

SVERIGES GEOLOGISKA UNDERSÖKNING

SER. C.

Avhandlingar och uppsatser.

N:o 313.

ÅRSBOK 16 (1922) N:o 3.

ON »DISCINELLA HOLSTI MBG.»

AND

SCAPHA ANTIQUISSIMA (MARKL.)

OF THE DIVISION

PATELLACEA

BY

HERMAN HEDSTRÖM

(WITH 1 PLATE)

Pris 0,50 kr.

STOCKHOLM 1923

KUNGL. BOKTRYCKERIET. P. A. NORSTEDT & SÖNER

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In 1911 and the beginning of 1912, a diamond boring¹ was carried out through the Cambrian-Silurian strata at the Cement Factory near Visby. At the detailed study of the cores that was made in the following year by Mr. GEORG LILJEVALL, there was also found a fossil that showed a full correspondence to the Brachiopod »*Discinella Holsti*», described by MOBERG². When, as a result of LILJEVALL'S discovery, I examined, at the Geological Survey of Sweden, the original material for MOBERG'S description of this fossil, and his diagnoses based on this, it appeared to me that sufficient reasons were not adduced in favour of the specimen being a Brachiopod. The muscle-impressions lying around the apex appeared to me more similar to those existing in the families *Patellidae*, *Acmaeidae* and *Tryblidiidae*³ belonging to Class *Gastropoda*, Order *Aspidobranchia* and sub-order *Docoglossa*.

MOBERG describes »*Discinella Holsti*» as »a Brachiopod with two different shells», with both shells almost »circular or elliptical» in shape. The essential difference between these two shells is, that »the one is almost flat» (Fig. 5, 7 and 8) and »the other» »in its central part more or less arched» (Fig. 3, 4 and 6), and, in addition, that the arched or more convex shell has »14 furrowshaped, outward rounded depressions (muscle-impressions?)», while the flat shell is provided with »14 radiating faint ribs or ridges, arranged in the same way as the furrows» in the arched shell.

A renewed examination of the whole of the material brought together by MOBERG and HOLST shows quite clearly, however, that we are dealing with but one kind of shell.

¹ A lecture on this deep diamond boring was given by the present writer at the meeting of the Geological Society of Stockholm, on the 7 March, 1912 (Cfr. Geol. Fören. Förh., Vol. 34, P. 282), but the paper then promised has not yet been printed, it being considered more suitable to await the results of the examination of the fossil contents of the cores.

² MOBERG, JOH. CHR.: Om en nyupptäckt fauna i block af kambrisk sandsten, S. G. U., Ser. C., N:o 125. Also printed in G. F. F., 1892, Vol. 14. — Cfr also MOBERG, JOH. CHR.: Historical-stratigraphical review of the Silurian of Sweden, S. G. U., Ser. C., N:o 229. 1910. Pag. 198.

³ In systematic respects I follow the latest and revised edition of ZITTEL-EASTMAN'S »Text-book of Palaeontology» (1913).

The »flat shell» has proved to be merely a compressed, accidental form of preservation of the arched shell, the character of the rock in which the shells lie appearing to play an essential role in the matter. Where the rock consists of denser, schistose sandstones of fine consistency, such as in boulders from Ekerum harbour, there may be found all possible transitional forms, from arched shells to almost entirely or partially and more or less compressed so-called »flat shells».

The best specimens of the fossil occur almost exclusively in a somewhat coarser sandstone which, judging by the collected boulders, presents hardly any stratification visible to the naked eye, and in this there are found almost exclusively shells of the arched form. Such well-preserved specimens (Fig. 9, 10 and 11) have, especially if they be viewed exteriorly, a marked mother-of-pearl sheen, with occasional concentric brownish bands, and a fine, concentric striation. When analysed, the shell-substance proves to consist of phosphate of lime. All the shells, of which the largest have a greatest shell-diameter of a little more than 4 mm, are very thick in proportion to their small size, and are composed of several layers of shell substance. These shell-layers have, in many instances, become loose and separated, a circumstance which is specially prominent in the closer-grained and stratified specimens. Frequently, this loosening of the layers has occurred along the concentric striation and the sculpture caused by the lines of growth, so that, as we pass inwards from the margin of the shell across the lines of growth, in one and the same specimen, it is possible to see how the one layer after the other has loosened or »scaled off».

