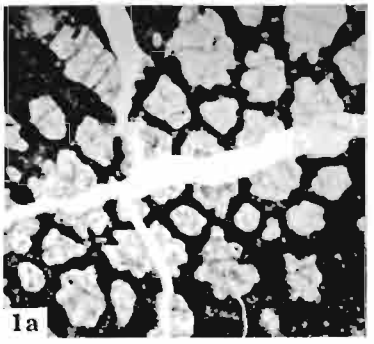
Page

Fig. 1. *Thecia confluens* (EICHWALD) (Z.Pal.T/III-10): *a* cross-section, ×10; *b* longitudinal section, ×5. Poland, erratic boulder 64

Fig. 2. *Thecia saaremica* KLAAMANN (Z.Pal.T/III-101): *a* cross-section, ×10; *b* longitudinal section, ×10. Poland, erratic boulder 64

Fig. 3. *Thecia swinderniana* (GOLDFUSS) (Z.Pal.T/III-33): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, erratic boulder 64

Fig. 4. *Laceripora cribrosa* EICHWALD (Z.Pal.T/III-29): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, erratic boulder 65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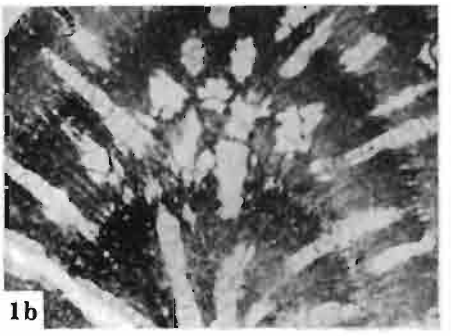
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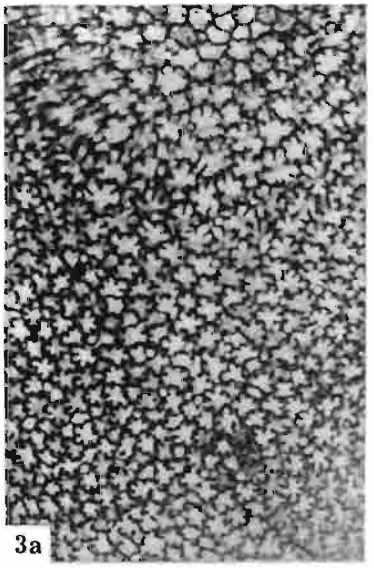
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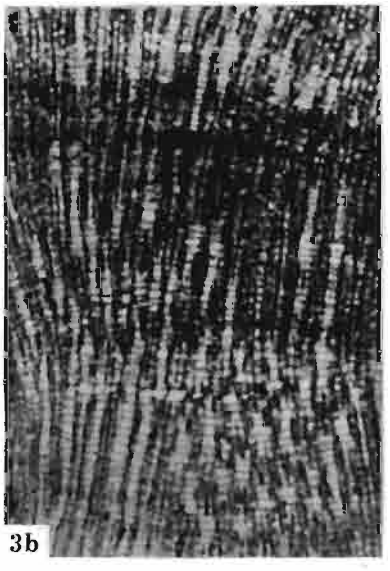
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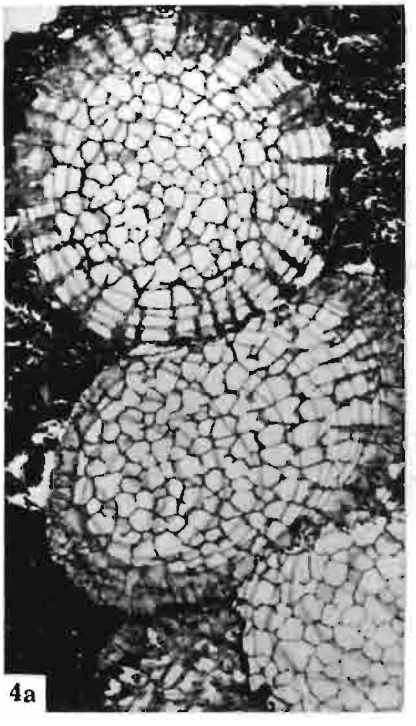
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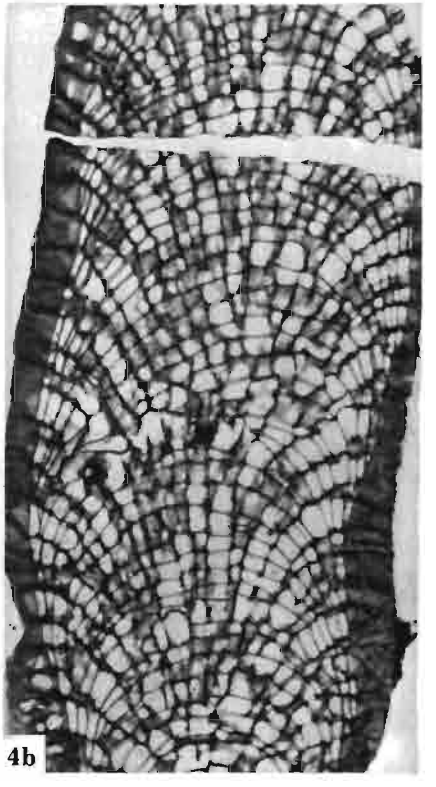
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XIII

Page

Figs. 1-4. *Favosipora clausa* (LINDSTRÖM), Sweden, Island of Gotland, Visby, Silurian 100

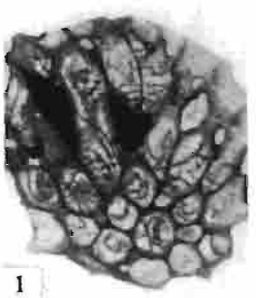
Fig. 1. Cross-section, ×5 (RM-18041).

Fig. 2. Cross-section, ×5 (RM-18035).

Fig. 3. Magnified fragment of calycal surface, showing angular pores, ×15 (RM-18044).

Fig. 4. Side-view of colony, ×4 (RM-18046).

Fig. 5. *Palaeofavosites kalvensis* n. sp. (PMO-40814): *a* cross-section, ×5; *b* side surface of corallites, ×3·5; *c* weathered surface of colony, ×2; *d* longitudinal section, ×5. Norway, Malmøy, Malmøykalv, Series 6. Holotype. 70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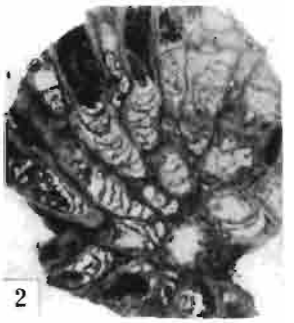
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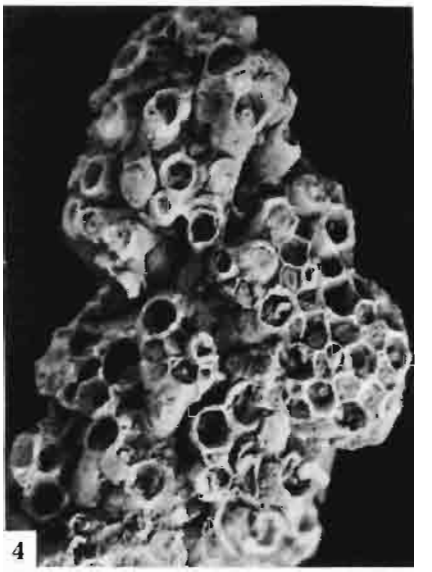
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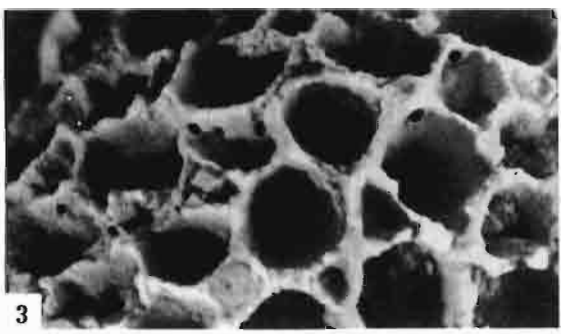
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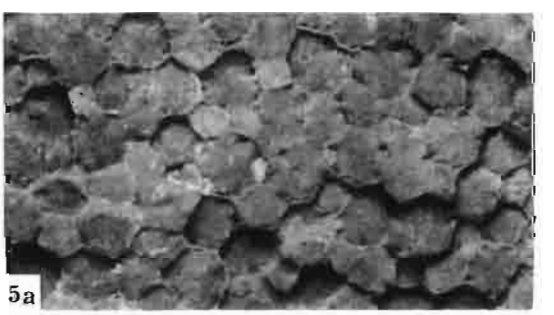
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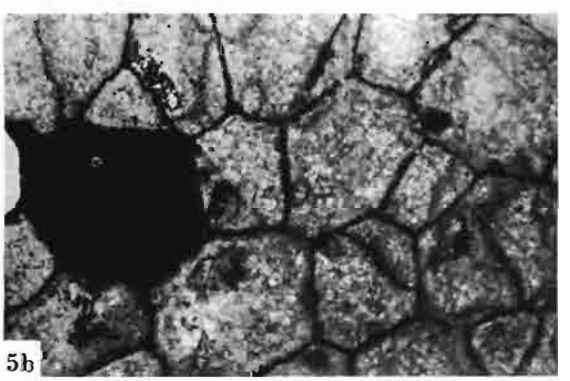
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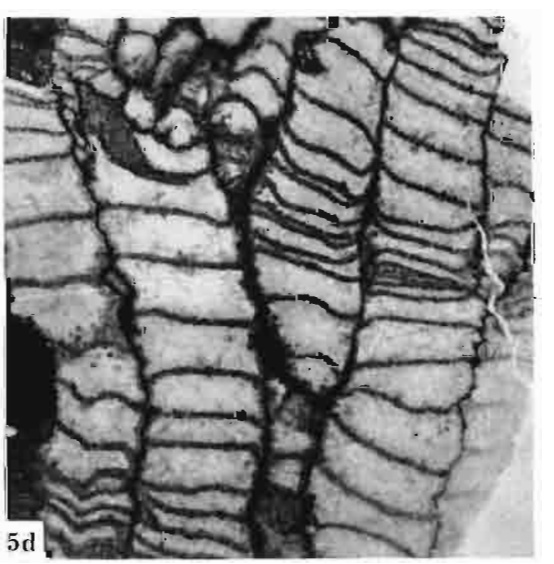
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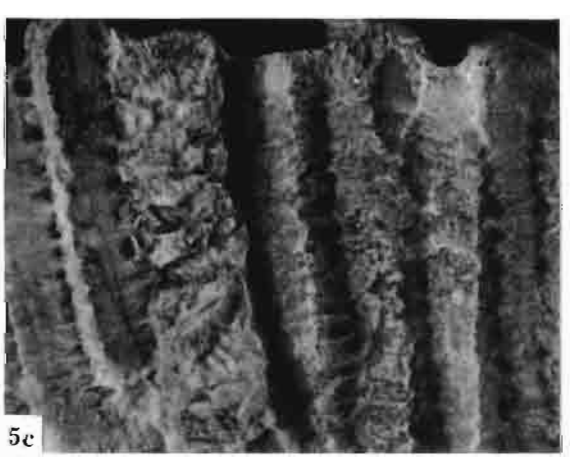
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XIV

Page

Fig. 1. *Palaeofavosites oelaensis* KLAAMANN (PMO-52665): *a* cross-section, ×5; *b* longitudinal section, ×5. Norway, Asker, Spirodden, Substage 6cα 71

Fig. 2. *Palaeofavosites abstrusus* KLAAMANN (PMO-52667): *a* cross-section, ×5; *b* longitudinal section, ×5. Norway, Spirodden, Substage 6cα 66

Fig. 3. *Palaeofavosites haapsaluensis* KLAAMANN (PMO-52682): *a* cross-section, ×6; *b* longitudinal section, ×5. Norway, Asker, Spirodden, Substage 6cα 69

Fig. 4. *Palaeofavosites legibilis* SOKOLOV (Z.Pal.T/III-126): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, erratic boulder 70


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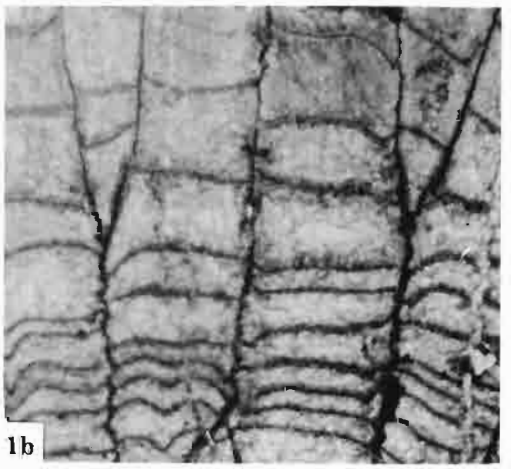
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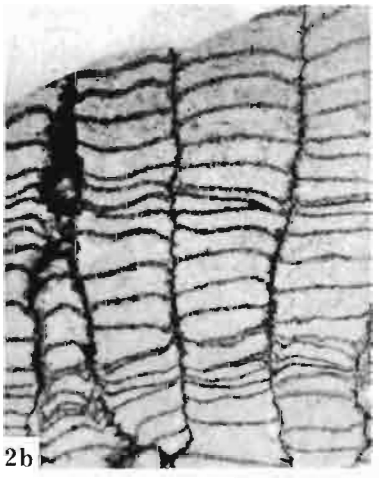
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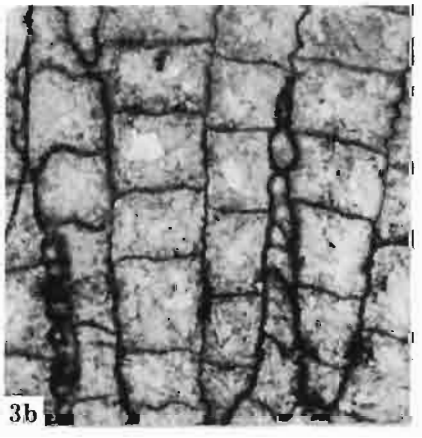
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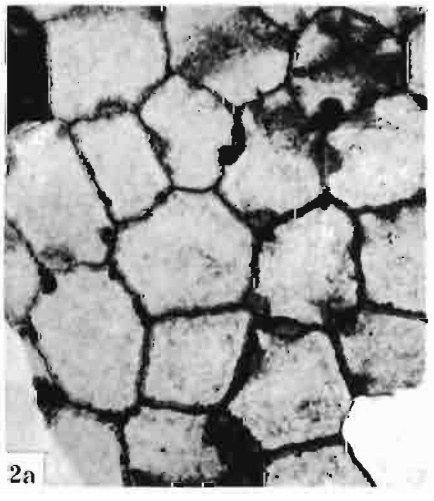
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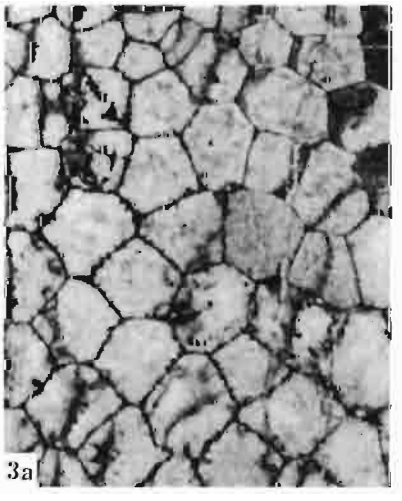
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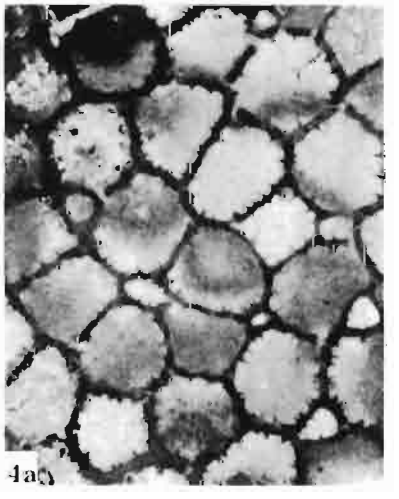
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

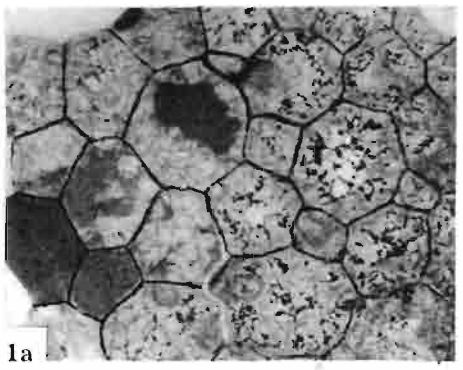
PLATE XV

Page

Fig. 1. *Palaeofavosites* aff. *alveolaris* (GOLDFUSS) (PMO-54788): *a* cross-section, ×5; *b* longitudinal section, ×5. Norway, Holmestrand, Bjerkøy, Series 7 67

Figs. 2-3. *Palaeofavosites alveolaris* (GOLDFUSS), Norway, Spirodden, Series 6 67
Fig. 2. Outer surface of corallites with visible pores, ×10 (PMO-52671).
Fig. 3. *a* cross-section, ×5; *b* longitudinal section, ×2 (PMO-52658).