Such layers, which, on their inner side facing towards the hollow of the shell, present these muscle impressions and furrows, have, of course, on their outward face, moulds of these impressions in the form of ridges; i. e., if we look at the inner side of the shell, the muscle impressions appear like grooves or furrows while, on the other hand, if we view the outside of the top of such a shell whose outer layers are wanting, we then observe elevations or ridges. Among the material collected there are numerous examples of this really being the case, and if we examine MOBERG'S figures of the so-called »flat shell» a little more closely, we find that, there too, the present explanation is the correct one, in spite of the figures not being very well executed. In Fig. 7, which is that of a compressed shell, there is seen from the outside, the faint marks of the muscle impressions, and, in Fig. 5, which, according to MOBERG, is a drawing of the inner side of a »flat shell», it is in reality, the outward-turned, ridge-marked, side of a deeper-lying shell layer which is presented to us, and not

the inner nor the outer side of an entire shell. In the moulds of the inner side of the shell there are also visible fully analagous ridges resembling those on MOBERG'S so-called »flat shells».

From what has been said follows that »*Discinella Holsti* MBG.» is a univalve fossil. Its Patellida form, and the occurrence of the paired muscle-impressions refer it necessarily to the Class Gastropoda, sub-class Docoglossa and, most immediately, therefore, to the division Patellacea. Its present generic name »*Discinella*», which, as a diminutive name of the Brachiopod genus *Discina*, refers it to the Class *Brachiopoda*, must be altered to another. Professor MOBERG having been the first to call attention to, and to describe, the fossil in question, I propose for it the generic name *Mobergella* and beg to characterize it as follows:

Genus *Mobergella* n.

Small shells of phosphate of lime, circular or somewhat elliptic in form, with the apex lying in front of the centre, with concentric striation (lines of growth), on the inside with paired, but non-connected muscle impressions, issuing radially from the apex and arranged symmetrically on both sides of the longitudinal axis of the shell.

Mobergella Holsti (MBG.). (On the Plate there are given three new illustrations of the fossil, Fig. 9—11.) In well-preserved specimens the shell is translucent and with a mother-of-pearl sheen; the somewhat weathered specimens are of a dull white. The length of the largest specimens is about 4 mm, the greatest breadth, that behind the apex, is about 3.5 mm. In the best preserved specimens the shell has the form of a low, oblique cone with its maximum slope in front of the apex¹ and its minimum inclination out towards the margin behind the apex. In a large number of specimens, the apex occasionally rises like a skull-cap above a more or less broad and flattened outer margin or a brim which varies in breadth and character in the different specimens, but is seldom of a convex form.

The apex rises about 1 mm, or a little more, above the base of the shell, and lies at a distance of $\frac{1}{3}$ and $\frac{2}{3}$ the length of the shell from the respective ends of the longitudinal axis; it does not seem to be perfectly pointed, however, but the extreme end is flattened a little and rounded off (Fig. 10). On the outside, the shell has a fine, concentric striation (lines of growth) and, as mentioned above, has a mother-of-pearl sheen with one or more concentric brown bands

¹ This part is called the anterior, and the other, the posterior margin of the shell, just as in the case of the *Patellidae*, and in distinction from, e. g., MOBERG'S contrary terms on p. 8 of his paper.

visible in well preserved specimens, and is translucent, so that the muscle impressions are visible through the outer layers of the shell. There is also a brown band along the outer margin of the shell (v. Fig. 10).

The inside of the shell (Fig. 9 and 11) shows 14 non-connected depressions or furrows running radially in pairs from the sides of the median axis of the shell, these furrows being shortest on the anterior and steeper side of the shell lying in front of the apex, and gradually increasing in length behind the more gently sloping part of the shell. In young individuals, the muscle impressions appear to start close to the point of the apex (Fig. 10); in older examples they are most clearly visible farther from the apex and nearer the outer contour of the shell (Fig. 9 and 11). The penultimate pair of furrows, however, are the broadest and the longest, the last couple being narrower and, as a rule, somewhat shorter than their neighbours, and they are frequently placed farther back than the pair immediately before them. In such instance, this rearmost pair of furrows form points narrowing inwards, and are outwards of a rounded oval form (Fig. 9 and 11). Between the first three pair of furrows and the four rearmost pair the intervals between the impressions are somewhat broader than in the case of other pairs. There is also a somewhat less prominent interval along the symmetry line in the longitudinal axis of the shell between the foremost two muscle impressions and the two rearmost. — Mention has already been made of the characteristics of the muscle impressions on the outer and inner sides of each shell-layer.