Fig. 4. *Palaeofavosites spiroddensis* n. sp. (PMO-52685): *a* cross-section, ×5; *b* longitudinal section, ×5; *c* outer surface of corallites with pores, ×8. Norway, Asker, Spirodden, Substage 6cα. Holotype. 72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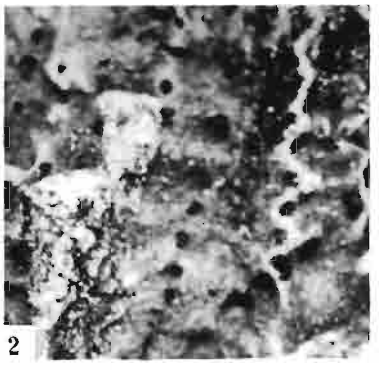
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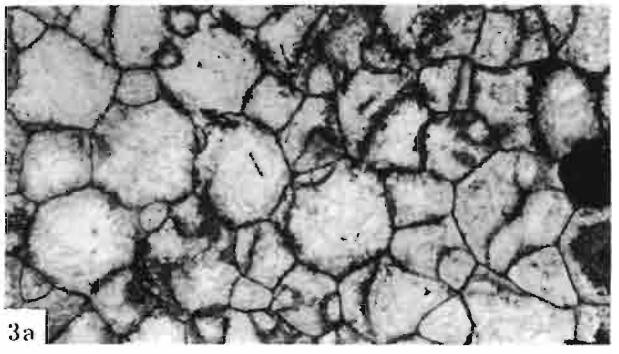
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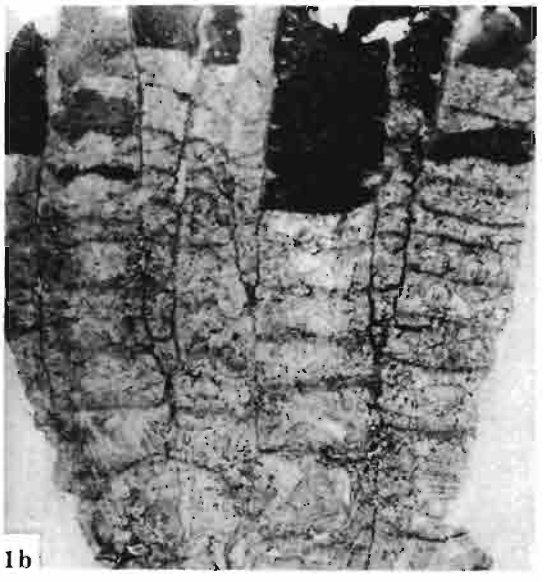
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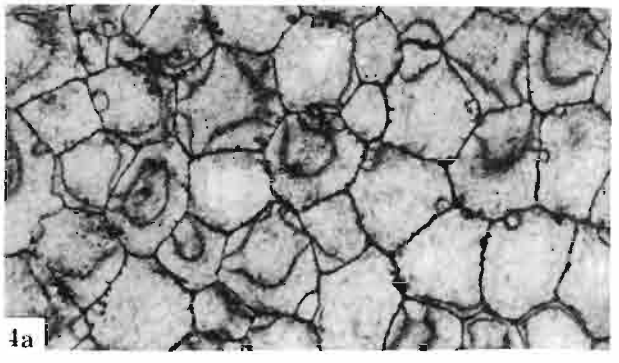
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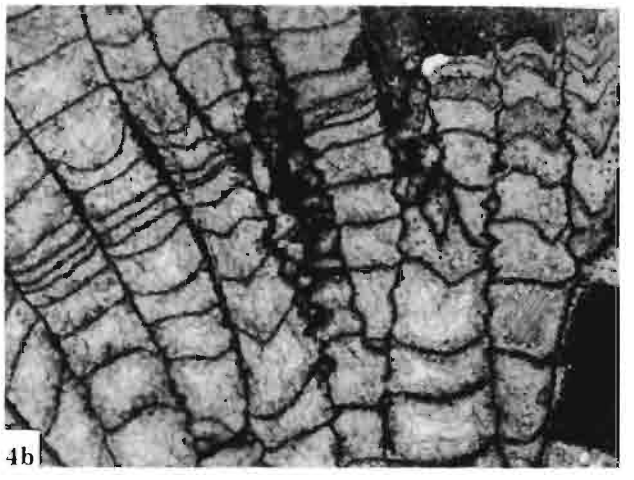
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PLATE XVI

Page

Fig. 1. *Palaeofavosites forbesiformis* SOKOLOV (Z.Pal.T/III-2): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, erratic boulder 68

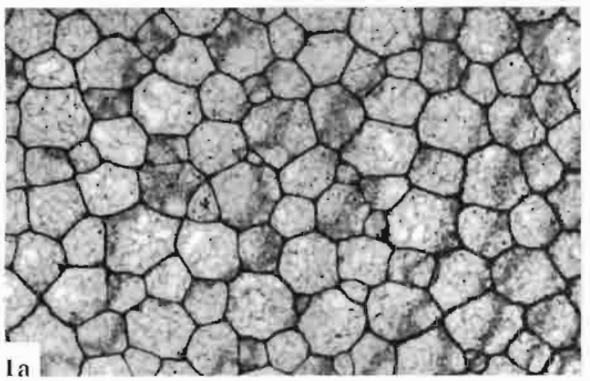
Figs. 2-5. *Palaeofavosites schmidti* SOKOLOV 71

Fig. 2. *a* cross-section, ×5·5; *b* longitudinal section, ×5·5 (PMO-52669). Norway, Asker, Spirodden. Substage 6cα.

Fig. 3. Upper surface of colony, ×4 (PMO-52325). Norway, Asker, Spirodden, Series 6.

Fig. 4. Upper surface of young colony, ×4 (PMO-40811). Norway, Malmøy, Series 6.

Fig. 5. Outer surface of corallites, ×4 (PMO-63155). Norway, Malmøy, Ulvøy, Stage 6b.



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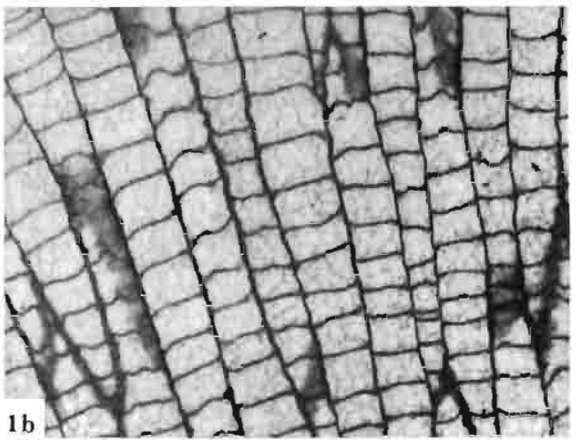

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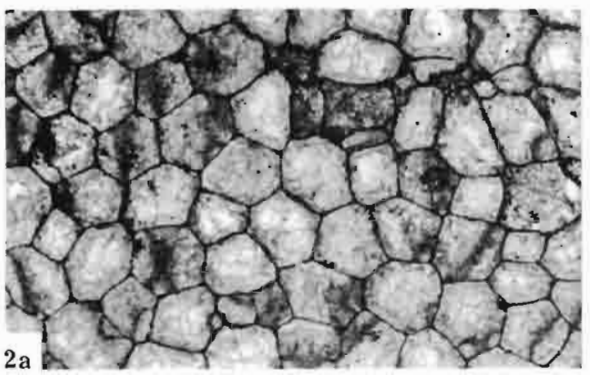

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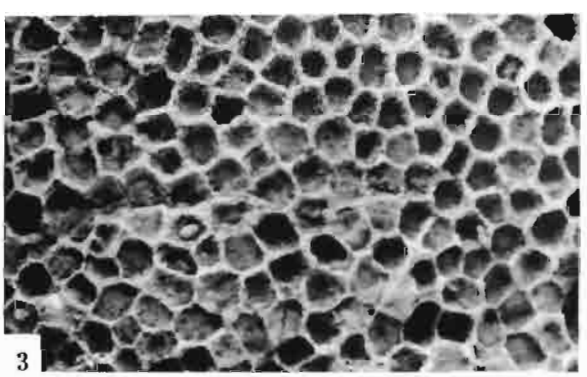

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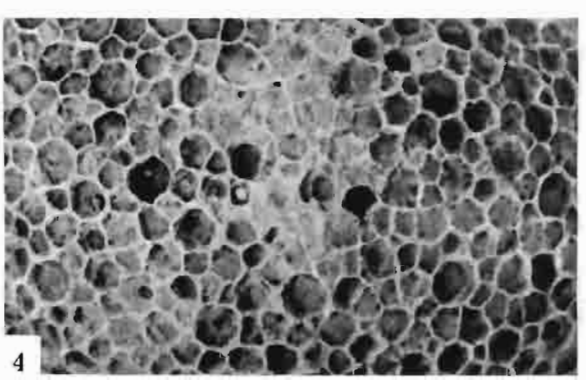

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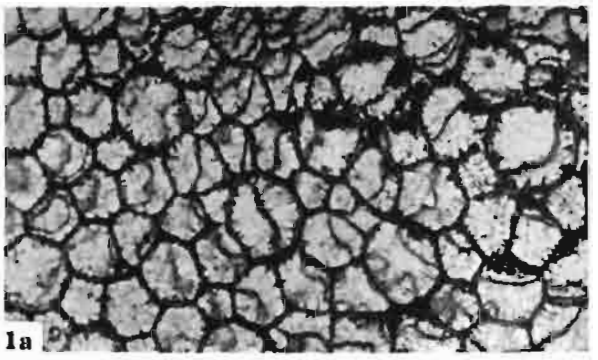
A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XVII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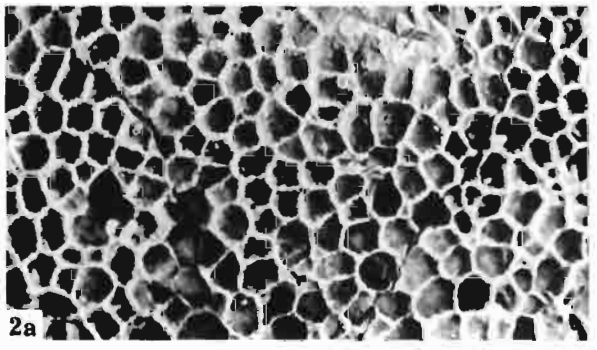
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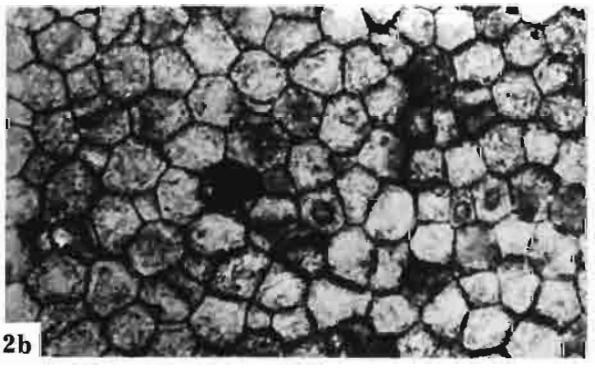
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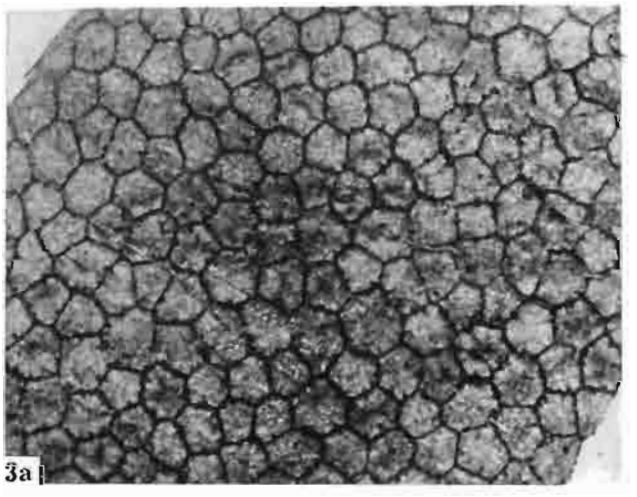
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XVIII

Page

Figs. 1-2. *Palaeofavosites raikkuelaensis* SOKOLOV, Norway, Malmøy, Malmøykalven, Series 6 71
Fig. 1. *a* outer surface of corallites, ×7; *b* cross-section, ×5 (PMO-42257).
Fig. 2. *a* upper surface of colony, ×4; *b* longitudinal section, ×5 (PMO-43503).

Fig. 3. *Priscosolenia rozkowskae* n. sp. (Z.Pal.T/III-47): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, erratic boulder. Holotype 74

Fig. 4. *Priscosolenia kozlowskii* n. sp. (Z.Pal.T/III-171): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, erratic boulder. Holotype. 73


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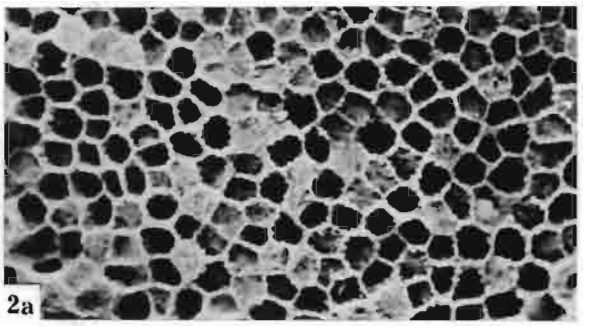
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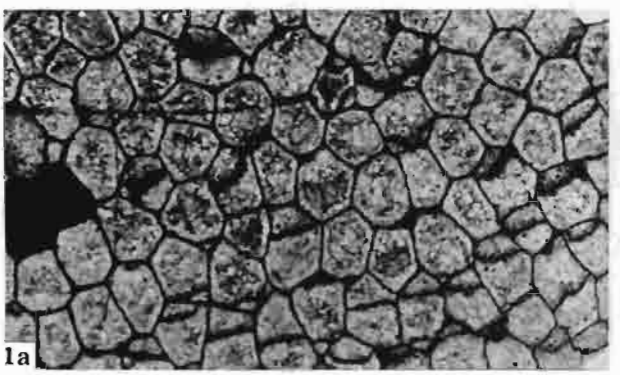
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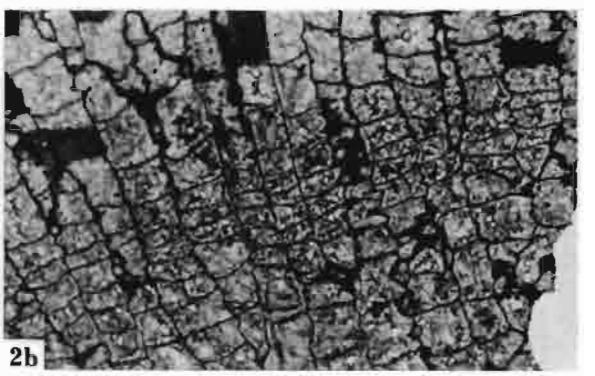
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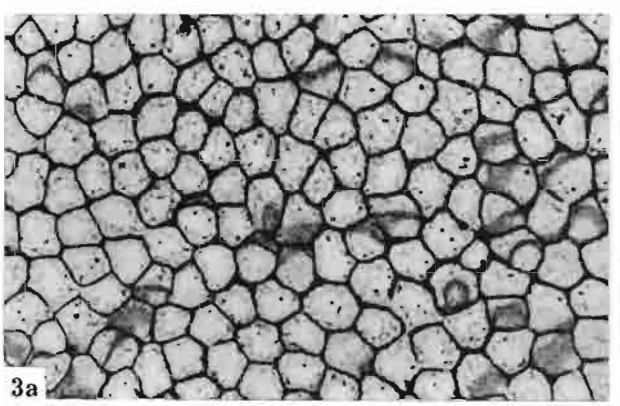
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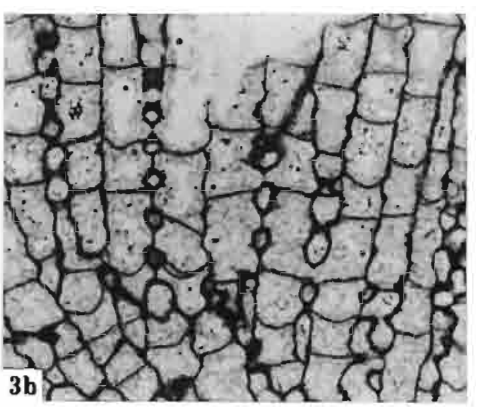
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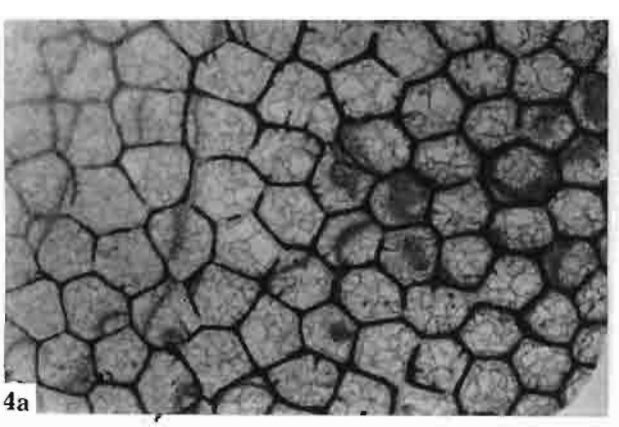
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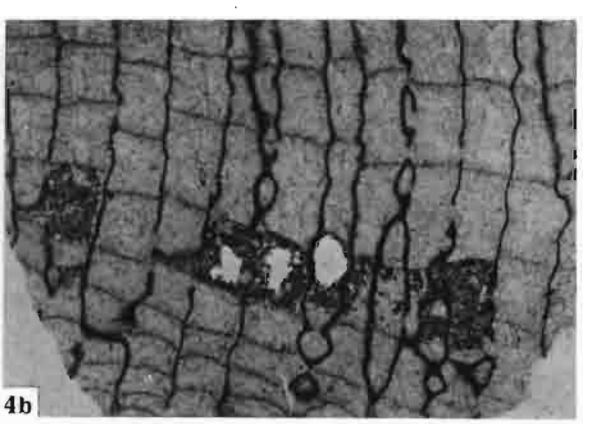
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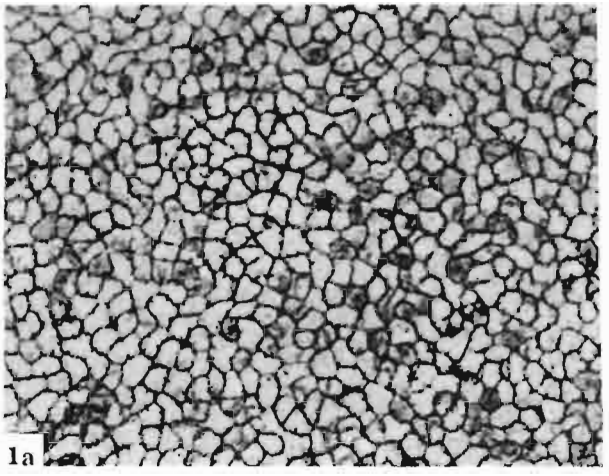
A. Stasińska: Tabulata from Norway, Sweden and Poland

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XIX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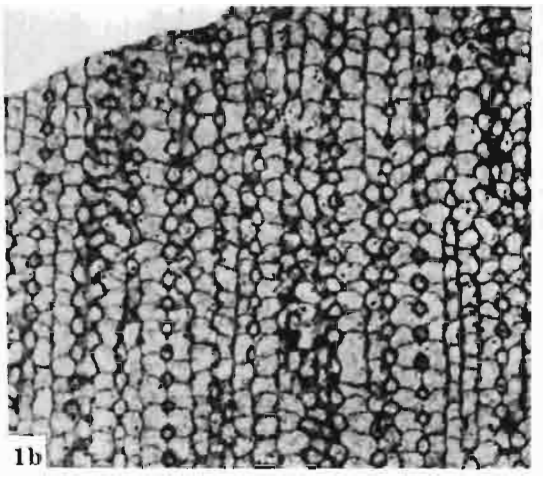
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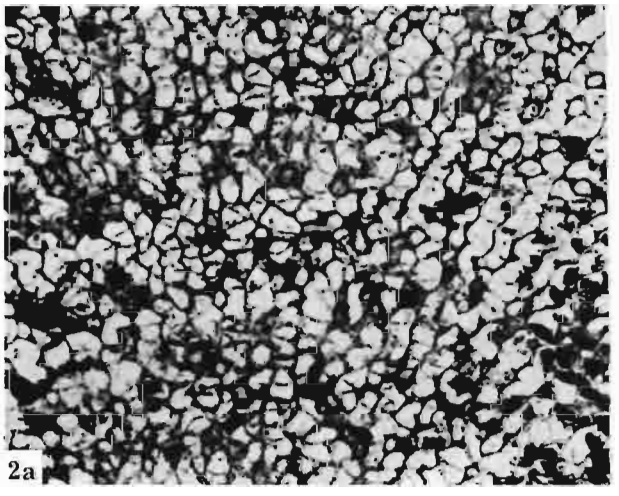
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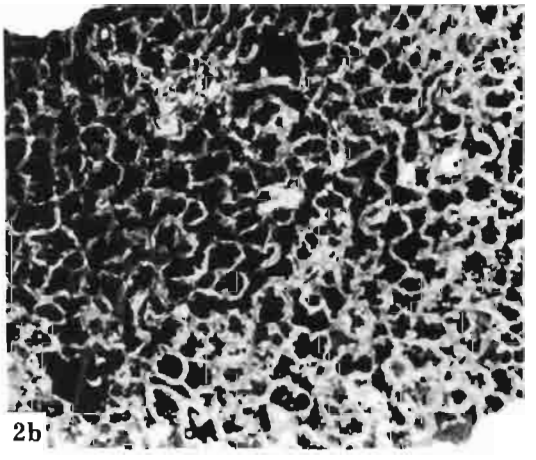
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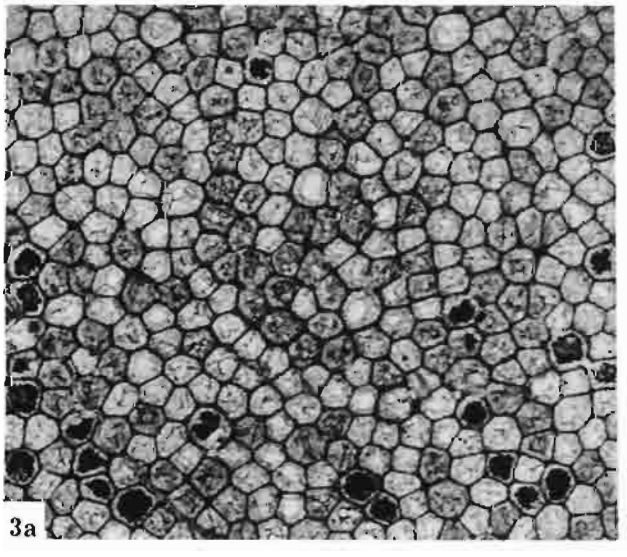
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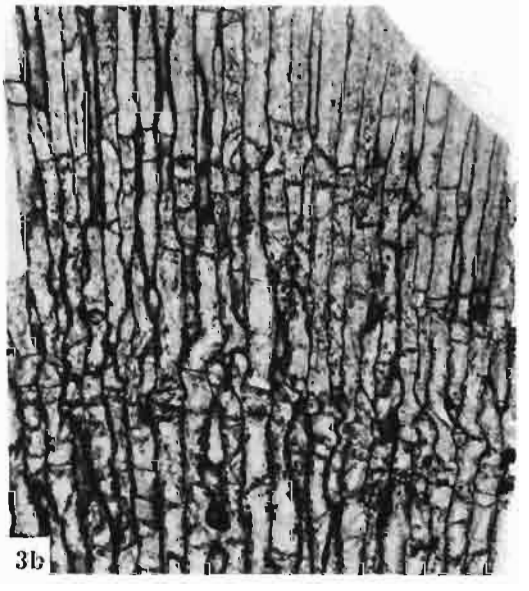
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XX

Page

Figs. 1-4. *Favosites ingens* KLAAMANN 80

Fig. 1. Cross-section, ×5 (PMO-44994). Norway, Rytteraker, Series 7.

Fig. 2. Longitudinal section, ×5 (PMO-44995). Norway, Rytteraker, Series 7.

Fig. 3. Weathered upper surface of colony, ×3 (PMO-43356). Norway, Malmøy, Ulvøy, Series 7.

Fig. 4. Side-surface of corallites with epitheca and pores, ×3 (PMO-42502). Norway, Malmøy, Ulvøy, Series 7.

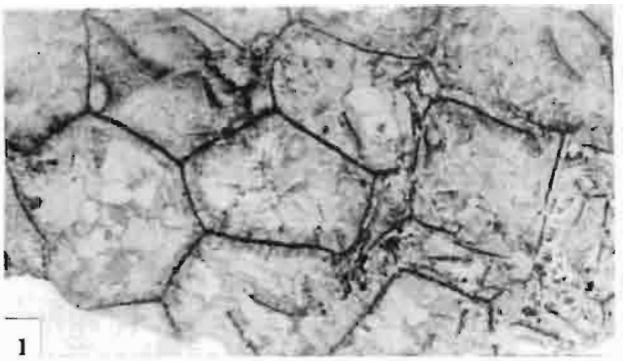
Figs. 5, 8. *Mesofavosites imbellis* KLAAMANN. Norway, Ringerike, Limåstangen, Series 7 76

Fig. 5. Cross-section, ×5 (PMO-45030).

Fig. 8. Longitudinal section, ×5 (PMO-45031).

Fig. 6. *Mesofavosites validus* KLAAMANN (PMO-54433): upper surface of colony, ×4. Norway, Holmestrand, Kommersøy, Stage 8a 77

Fig. 7. *Mesofavosites silicificatus* KLAAMANN (PMO-40808): weathered upper surface of colony, ×3. Norway, Malmøy, Series 6 77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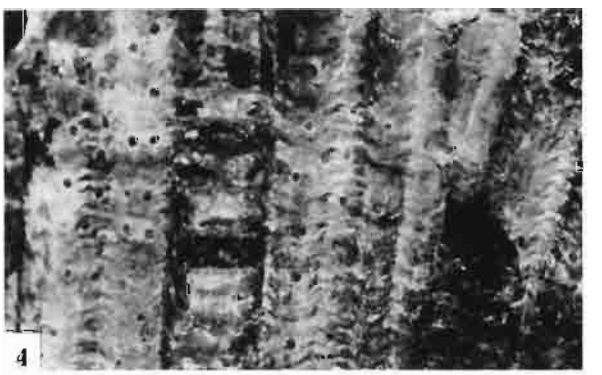
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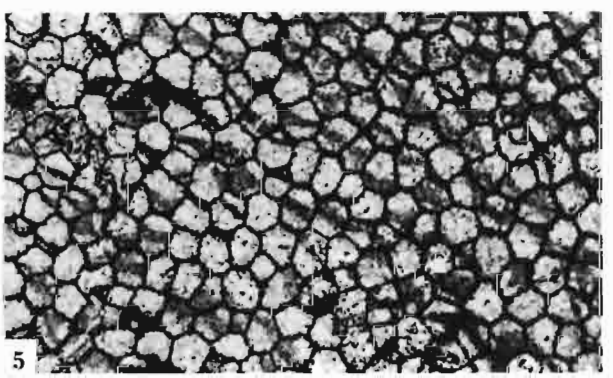
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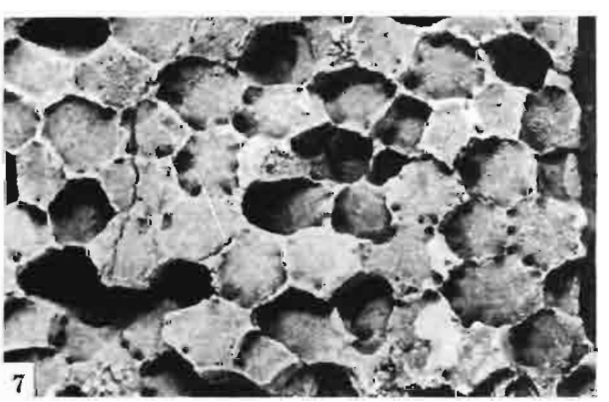
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8

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

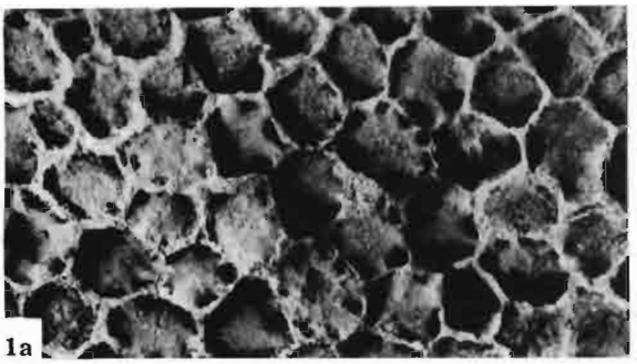
PLATE XXI

Page

Fig. 1. *Favosites kjerulfi* n. sp. (PMO-42506): *a* weathered upper surface of colony, ×3; *b* cross-section, ×5; *c* longitudinal section, ×5. Norway, Malmøy. Holotype 82

Fig. 2. *Favosites favosus* (GOLDFUSS) (PMO-45156): *a* weathered upper surface of colony, ×3; *b* cross-section, ×5; *c* longitudinal section, ×5. Norway, Ringerike, Vakerdal, Series 7 79

Fig. 3. *Favosites favosiformis* SOKOLOV (PMO-58568): *a* cross-section, ×5; *b* longitudinal section, ×5. Norway, Malmøy, Stage 8b 79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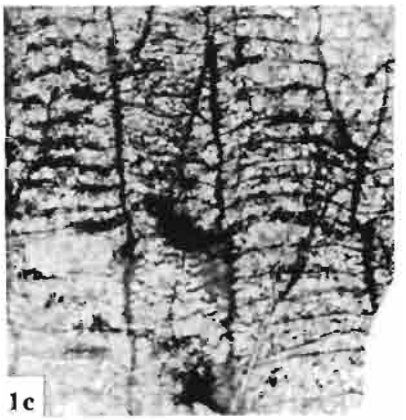
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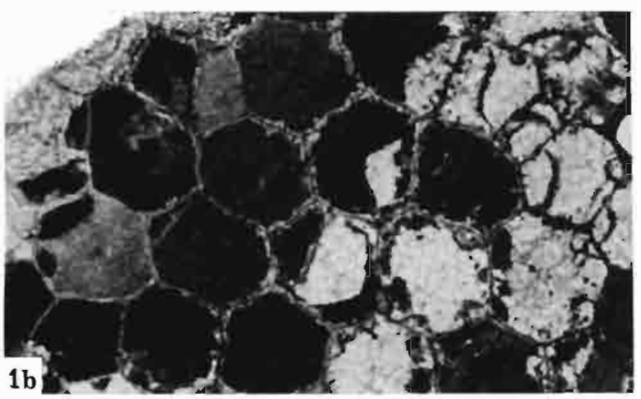
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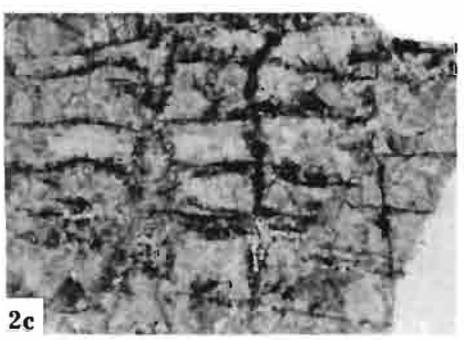
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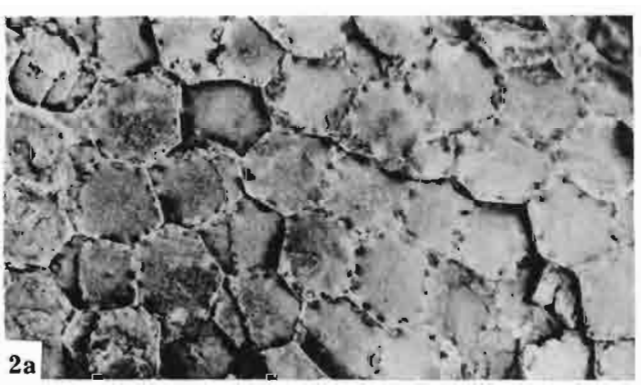
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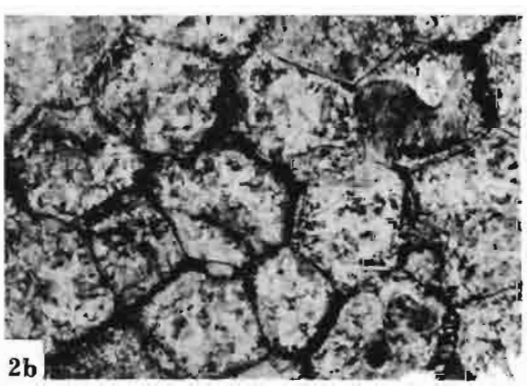
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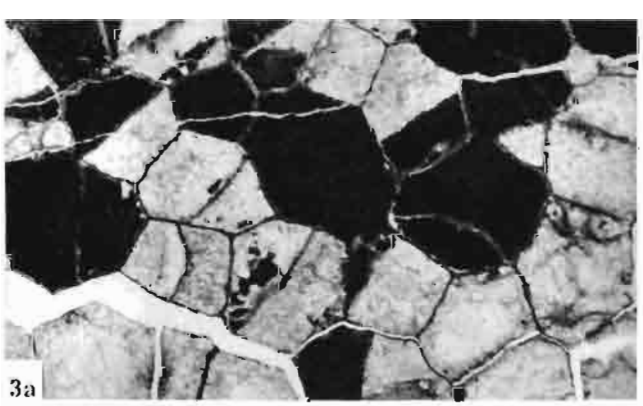
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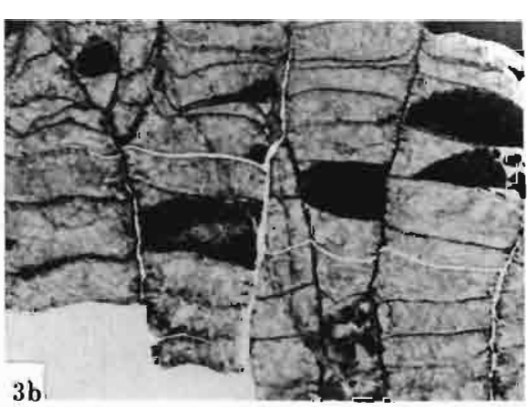
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A. Stasińska: Tabulata from Norway, Sweden and Poland

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XXII

Page

Fig. 1. *Favosites stoermeri* n. sp. (PMO-S. 3610): *a* weathered surface of colony, ×1; *b* cross-section, ×5; *c* longitudinal section, ×5. Norway, Ringerike, Garnstangen, Substage 7cβ. Holotype 84

Figs. 2-3. *Favosites subfavosus* KLAAMANN. Poland erratic boulder. 85
Fig. 2. Longitudinal section, ×5 (Z.Pal.T/III-15).
Fig. 3. Cross-section, ×5 (Z.Pal.T/III-36).