Localities: In erratic boulders of Lower Cambrian sandstone on the west coast of Öland and in the islands and reefs in Kalmar Sound, most richly between Halltorp, in the parish of Högsrum, in the north, and Mörbylånga, in the south. According to HOLST, 1889, also found in boulders at the north end of the island of Bornholm. Also encountered in boulders of rusty sandstone, collected by G. VON SCHMALENSÉE at Marichamn in the Åland Islands (Cfr. CARL WIMAN: Studien über das nordbaltische Silurgebiet 1. Bull. of the Geol. Inst. of Upsala, N:o 11, vol. VI. Part 1: 1902. P. 55, Pl. II, Fig. 10. Here, too, it is mentioned as a Brachiopod).

Fairly entire specimens and a large number of fragments have been found in solid rock (vide Fig. 1 and 2), prepared out of a borecore (Core-portion N:o 179*) which was obtained at a depth of 331.57—334.27 metres below the mouth of the bore-hole in the diamond boring in the marl pit of the Cement Factory, Visby.

From the account just given and from the illustrations reproduced in this paper it follows that *Mobergella Holsti* (MBG.) is a univalve fossil (MOBERG has allowed himself to be deceived by the varying states of preservation of the shells, and has described it as a bivalve one) and that it has muscle-impressions which do not at all resemble those of Brachiopoda, but are in agreement with those of the Patellacea, belonging to the Class Gastropoda.

Not having had an opportunity of seeing American specimens of *Discinella* HALL¹ which, according to WALCOTT², are identical with BILLINGS³ *Hyolithellus micans*, which, by the two last-mentioned writers, has been considered to be the operculum of a form belonging to the Pteropods and closely related to the genus *Hyolithus*. BARRANDE⁴, too, assumes that a fragment described by him is such an operculum. HALL has been doubtful of the stratigraphical place of »*Discinella*», however. He describes the fossil and says: »It is a minute discinoid phosphatic shell which I have long known in its exterior character as having the concentrically striated and obscurely radiate surface, with an eccentric apex, like many of the Discinidae. The interior of the shell (dorsal valve) is distinctly marked by nine radiating depressions, the central one of which extends towards the margin nearest the apex, with four others upon each side. At the extremities of some of these depressions there are distinct muscular markings; but were all these to be considered due to the muscular organization, we would scarcely recognize the fossil as a Brachiopod, but rather as a Gastropod. The general character of the shell, however, is such as to ally it with the Discinidae, and since we do not yet know any Gastropod of similar form and character in the older rocks, I propose for this fossil the name of *Discinella*.»

BILLINGS describes the »operculum» in the following words: »The operculum does not show distinctly a division into a dorsal and ventral limb. It is of an ovate form, depth somewhat greater than the width, the nucleus about one-third the depth from the dorsal margin. Externally it is gently concave in the ventral two-thirds of the sur-

¹ HALL: On some new or imperfectly known forms among the Brachiopoda, etc. 23 Annual Report to the Regents of the University of the State of New York, etc. Albany 1872, Appendix G, p. 246.

² WALCOTT: Second contribution to the studies on the Cambrian faunas of North America. Bulletin of the United States Geol. Survey. No 30 Washington 1886. P. 141 et seq. Pl. 14. Fig. 2 c-e.

³ BILLINGS: On some new genus of Palaeozoic fossils. The Canadian Naturalist. New Series. Vol. VI. No 2, Montreal 1871. P. 215, Fig. 3, and P. 240. (From the American Journal of Sciences and Arts. Vol II. July 1871).

⁴ BARRANDE: Système silurien du centre de la Bohême. I partie, vol. III. Prag. 1867, pag. 98 »opercule isolé H», pl. 9, fig. 16 H and 17.

face; a space around the nucleus is convex, and finely striated concentrically. On the inner surface there is a small pit at the dorsal third of the depth, indicating the position of the nucleus. From this point radiate ten elongate ovate scars, arranged in the form of a star, the rays towards the ventral side being the longest. None of these scars quite reach the margin.» — The operculum is at the »thin end of a finely lamellar structure, smooth and shining».