Fig. 4. *Favosites adaverensis* SOKOLOV (INB-865): *a* cross-section, ×5; *b* longitudinal section, ×5. Sweden, Island of Gotland, Wenlock 78

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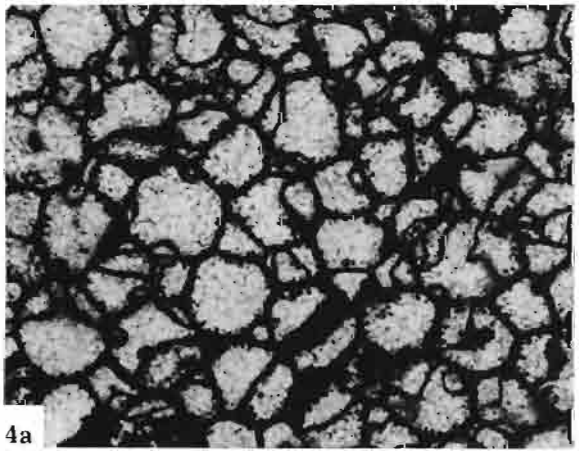

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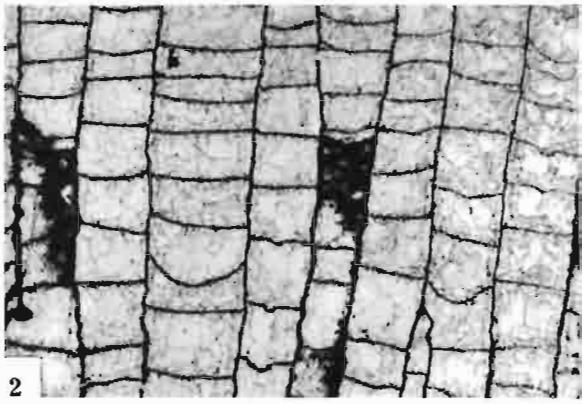

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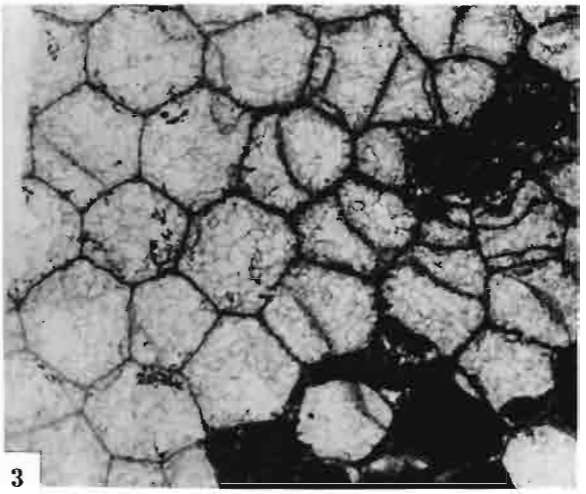

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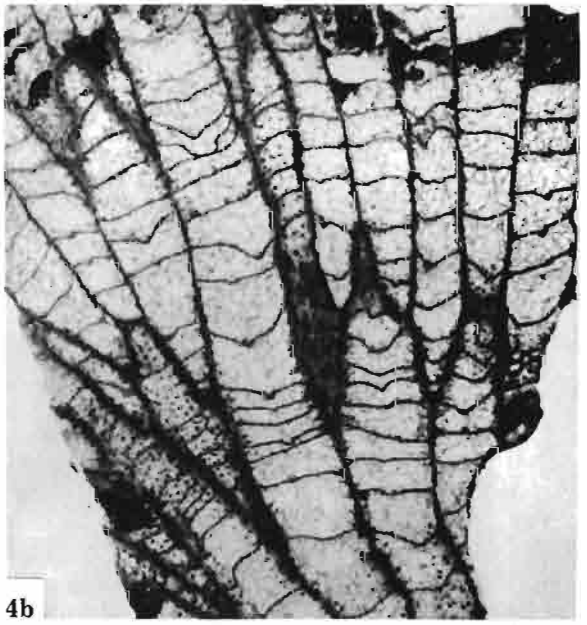

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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

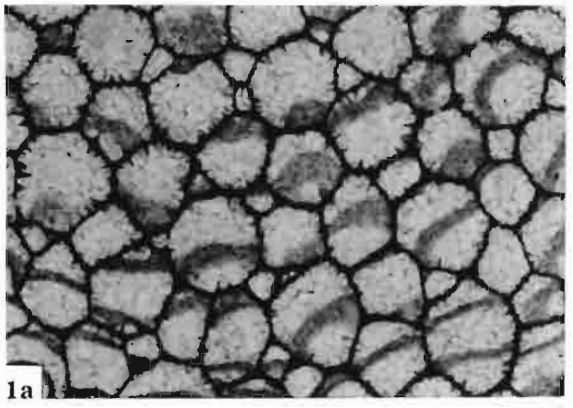
PLATE XXIII

Page

Fig. 1. *Favosites kogulaensis* Sokolov (Z.Pal.T/III-21): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, Jastrzębia Góra, erratic boulder 81

Fig. 2. *Favosites norvegicus* n. sp. (PMO-42505): *a* cross-section, ×5; *b* longitudinal section, ×5. Norway, Malmøy, Malmøykalven, Series 7. Holotype 82

Fig. 3. *Favosites gothlandicus* Lamarck (Z.Pal.T/III-100): *a* cross-section, ×5; *b* outer surface, of corallites with pores, ×5; *c* longitudinal section, ×5. Poland, erratic boulder 80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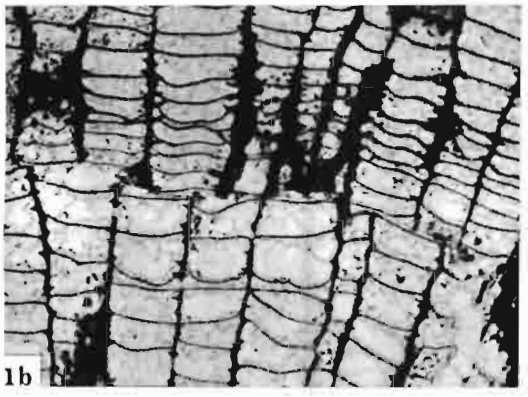
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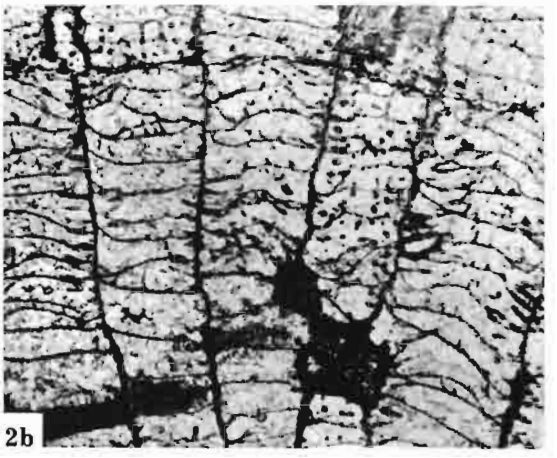
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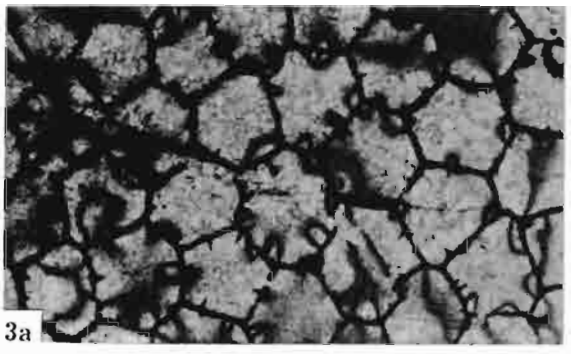
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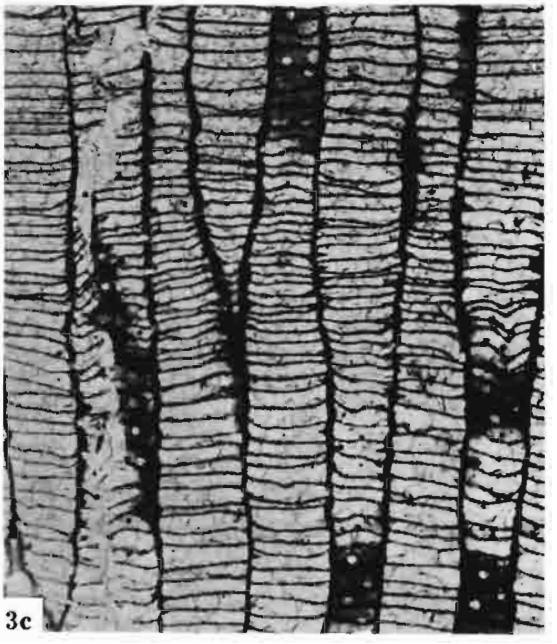
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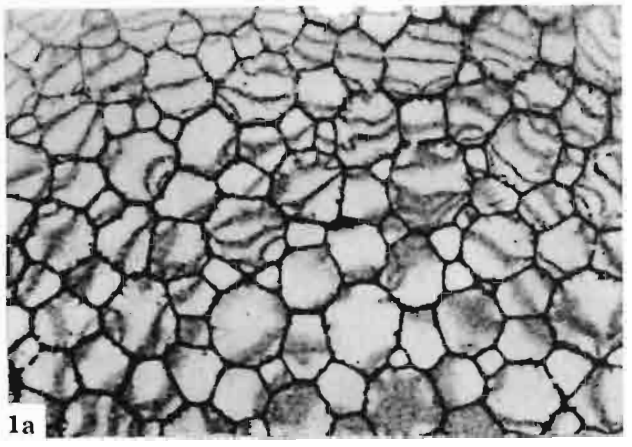
A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XXIV



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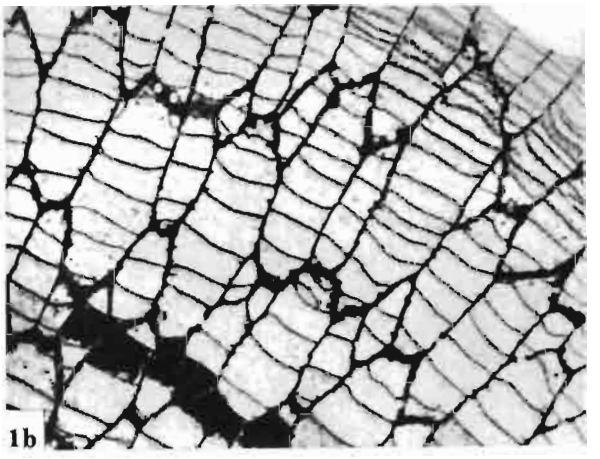

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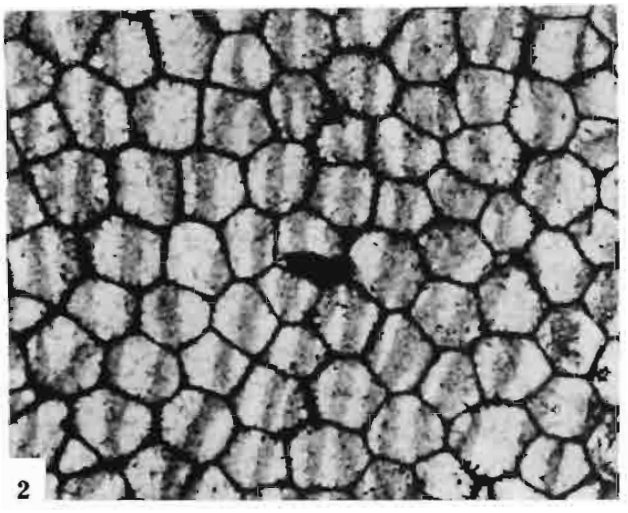

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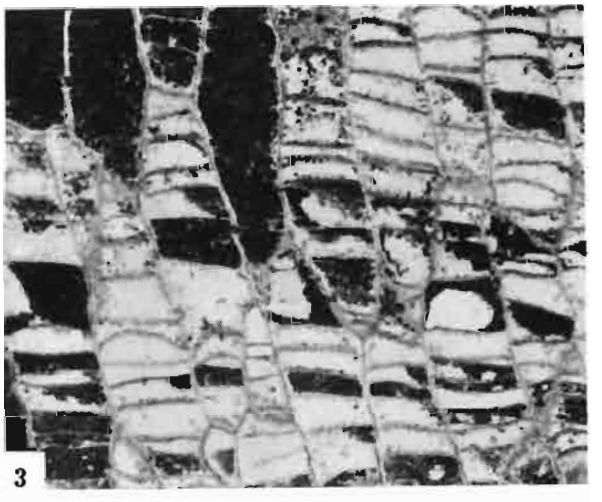

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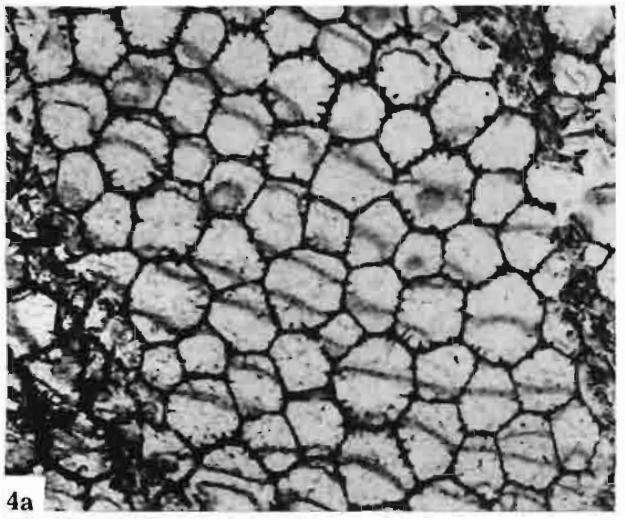

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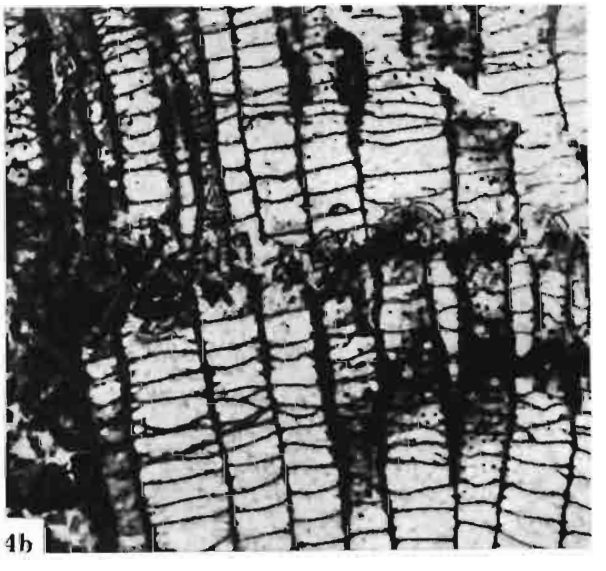

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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XXV

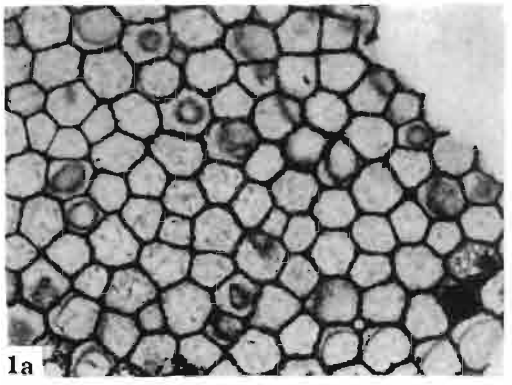
Page

Fig. 1. *Favosites mirandus* SOKOLOV (INB-867): *a* cross-section, ×5; *b* longitudinal section, ×5. Sweden, Island of Gotland, Kopparsvik, Wenlock 82

Fig. 2. *Favosites similis* SOKOLOV (Z.Pal.T/III-161): *a* cross-section, ×5; *b* longitudinal section, ×6. Poland, erratic boulder 84

Fig. 3. *Favosites pseudoforbesi ohesaarensis* KLAAMANN (Z.Pal.T/III-67): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, erratic boulder 84

Fig. 4. *Favosites vicinali*" KLAAMANN (Z.Pal.T/III-12): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, erratic boulder 86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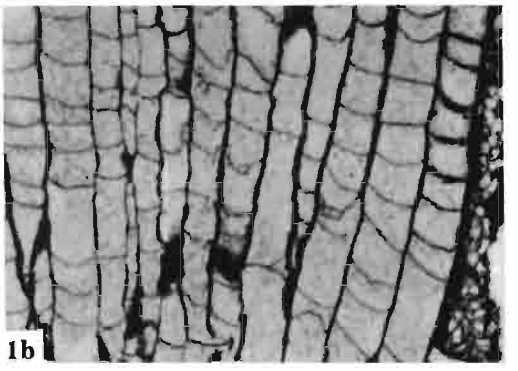
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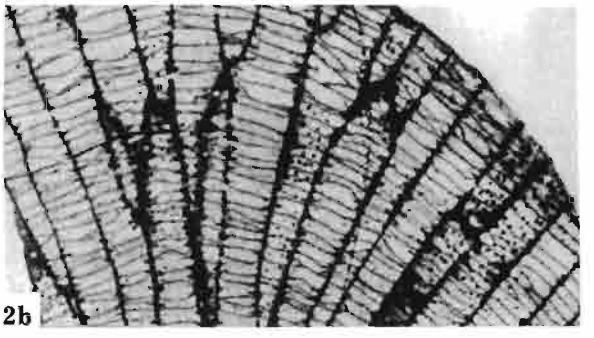
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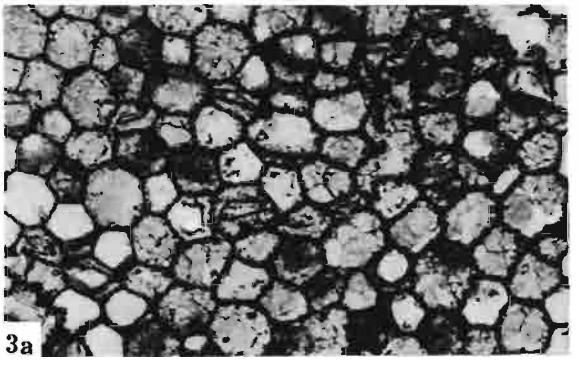
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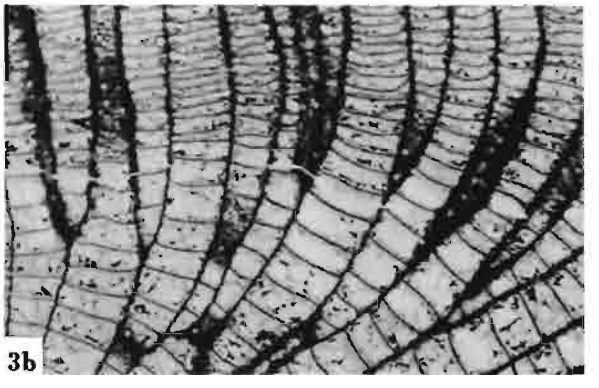
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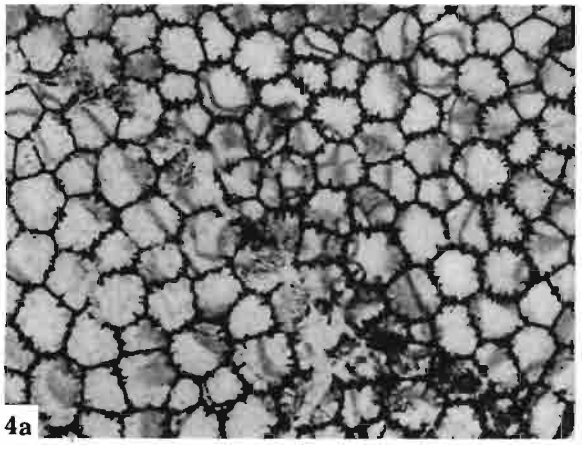
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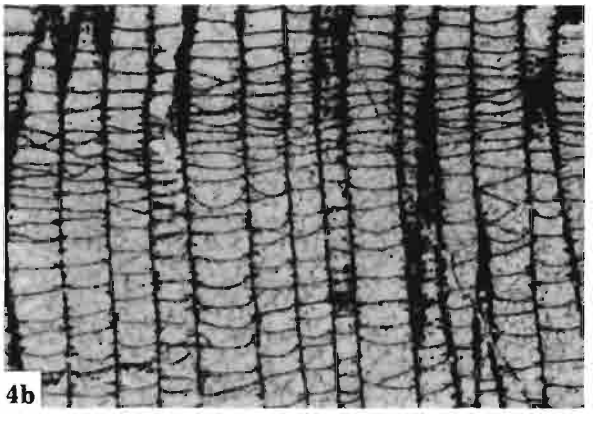
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A. Stasińska: Tabulata from Norway, Sweden and Poland

Palaeontologia Polonica, No. 18, 1967

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

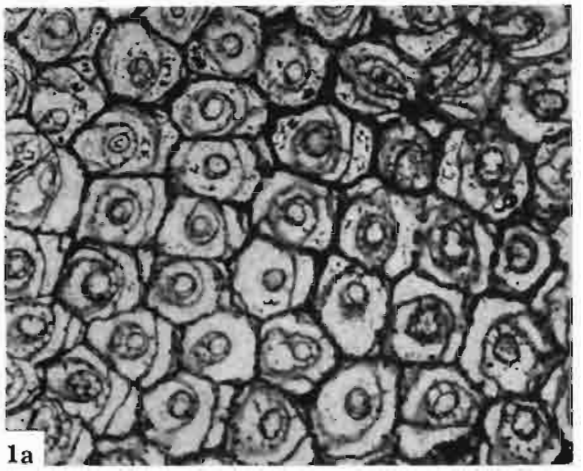
PLATE XXVI

Page

Fig. 1. *Syringolithes kunthianus* (LINDSTRÖM) (Z.Pal.T/IV-5): *a* cross-section, ×5; *b* longitudinal section, ×5. Sweden, Island of Gotland, Silurian 85

Fig. 2. *Favosites lichenarioides* SOKOLOV (INB-1911): *a* cross-section, ×10; *b* longitudinal section, ×10. Sweden, Island of Gotland, Korpklint, Wenlock 81

Fig. 3. *Favosites exilis* SOKOLOV (Z.Pal.T/III-5): *a* cross-section, ×5; *b* longitudinal section, ×5. Poland, erratic boulder 78



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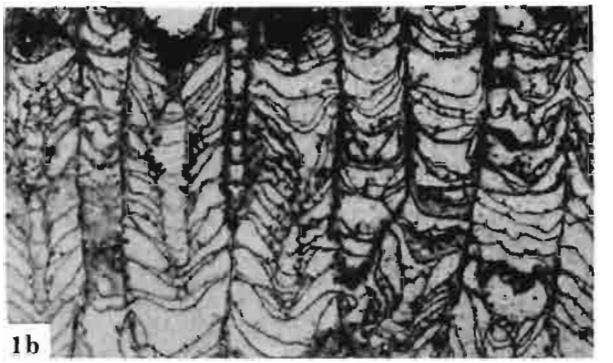

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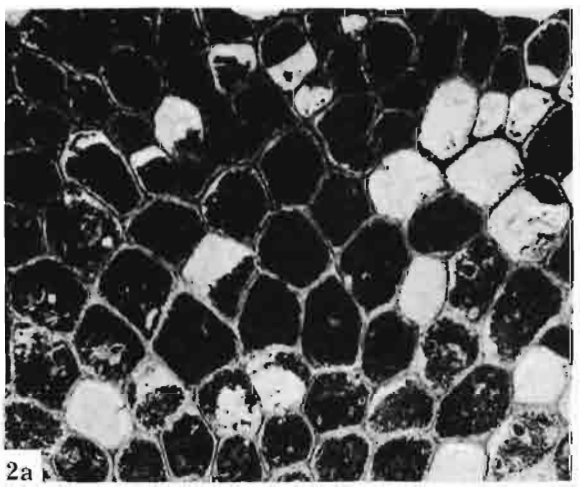

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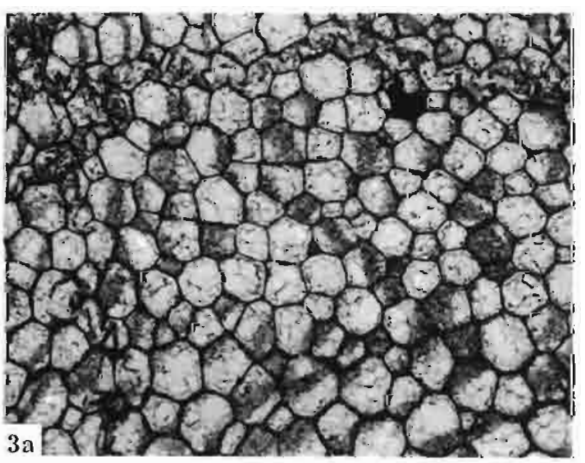

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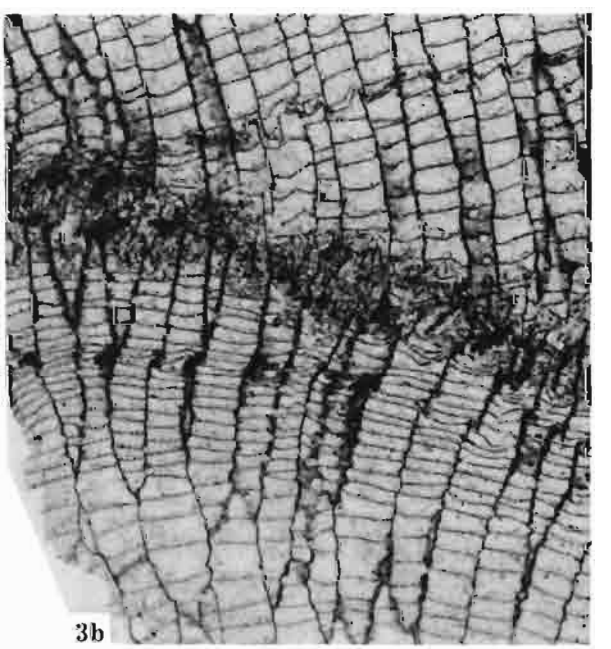

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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

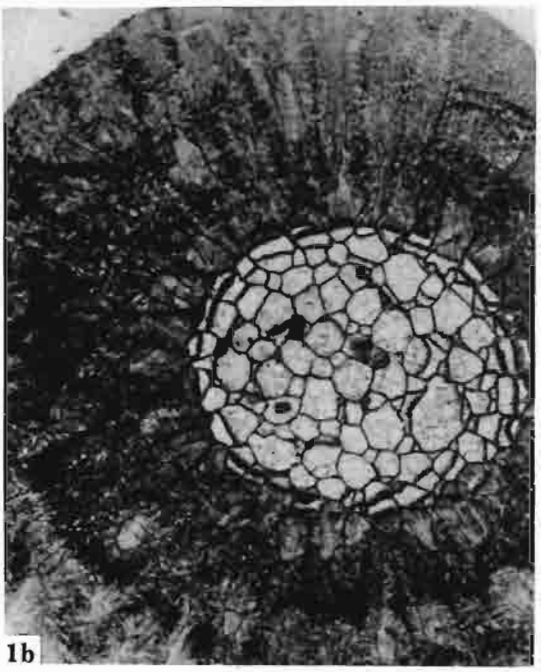
PLATE XXVII

Page

Fig. 1. *Parastriatopora sokolovi* SMIRNOVA (Z.Pal.T/III-205): *a* cross-section, ×3; *b* longitudinal section, ×3. Poland, erratic boulder 87

Figs. 2-3. *Pachypora lamellicornis* LINDSTRÖM, Sweden, Island of Gotland, Silurian 88
Fig. 2. *a* cross-section, ×11; *b* longitudinal section, ×11 (INB-1840)
Fig. 3. Surface of colony, ×1·5 (INB-1925).

Figs. 4-5. *Thamnopora? undvaensis* KLAAMANN 89
Fig. 4. Longitudinal section, ×5. Sweden, Island of Gotland (INB-1852).
Fig. 5. Cross-section, ×15. Poland, erratic boulder (Z.Pal.T/III-158).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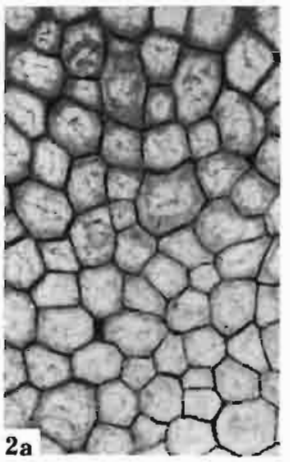
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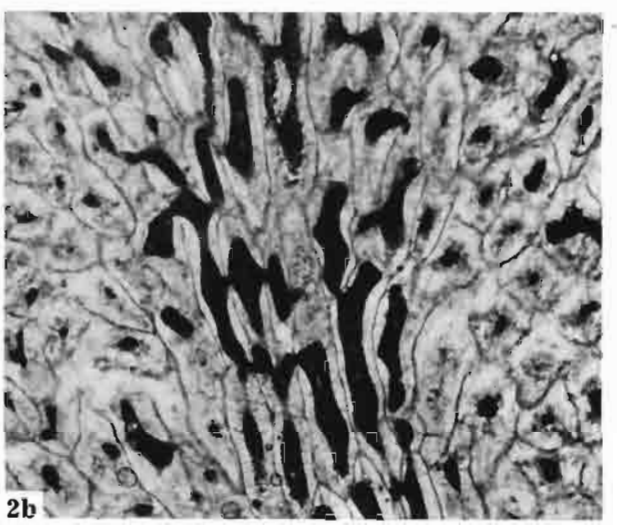
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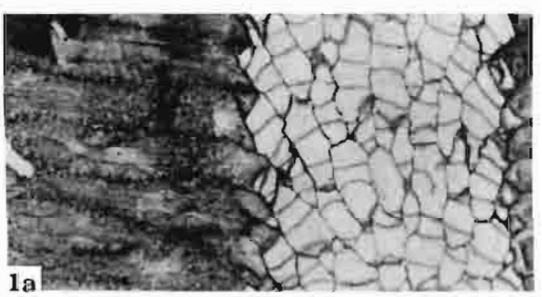
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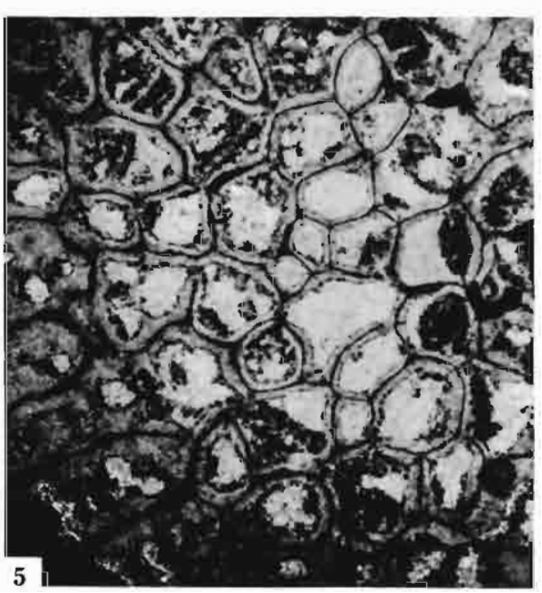
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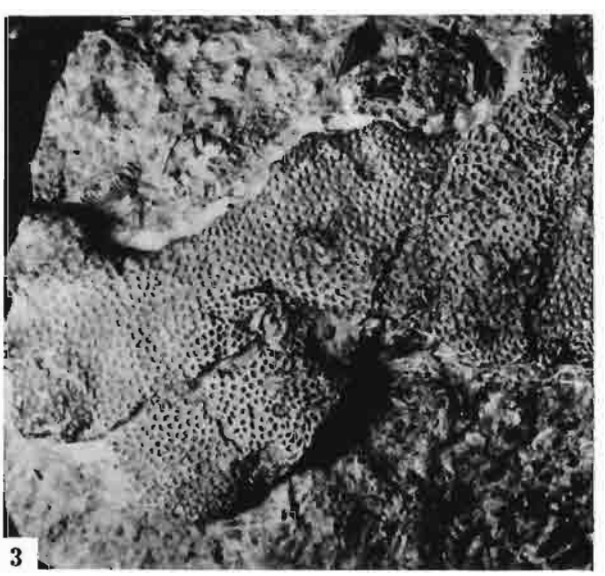
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XXVIII