Uncertainty prevails, consequently, with respect to the muscle-impressions. HALL gives the number as 9, and WALCOTT has the same number in his figures (reproduced here as Fig. 12—14). BILLINGS mentions 10 muscle scars, and MOBERG too, who, by means of HOLST, has been in a position to see American specimens, has in one example, a mould, been able with certainty to count 10 radiating muscle markings.

Be this as it may, however. The American *Discinella* presents, to judge both by the description and the illustrations, an unmistakable relationship to *Mobergella Holsti* (MBG.), and is not to be considered as any operculum of *Hyolithus*. Compare, too, for this purpose, what Professor HOLM¹ says with regard to the fossil now in question. Neither the outward form nor the inner characteristics chiefly, as regards the muscle attachments, agree with such opercula. In addition to this there is the fact that no *Hyolithus* species have been found together with »*Discinella*», which latter could be the cover of the former. The names *Discinella* HALL 1872, and *Hyolithellus micans* BILLINGS 1872, cannot, therefore, be employed for this fossil, which is neither a Brachiopod nor an operculum of any *Hyolithus*. For the present the most suitable name for the fossil appears to me to be *Mobergella micans* (BILLINGS).

BARRANDES »Opercule isolé H» (quoted in paper, Pl. 9, Fig. 16 H and 17), is, probably no operculum either, but a form closely related to *Mobergella* with 3 pair of furrows or muscle impressions radiating from the apex. It has a diameter of 5 mm and he describes it in the following way: »Cette forme est remarquable, en ce que sa partie conique est sillonnée de chaque côté par 3 profondes rainures, qui se prolongent a partir du sommet, jusqu'au $\frac{2}{3}$ de la longueur. La base du cone est circulaire, et décrit un peu plus d'un demi-cercle.

Ces trois paires de rainures représentent vraisemblablement, des impressions musculaires, comme la paire habituelle, que nous avons indiquée dans les autres opercules: mais il nous est impossible d'interpréter la multiplication de ces apparences; d'ailleurs semblables.

¹ HOLM, G. Sveriges kambriska Hyolithidae och Conularidae. S. G. U. Ser, C. N:o 112. Pag. 6. Note 1.

La limbe vertical manque, dans tous les spécimens assez nombreux, que nous possédons. Nous voyons seulement, au dessus du sommet du cône, un prolongement rectiligne, toujours brisé, à la distance d'environ 1 mm.

La test a été dissous, et les apparances décrites representent le moule interne.»

If the above-mentioned fossils be submitted to a thorough revision, and if access can be had to a sufficiently large supply of material for examination, it seems to me that it would be possible to employ the number and character of the muscle-impressions or the markings as generic characteristics. BARRANDES' form, then, would belong to another genus, if it may be considered as a Gastropod.

Among Swedish nearly related fossils, LINDSTRÖM¹ has described from the silurian of Gotland, without *Tryblidium* species (op. cit. Pp. 52—58, Pl. I. Fig. 25—31; Pl. III. Fig. 1—5; Pl. I. Fig. 33—37; Pl. XIX. Fig. 2, and Pl. XVIII. Fig. 1, 2) a *Palaeacmaea*? *solarium* LINDSTR. (op. cit. Pp. 58, 59. Pl. XIX. Fig. 3, 4), which, in the best preserved specimen, has muscle impressions or scars, the number of which could not be determined, however, the example being imperfect.

In this connection, mention should also be made of *Metoptoma Barrandei* LINRS.² from the »Exsulans Limestone» in Scania, Sweden, although the only specimen hitherto known does not exhibit any muscular markings or scars. I have, to this end, examined LINNARSSON'S original specimen, which is preserved in the collections of the Swedish Geological Survey, but have been unable to find any muscular markings. According to the characteristics of the genus *Metoptoma* there should be a connected horseshoe-shaped muscular impression below the apex, so that the specimen in question cannot be related to the Patellidae.

The *Patella antiquissima* MARKL.³, found at Borensult in Östergötland, is on the other hand, a nearly related form and worthy a fuller description than KOKEN⁴ has given it.

Professor G. HOLM has kindly allowed me to borrow some specimens from the Palaeozoological Department of State Museum of Na-

¹ LINDSTRÖM, G.: On the silurian Gastropoda and Pteropoda of Gotland. Kgl. Sv. Vet. Akad. Handl. Vol. 19. 1884. N:o 6.