Page

Fig. 1. *Coenites juniperinus* EICHWALD (PMO-49367): longitudinal and tangential section, ×5. Norway . . . 92

Fig. 2. *Subalveolitella majuscula* KLAAMANN (INB-1857): *a* cross-section, ×5; *b* longitudinal section, ×5. Sweden, Island of Gotland, Silurian 91

Fig. 3. *Subalveolites sokolovi* KLAAMANN (Z.Pal.T/IV-2): longitudinal and cross-section, ×5. Sweden, Island of Gotland, Silurian 90

Fig. 4. *Subalveolites panderi* SOKOLOV (INB-1826): *a* cross-section, ×10; *b* longitudinal section, ×10. Sweden, Island of Gotland, Korpklint, Silurian 90

Fig. 5. *Subalveolites callosus* KLAAMANN (Z.Pal.T/IV-34): longitudinal and cross-section, ×5. Sweden, Island of Gotland, Silurian 89


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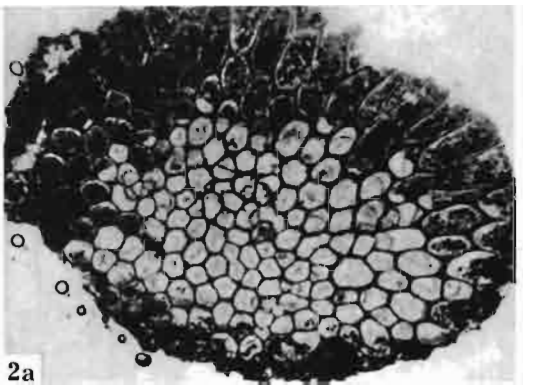
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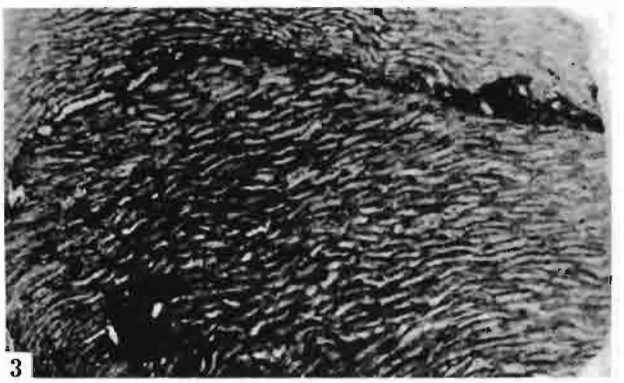
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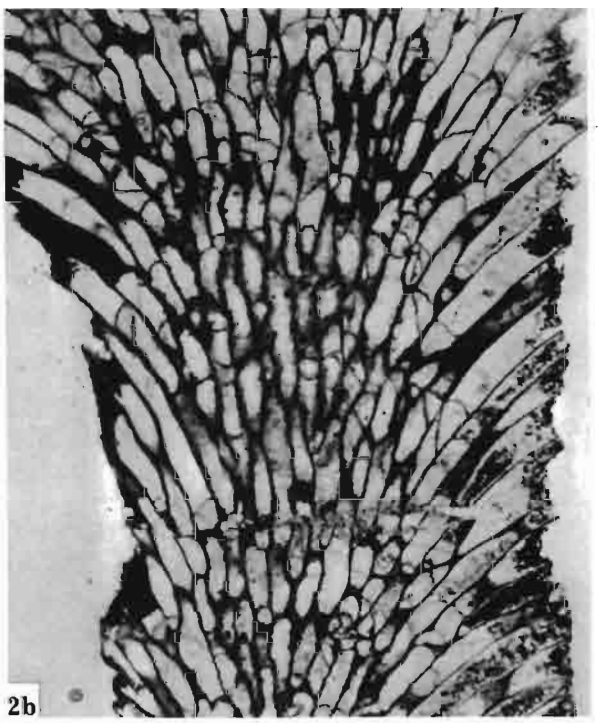
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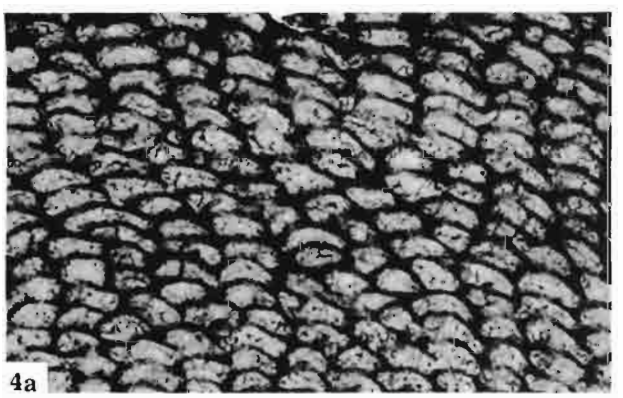
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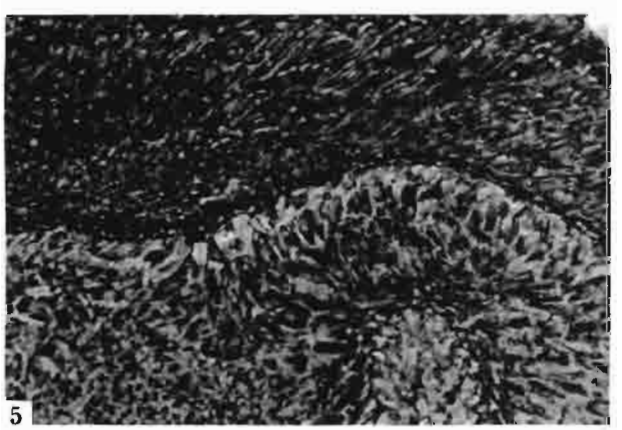
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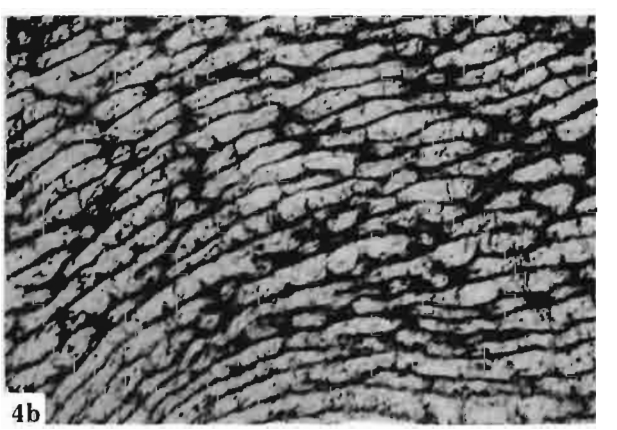
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PLATE XXIX

Page

Fig. 1. *Syringopora maxima* n. sp. (Z.Pal.T/III-112): *a* cross-section, ×7; *b* longitudinal section, ×5. Poland, erratic boulder. Holotype 94

Fig. 2. *Syringopora lindstroemiformis* n. sp. (Z.Pal.T/III-114): *a* cross-section, ×4·5; *b* longitudinal section, ×4·5. Poland, erratic boulder. Holotype. 95

Fig. 3. *Syringopora norvegica* n. sp. (PMO-49492): *a* cross-section, ×5; *b* longitudinal section, ×5. Norway, Holmestrand, Langøy, Series 9. Holotype 96


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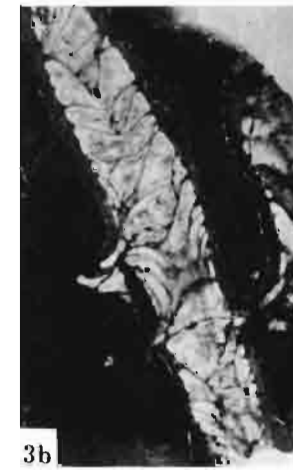
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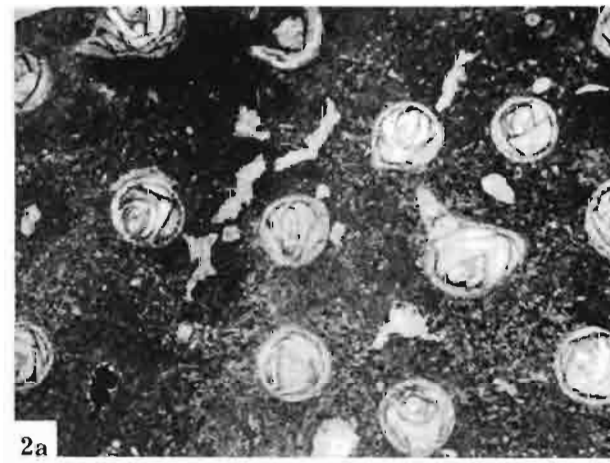
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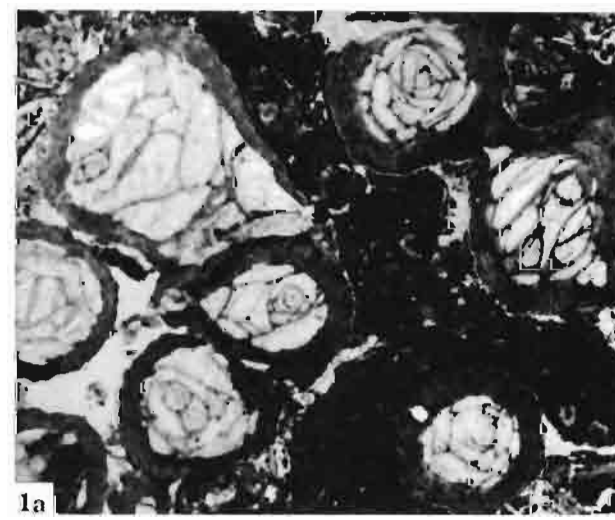
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

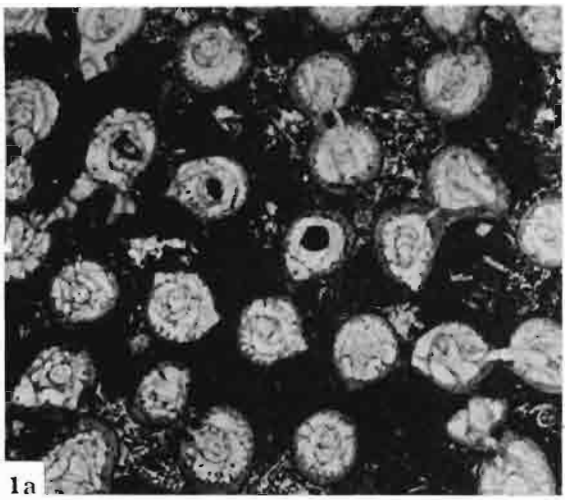
PLATE XXX

Page

Fig. 1. *Syringopora blanda* KLAAMANN (PMO-49359): *a* cross-section, ×5; *b* longitudinal section, ×5. Norway, Malmøy, Langøy, Stage 7a 93

Fig. 2. *Syringopora novella* KLAAMANN (INB-1782): *a* cross-section, ×9; *b* longitudinal section, ×9. Sweden, Island of Gotland, Upper Visby Marl, between Kopparsvik and Högklint 96

Fig. 3. *Syringopora blandaeformis* n. sp. (Z.Pal.T/III-166): *a* cross-section, ×10; *b* longitudinal section, ×10. Poland, Oborniki, erratic boulder. Holotype 93



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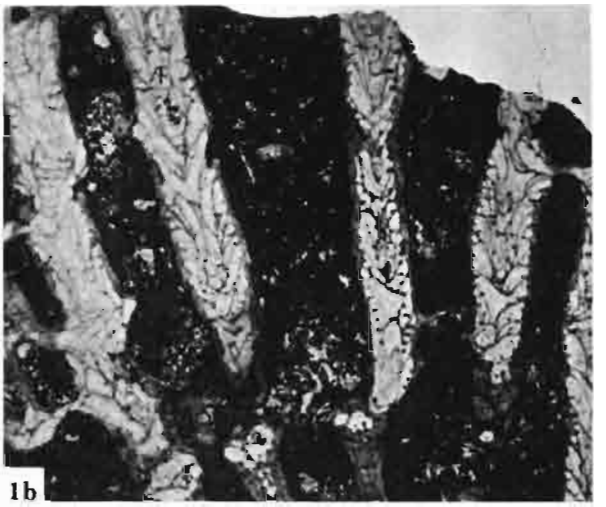

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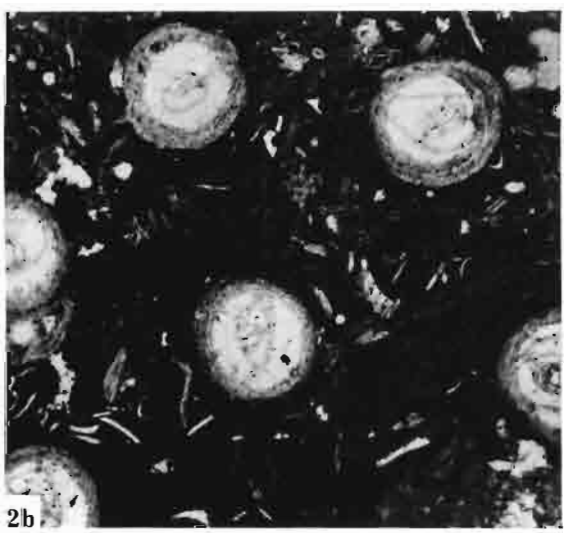

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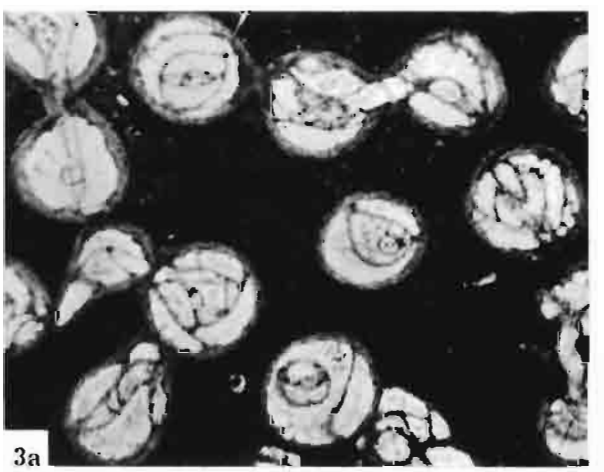

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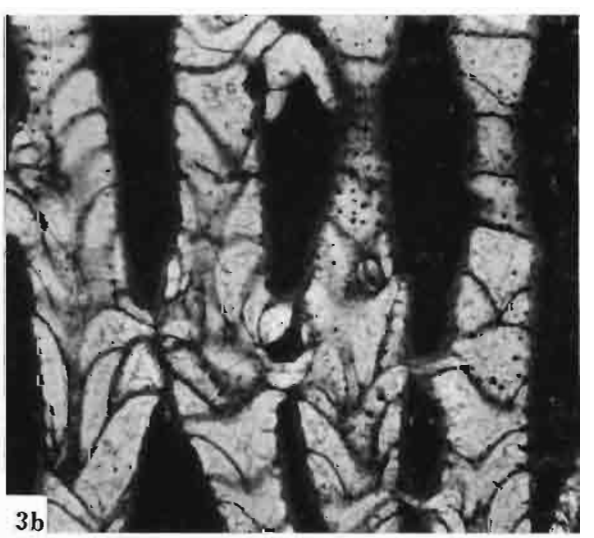

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Palaeontologia Polonica, No. 18, 1967