² LINNARSSON, G.: Om faunan i kalken med *Conocoryphe exsulans* (»*Coronatus kalken*»). S. G. U. Ser. C. N:o 35. 1879. P. 24. Pl. III, Fig. 35—37.

³ HISINGER, W.: *Lethaea Svecica seu Petrificata Sveciae*. Stockholm 1837. P. 45, Pl. XII, Fig. 10 a—c.

⁴ KOKEN, ERNST: Die Gastropoden des baltischen Untersilurs. Bull. de l'Académie Imper. des Sciences de St. Pétersbourg 1897. Vol. VII. N:o 2. P. 114.

tural History (Naturhistoriska Riksmuseum), for the purpose of illustration and description.

LINDSTRÖM, who had evidently been engaged in the examination of the fauna at Borensult, has on the museum-label given this fossil the name *Scaphe antiquissima* (MARKL.). For my own part, I consider that the generic name *Scapha*, which means boat (jollyboat), is better than *Scaphe*, signifying a hollowed-out vessel, provided with a peg and serving as a sun-dial.

Genus *Scapha* n.

The shell has a patellid, elliptical or oval form, with concentric lines of growth. The apex lies in front of the centre. The muscle scars are separate about 16 in number, and lie in a ring below the apex.

Scapha antiquissima (MARKL.)

Fig. 15—19 on the Plate.

Patellites antiquissimus MARKL.—In the Marklin Collection.

Patella antiquissima HISINGER, W.: *Lethaea Svecica*. Stockholm 1837, p. 45. Pl. XII, Fig. 10.

»*Patella*» *antiquissima* LINDSTRÖM, G.: On the silurian Gastropoda of Gotland. Kgl. Sv. Vet. Akad. Handl. Vol. 19. 1884. N:o 6. Pp. 53, 54 and 58.

Patella antiquissima KOKEN, ERNST: Die Gastropoden des baltischen Untersilurs.—Bull. d. l'Acad. Imp. des Sciences de St. Pétersbourg 1897. Vol. VII. N:o 2. P. 114. Fig. 1.

Scapha antiquissima LINDSTRÖM, G.: In the collections of State Museum of Natural History.

A limpet, obliquely conical in form, with oval circumference, the height of which is about one-half the length. The greatest breadth is behind the apex which lies in front of the centre at a distance from the anterior margin varying, in different specimens, from 5, 6.5 to 7.5 mm, while the corresponding distances to the dorsal margin are 8, 11 and 12.5 mm respectively. All the shells consist mainly of sulphur pyrite, and, appear to be somewhat worn (the apex, for instance, is rounded off at the top, and some specimens have the heavy terrace-like lines rounded too). The shell slopes more steeply out towards the anterior than towards the dorsal margin, and has concentric, heavy, terrace-like deposited lines of growth at varying distances from each other. Where the distance between these lines is great, the terrace edge is sometimes concave (Fig. 18). The outer margin of the shell appears to have been pretty nearly flat. If it be viewed from above, the apex always seems to lie somewhat nearer

the right than the left side (Fig. 17 and 19), this making the shell a little slanting, a circumstance which can be marked, too, in the inside of the shell, which is not perfectly bilaterally symmetrical.

On the inner side there are 16¹ short and broad muscular scars, separated from each other, and lying at about half the distance between the apex and the margin of the shell and, on the ventral side at least, nearer to the shell-margin than to the apex (Fig. 15 and 19). These scars lie arranged concentrically and symmetrically around the apex; they are arranged in pairs and gradually increase in size from the anterior to the dorsal margin. The scars are most deeply impressed on the side turned towards the apex and, as a rule, are broadest on the opposite side, or that turned towards the margin, a circumstance which is specially evident in the rearmost scars (Fig. 15). The dorsal and marginal ridges between the muscular markings are about half the breadth of the impressions, but, between the foremost and the next following pairs, the space between the scars is of about the same breadth as the latter.

As already mentioned, the shells are more less imperfect, but if, in order to obtain an approximate estimate of their size, we imagine the parallel lines of growth as extended to the anterior part of the shell, which is usually somewhat injured, the following dimensions are obtained:

	Length.	Breadth.	Height.
Specimen a.	20 mm	14 mm	11 mm (Fig. 15, 16).
» b.	17.5 »	14 »	8.5 » (Fig. 17, 18).
» c.	13.5 »	11 »	6—7 mm (Fig. 19).

Locality: Östergötland, Borenskull.