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

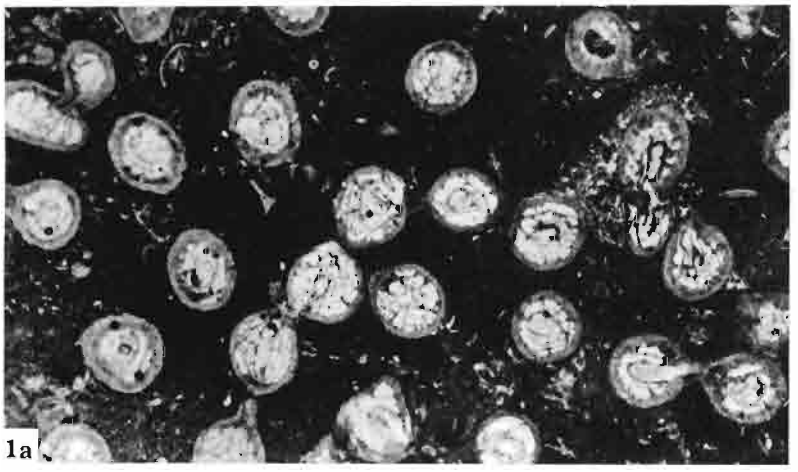
PLATE XXXI

Page

Fig. 1. *Syringopora multifaria* KLAAMANN (PMO-S3675): *a* cross-section, ×5; *b* longitudinal section, ×5. Norway, Ringerike, Bragsøy, Stage 8c 96

Fig. 2. *Syringopora polonica* n. sp. (Z.Pal.T/III-73): *a* cross-section, ×7; *b* longitudinal section, ×10. Poland, Oborniki, erratic boulder. Holotype 95

Fig. 3. *Syringopora schmidti* TCHERNYCHEV (Z.Pal.T/III-4): *a* cross-section, ×8; *b* longitudinal section, ×8. Poland, erratic boulder 98



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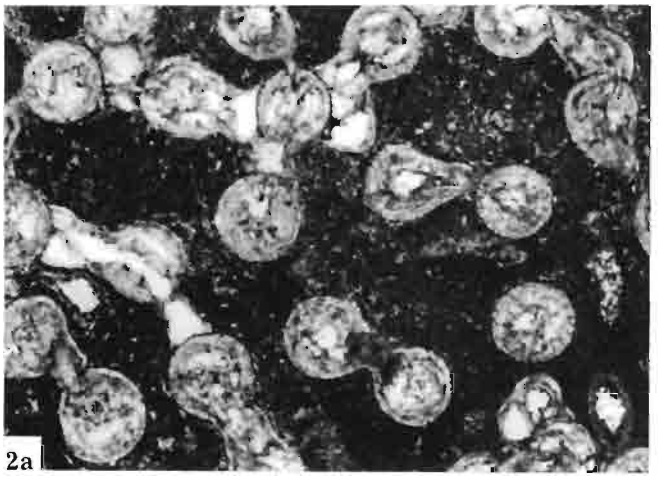

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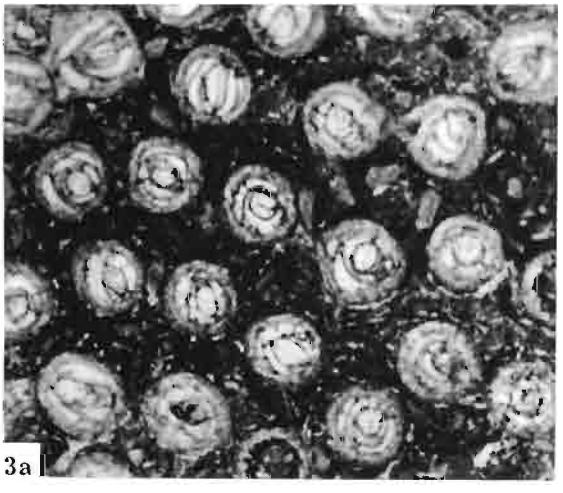

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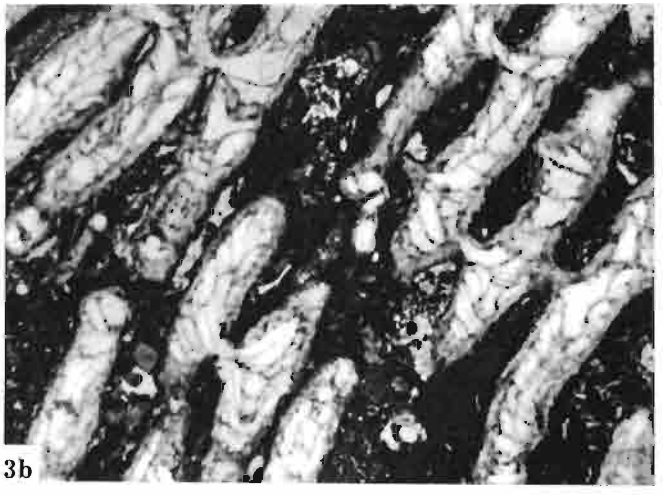

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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XXXII

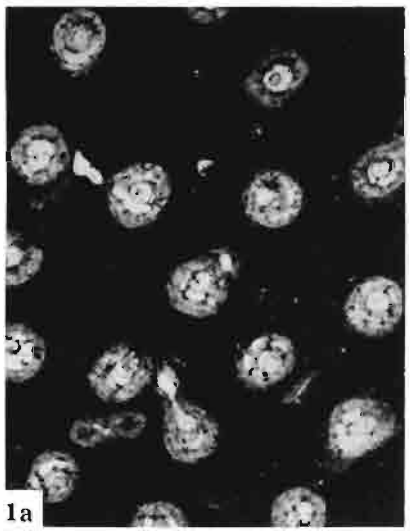
Page

Fig. 1. *Syringopora parviformis* n. sp. (Z.Pal.T/III-147): *a* cross-section, ×10; *b* longitudinal section, ×10. Poland, erratic boulder. Holotype 97

Fig. 2. *Syringopora schmidtiformis* n. sp. (Z.Pal.T/III-72): *a* cross-section, ×5·5; *b* longitudinal section, ×5·5. Poland, erratic boulder. Holotype. 98

Fig. 3. *Syringopora parva* n. sp. (Z.Pal.T/III-43): *a* cross-section, ×10; *b* longitudinal section, ×10. Poland, Ustka, erratic boulder. Holotype 97

Fig. 4. *Syringopora crassa* n. sp. (Z.Pal.T/III-1962): *a* cross-section, ×8; *b* longitudinal section, ×5. Poland, Mochty, erratic boulder. Holotype 94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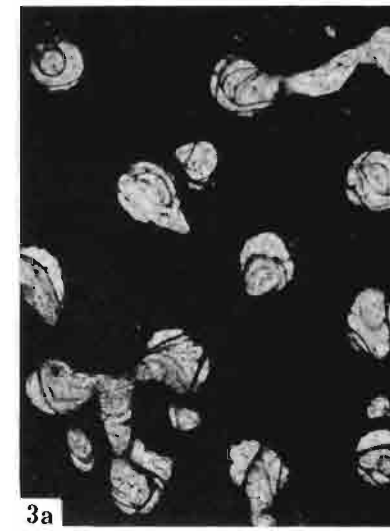
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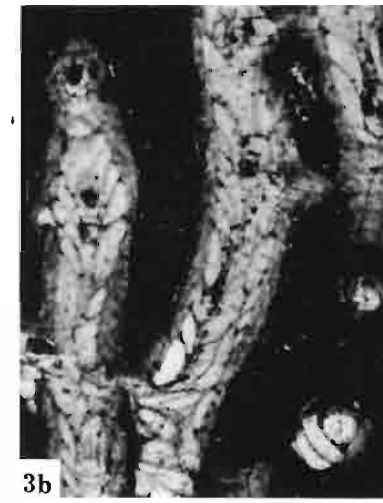
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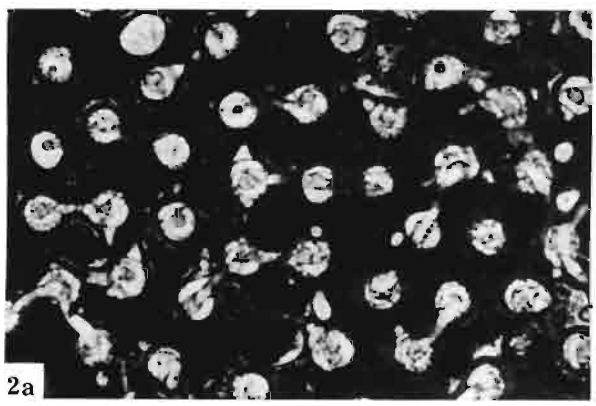
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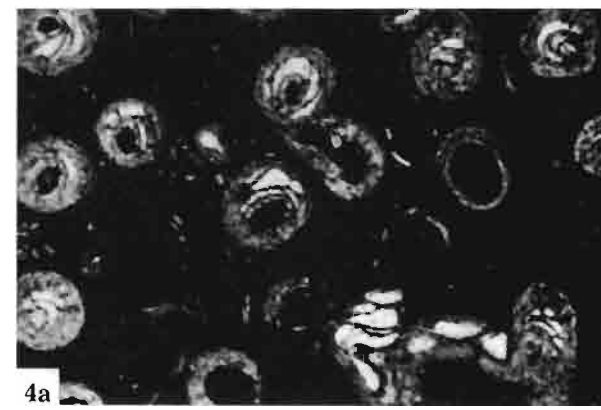
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A. Stasińska: Tabulata from Norway, Sweden and Poland

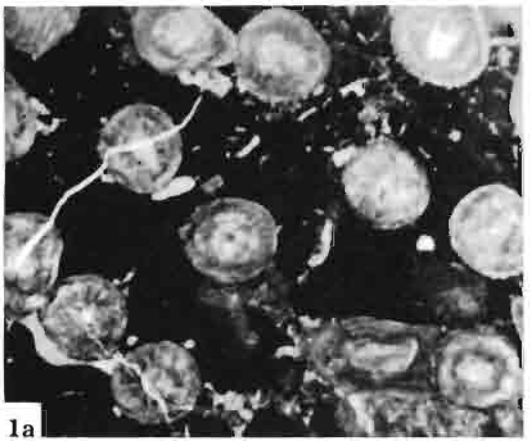
A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XXXIII

Page

Figs. 1-2. *Multithecopora norvegica* n. sp. Norway, Ringerike, Rytteraker, Stage 7b 99
Fig. 1. *a* cross-section, ×5; *b* cross-section, ×10 (PMO-72259).
Fig. 2. Longitudinal section, ×5 (PMO-61028). Holotype.

Figs. 3-4. *Fletcheria tubifera* MILNE-EDWARDS & HAIME. Sweden, Island of Gotland, Stora Carlsö 101
Fig. 3. *a* cross-section, ×5; *b* longitudinal section, ×5 (RM-19099).
Fig. 4. Upper surface of colony, ×4 (RM-21081).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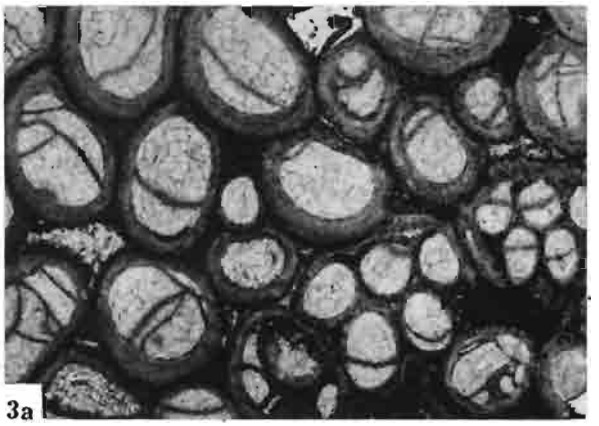
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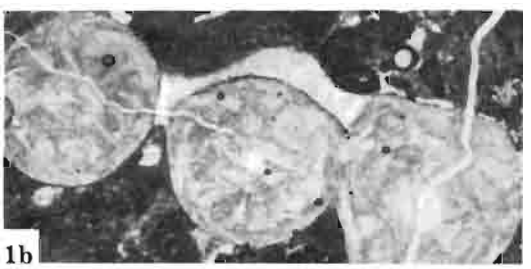
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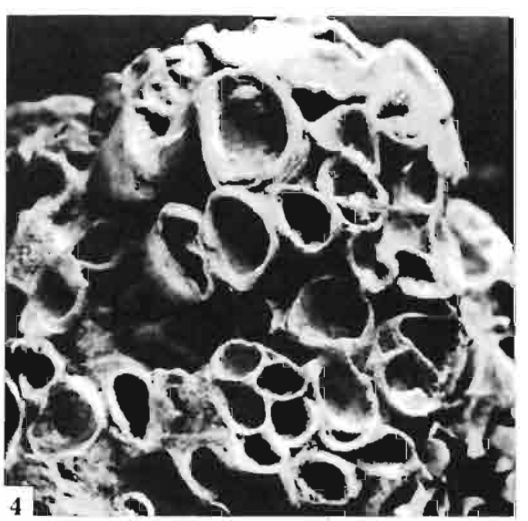
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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XXXIV

Page

Fig. 1. *Catenipora* sp. (INB-1930): incipient stage of colony, ×12. Sweden, Island of Gotland, Korpklint, Wenlock 13

Fig. 2. *Favosites* sp. (RM-17255): incipient stage of colony, ×9. Sweden, Island of Gotland, Sproge 21

Fig. 3. *Halysites junior* KLAAMANN (RM-19721): lateral view of young colony, ×3·5. Sweden, Island of Gotland, Visby 57

Fig. 4. *Favosipora clausa* (LINDSTRÖM) (RM-18038): young colony, ×10. Sweden, Island of Gotland, Visby . 100

Fig. 5. *Catenipora* sp. (INB-1899): incipient stage of colony, ×13. Sweden, Island of Gotland, Wenlock, Upper Visby Marl 13

Fig. 6. *Catenipora escharoides* LAMARCK (RM-20063): basal view of colony, ×7. Sweden, Island of Gotland, Irevik 44

Fig. 7. *Halysites junior* KLAAMANN (RM-19715): incipient stage of lateral chain, ×5·2. Sweden, Island of Gotland, Visby 57

Figs. 8-9. *Catenipora* sp. (INB-1980): young colony, ×8. Sweden, Island of Gotland, Suderbys, Wenlock . . 13

Fig. 10. *Catenipora* sp.: young colony, ×4. Fragment of specimen illustrated on Fig. 1 13


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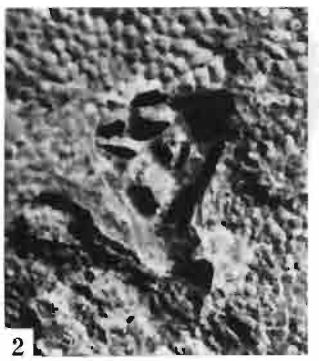
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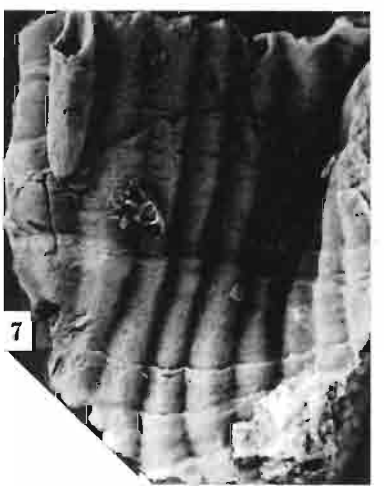
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Palaeontologia Polonica, No. 18, 1967

A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XXXV

Page

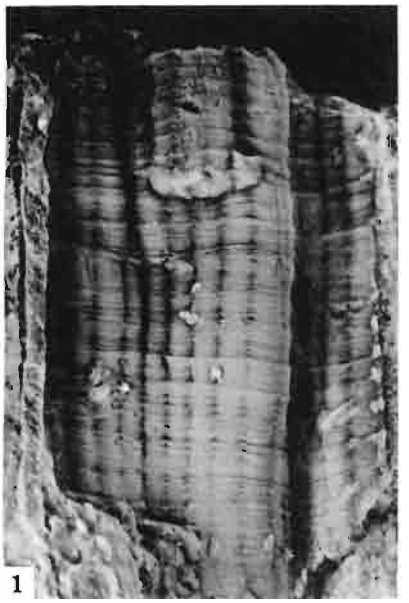
Fig. 1. *Catenipora quadrata* (FISCHER-BENZON) (INB-1771): lateral surface of colony, with epitheca folded, ×4. Sweden, Island of Gotland, Silurian 53

Fig. 2. *Halysites junior* KLAAMANN (RM-19714): lateral surface of colony, with epitheca folded. ×3·2. Sweden, Island of Gotland, Visby, Silurian 57

Fig. 3. *Catenipora heintzi* n. sp. (Z.Pal.T/III-71): cross-section, showing three-layered structure of wall (epitheca, middle and internal layers), ×34. Poland, erratic boulder 45