In writing the above short paper my intention has been to prove that *Mobergella Holsti* (MBG.) is a Gastropod. Occuring, as it does, in the Lower Cambrian, it is the oldest known specimen of this Class in Sweden. Among nearly related primitive Gastropodal forms may be mentioned: *Metoptoma Barrandei* LNRS, which belongs to the zone with *Paradoxides Tessini*. What the case may be respecting the 2 forms found by V. SCHMALENSÉE in the red *Orthoceras* limestone, at Vickleby, in Öland², one of which is stated to be a *Metoptoma*, I cannot say, not having been able to find and examine them.

Yonger than these, and belonging to the same division as the *Mo-*

¹ KÖKEN mentions 9 pair or 18 individual muscular markings, but, in the specimen figured by him, — which, it must be acknowledged, is somewhat imperfect (evidently the same example that is shown in Fig. 15 and 16) — there can be reckoned only 16. LINDSTRÖM says that it has 6 pair or 12 individual muscular scars (P. 54 in the paper cited).

² LINDSTRÖM, G.: On the silurian Gastropoda and Pteropoda of Gotland. — Kgl. Sv. Vet. Akad. Handl. Vol. 19, 1884. N:o 6, pag. 58.

bergella, is the *Scapha antiquissima* (MARKL.), described above in detail, which is derived from the *Brachiopod-shales* of Östergötland (the *Retiolites-shales*, according to LINDSTRÖM). Then we have the nearly related Gottland Upper Silurian *Tryblidium* species, and the *Palaeacmaea*(?) *solarium* LINDSTR. (Cfr. LINDSTRÖM'S above-quoted paper), which was found in the same formation.

ERRATA.

Page 7, line 14 fr. above is printed *stratigraphical*, read *systematical*.

Explanation of the plate.

Fig. 1. *Mobergella Holsti* (MBG.). Inner side of a shell. — 5/1. — From the deep diamond boring at the Cement Factory, Visby, at a depth of about 50 metres above the gneiss forming the bed under-lying the Cambrian strata there. The original belongs to the Swedish Geological Survey. The muscular scars are in agreement with those in Fig. 4.

Fig. 2. *Mobergella Holsti* (MBG.). The upper side of a shell-lamella showing ridge like impressions of muscular furrows. — 6/1. — From the same locality as the former. The original is the property of the Swedish Geological Survey. Cfr. Fig. 5.

Fig. 3—8. *Mobergella Holsti* (MBG.). Reproduction of MOBERG'S figuring of *Discinella Holsti* (MBG.). Fig. 3: The inner side of the arched shell (a) and profile (b). — Harbour of Ekerum. — 4/1; — Fig. 4. The inner side of the arched shell. — WNW. of Rälla. — 4/1; — Fig. 5. Inner side of a flat shell (a) and profile (b). — Mörbylånga. — 6/1; — Fig. 6. The arched shell's outer side (a) and profile (b). — S. of Stora Rör, Öland. — 4/1; — Fig. 7. Flat shell's outer side (a) and profile (b). — S. of Stora Rör. — Between 5/1 and 6/1. — Fig. 8. Flat shell of young specimen. Outer side (a); profile of this (b). — W. of Ekerum. — 9/1.

Fig. 9. *Mobergella Holsti* (MBG.). Inner side of shell, older individual. The same specimen as in Fig. 4. — 10/1.

Fig. 10. *Mobergella Holsti* (MBG.). Shell of a young individual, viewed from above. The 7 pairs of muscular scars are visible through the shell with its mother-of-pearl sheen. The extreme edge of the shell and some bands within this limit are of a brown tint. The top of the apex has a rugged, almost flat surface. — Harbour of Ekerum, from the same hand specimen as Fig. 3 and 11. — 10/1.

Fig. 11. *Mobergella Holsti* (MBG.). Inner side of the shell, showing the 7 pairs of muscular scars, and the field surrounding them. The same specimens as in Fig. 3. — 10/1.

Fig. 12—14. *Mobergella micans* (BILLINGS). Reproduction of WALCOTT'S figures of »*Hyolithellus micans* (BILLINGS)» — Fig. 12. The shell from outside. — Fig. 13. Impression of the inner side. — Fig. 14. The shell from the inner side.

Fig. 15. *Scapha antiquissima* (MARKL.). A shell from the inner side, showing the 8 pair of muscular markings. — 2/1.

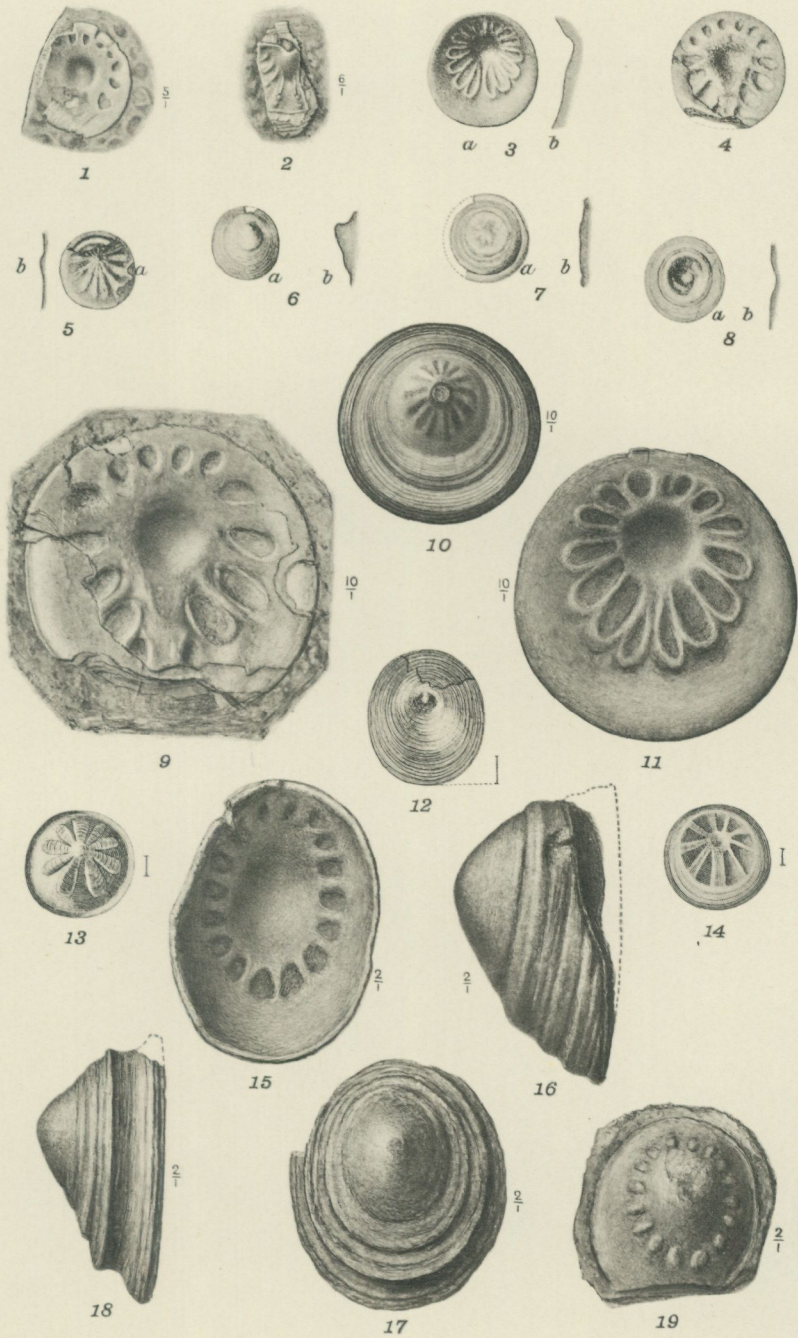
Fig. 16. *Scapha antiquissima* (MARKL.). The same specimen as in Fig. 15, but seen from the side. — 2/1.

Fig. 17. *Scapha antiquissima* (MARKL.). Another specimen seen from above down towards the apex. — 2/1.

Fig. 18. *Scapha antiquissima* (MARKL.). The same specimen as the foregoing, seen from the side. — 2/1.

Fig. 19. *Scapha antiquissima* (MARKL.). Stone core with impression of inner side of shell. 2/1.

All the specimens of *Scapha antiquissima* (MARKL.) are the property of the Palaeozoological Departement of State Museum of Natural History and are found at Borensult, in Östergötland.



J. W. Englund & O. Liljevall del. Fig. 1, 2, 9-11, 15-19.

Ljustr. A. B. Lagrelus & Westphal, Stockholm

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