Fig. 4. *Catenipora oriens* KLAAMANN (PMO-42944): cross-section showing three-layered structure of wall (epitheca, middle and internal layers), ×43·3. Norway 50

Fig. 5. *Catenipora escharoides* LAMARCK (RM-19964): tangential section of epitheca, ×50. Sweden, Island of Gotland, Silurian 44



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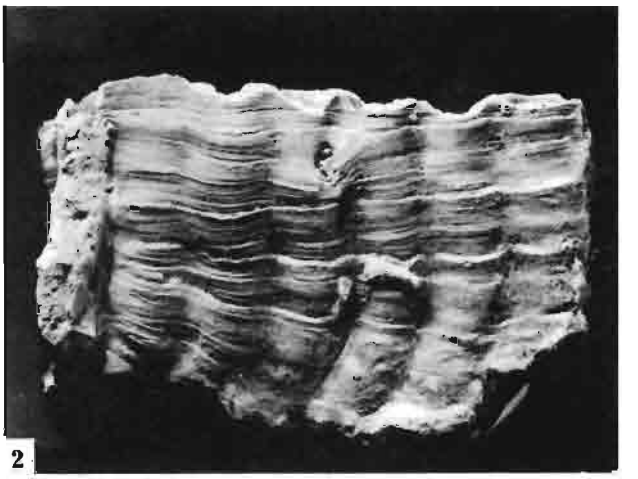

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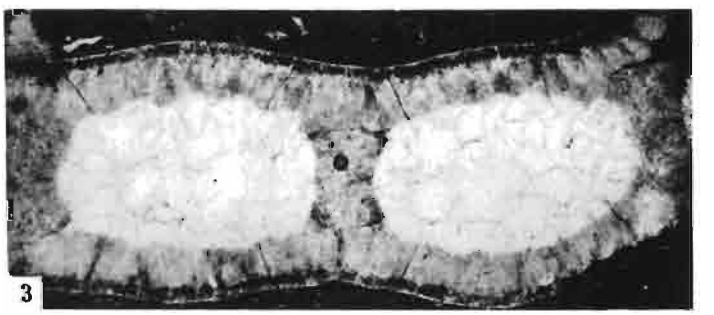

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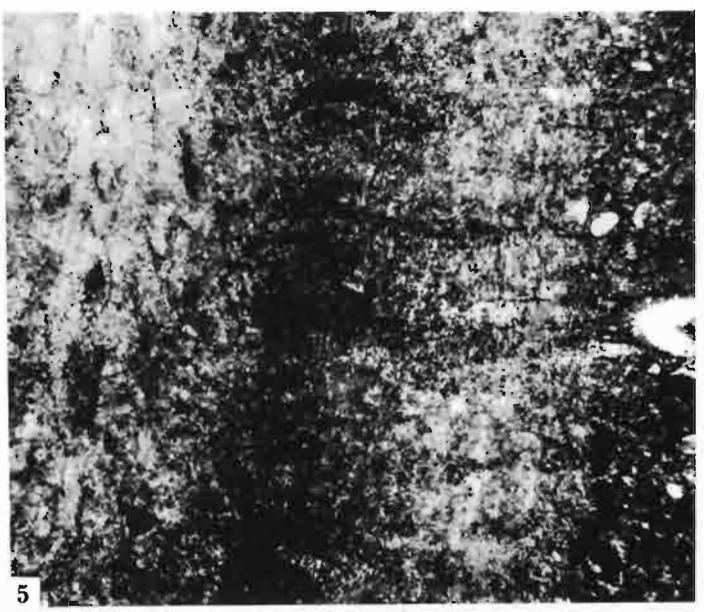

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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

Palaeontologia Polonica, No. 18, 1967

PLATE XXXVI

Page

Fig. 1. *Laceripora cribrosa* EICHWALD (Z.Pal.T/III-29): cross-section, ×42. Poland, erratic boulder 65

Fig. 2. *Catenipora piirsaluensiformis* n. sp. (Z.Pal.T/III-40): *a* cross-section, ×44; *b* longitudinal section, ×45. Poland, erratic boulder 52

Fig. 3. *Thecia swinderniana* (GOLDFUSS) (Z.Pal.T/III-157): cross-section, ×44. Poland, erratic boulder 64

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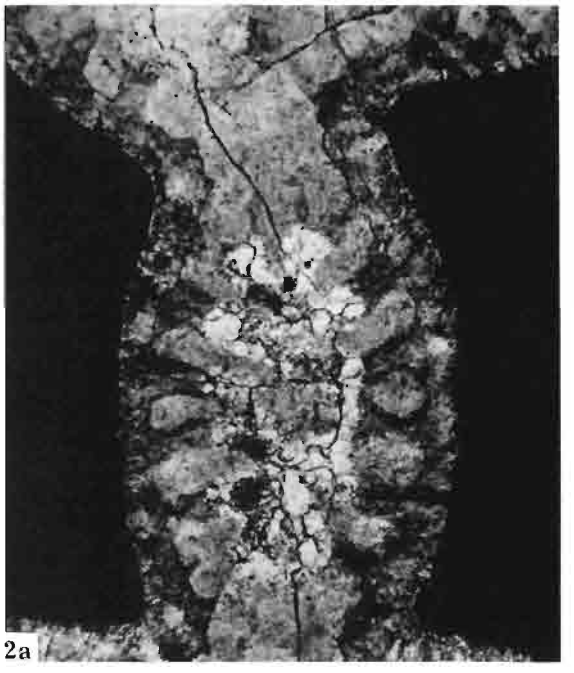

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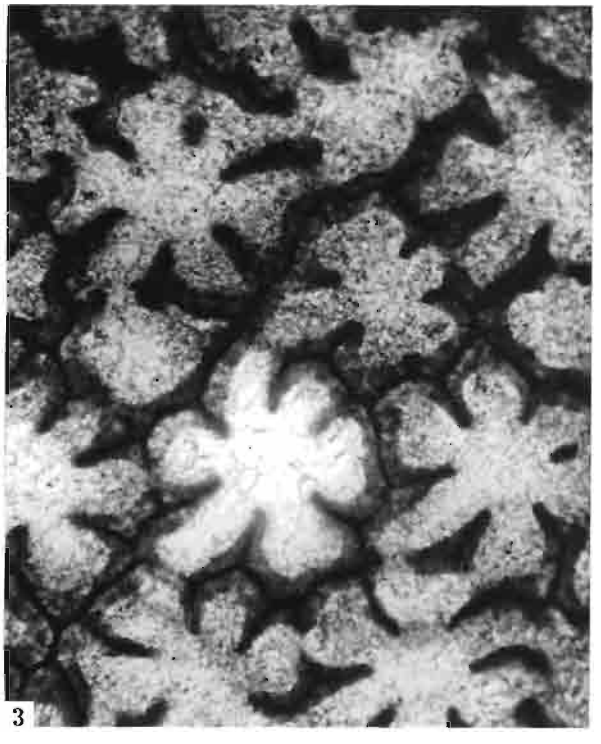

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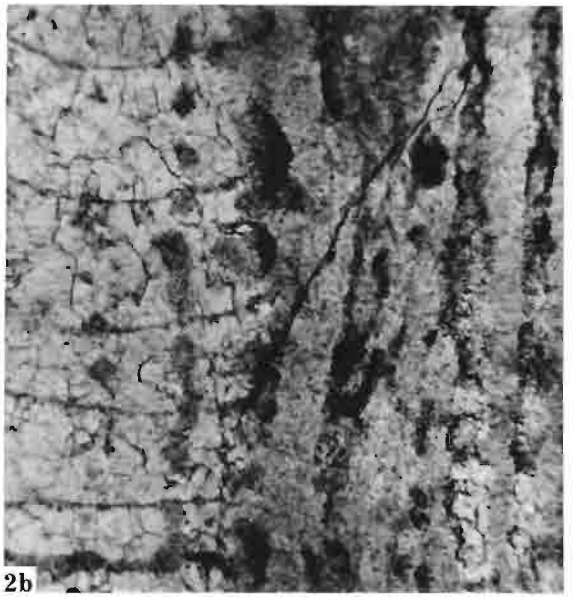

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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

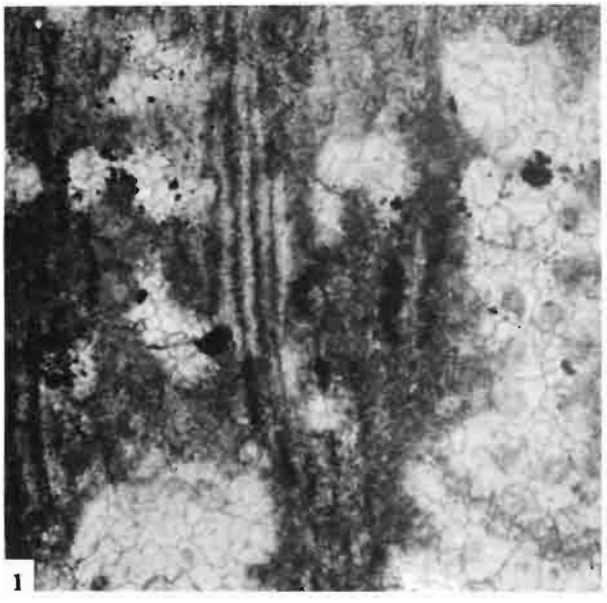
PLATE XXXVII

Page

Fig. 1. *Angopora hisingeri* JONES (INB-1761): longitudinal section, ×44. Sweden, Island of Gotland, Silurian . 61

Fig. 2. *Syringopora multifaria* KLAAMANN (PMO-3675): cross-section, ×44. Norway, Ringerike, Bragsøy, Stage 8c 96

Fig. 3. *Kiaerites norvegicus* n. gen., n. sp. (PMO-45341): *a* cross-section of wall, ×44; *b* longitudinal section of wall, ×44. Norway, Ringerike, Vesleøy, Substage 7cβ. Holotype 63



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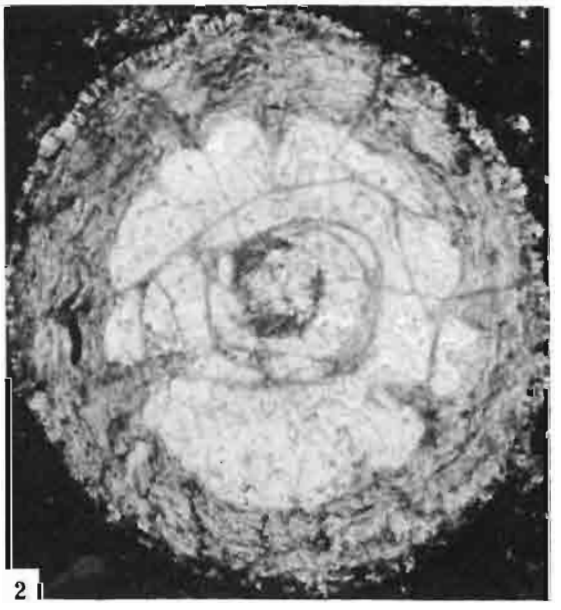

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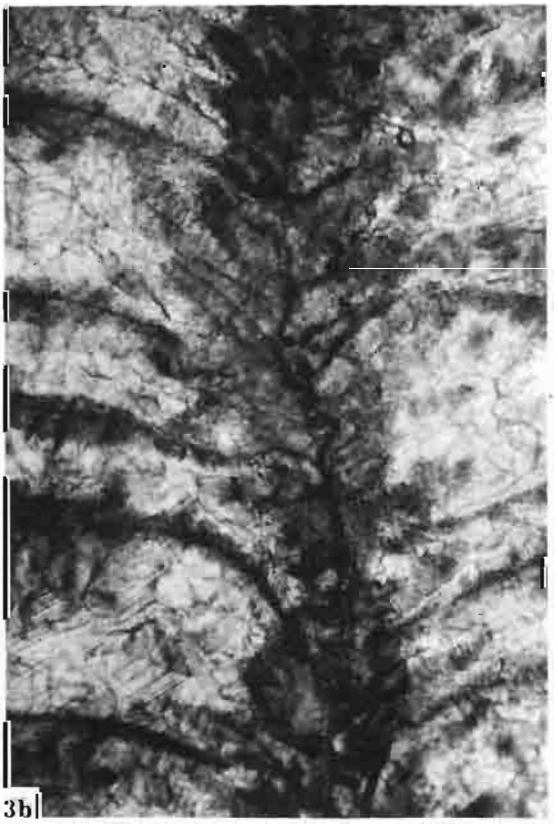

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A. STASIŃSKA: TABULATA FROM NORWAY, SWEDEN AND POLAND

PLATE XXXVIII

Page

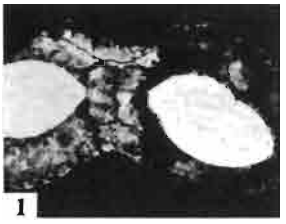
Figs. 1-6. *Halysites senior* KLAAMANN: cross-section showing formation of mesocorallites, ×28. Sweden, Island of Gotland, Silurian 57

Fig. 1. Irevik (Z.Pal.T/IV-14).
Fig. 2. Irevik (Z.Pal.T/IV-13).
Fig. 3. Klinteberget (Z.Pal.T/IV-34).
Fig. 4. Visby (Z.Pal.T/IV-15).
Fig. 5. Klinteberget (Z.Pal.T/IV-35).
Fig. 6. Visby (Z.Pal.T/IV-15).

Figs. 7-11. *Halysites junior* KLAAMANN: cross-sections showing formation of mesocorallites and shape of their side-walls, ×26 57

Fig. 7. Sweden, Island of Gotland, Fölingbo, Silurian, (RM-19799).
Fig. 8. Poland, erratic boulder (Z.Pal.T/III-113).
Fig. 9. Sweden, Island of Gotland, Västergarn, Silurian, (RM-19991).
Fig. 10. Poland, erratic boulder (Z.Pal.T/III-113).
Fig. 11. Sweden, Island of Gotland, Visby, Silurian (RM-19713).

Fig. 12. *Catenipora maxima* (FISCHER-BENZON) (PMO-47020): cross-section, ×25. Norway, Ringerike, Tyrifjord, Stage 7b 48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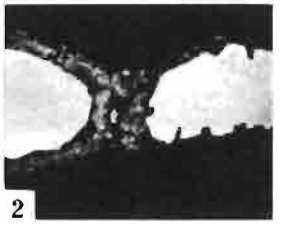
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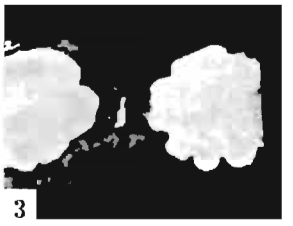
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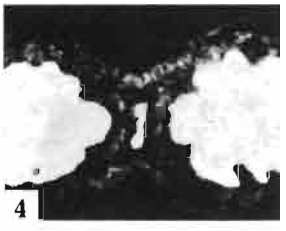
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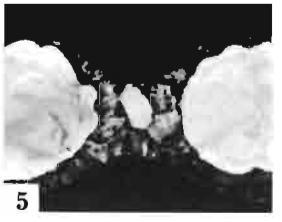
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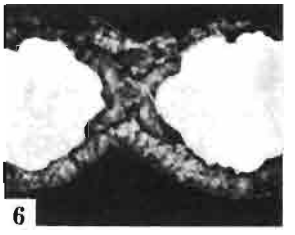
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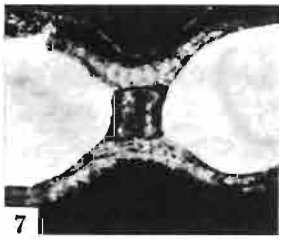
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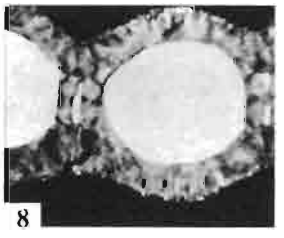
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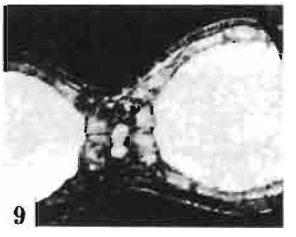
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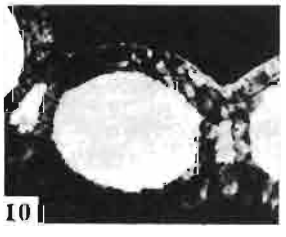
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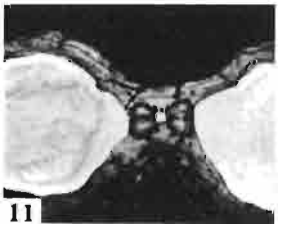
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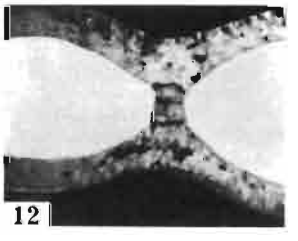
12

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