LEON KARCZEWSKI

SOME GASTROPODS AND BIVALVES FROM THE TRESKELODDEN AND KAPP STAROSTIN FORMATIONS, HORNSUND REGION, SPITSBERGEN

KARCZEWSKI, L.: Some gastropods and bivalves from the Treskelodden and Kapp Starostin Formations, Hornsund region, Spitsbergen. Palaeont. Polonica, 43, pp. 97-105.

Nine mollusc species are described from the Permian of Treskelodden and Kapp Starostin Formations, Hornsund region, Spitsbergen. These are the gastropods: *Bellerophon* cf. *vigilli* STACHE, *Straparollus* (*Leptomphalus*) *micidus* YOCHELSON, *Omphalotrochus alleni* YOCHELSON, *Babylonites* sp. *Platyostoma* cf. *indica* (WAAGEN), *Trachyspira* f. cf. *delphinoides* GEMMELLARO; and the bivalves: *Liebea* cf. *indica* (WAAGEN), *L. septifer* (KING), and *Edmondia sulcata* (PHILLIPS). Most species of the assemblage were thus far reported from the Permian, but some of them also occur in the Carboniferous.

Key words: Molluscs, gastropods, bivalves, Permian, Spitsbergen.

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NIEKTÓRE ŚLIMAKI I MAŁŻE FORMACJI TRESKELODDEN I KAPP STAROSTIN Z REJONU HORNSUNDU, SPITSBERGEN

Streszczenie. — Materiał opisany w niniejszej pracy został zebrany przez uczestników polskiej wyprawy paleontologicznej na Spitsbergen w roku 1974. Wyprawa ta kierowana była przez prof. G. BIERNAT z Zakładu Paleobiologii PAN oraz przez prof. K. BIRKENMAJERA z Instytutu Nauk Geologicznych PAN w Krakowie. Prace badawcze prowadzono w rejonie Hornsundu. Zbadane ślimaki i małże pochodzą z półwyspu Treskelen, z formacji Treskelodden oraz z Polakkfjellet z formacji Kapp Starostin. Z zebranego materiału mięczaków opisano 9 gatunków ślimaków: *Bellerophon* cf. *vigilli* STACHE, *Straparolus* (*Leptomphalus micidus* YOCHELSON, *Omphalotrochus alleni* YOCHELSON, *Babylonites* sp., *Platyostoma* cf. *indica* (WAAGEN), *Trachyspira* cf. *delphinoides* GEMMELLARO, oraz 3 gatunki małżów: *Liebea* cf. *indica* (WAAGEN), *Liebea septifer* (KING) i *Edmondia sulcata* (PHILLIPS). Ten niewielki zespół zawiera gatunki cytowane w literaturze z utworów permu lub permo-karbonu, nie może zatem w sposób jednoznaczny rozstrzygnąć wieku warstw, w których został znaleziony.

INTRODUCTION

The investigated material was collected in 1974 by the Polish-Paleontological Expedition to the Hornsund region in Spitsbergen headed by Professor G. BIERNAT (Institute of Paleobiology of the Polish Academy of Sciences, Warsaw) and Professor K. BIRKENMAJER

(Institute of Geology, Polish Academy of Sciences, Cracow). The molluscs come from the Treskelodden Formation (BIRKENMAJER 1964, 1977) and the Kapp Starostin Formation (MAŁKOWSKI 1982), Treskelen Peninsula and Polakkfjellet, respectively. The stratigraphic position of the Treskelodden Formation remains thus far disputable. CZARNIECKI (1969) attributed these strata to the Gzhelian stage (Upper Carboniferous) basing upon their branchiopod fauna. ORWIN (1940), FEDOROWSKI (1964, 1965, 1982), BIRKENMAJER (1964), and others assign the Treskelodden beds to the Permian. BIRKENMAJER (1977) included the Treskelodden beds to the Permo-Carboniferous Treskelodden Formation.

The investigated mollusc assemblage from the Treskelodden Formation is composed of species cited from both the Permian and Permo-Carboniferous strata and hence, it does not permit any unequivocal stratigraphic attribution. The author has at his disposal a much larger mollusc collection (ca 400 specimens) collected in the same deposits by Dr. S. CZARNIECKI (Institute of Geology, Polish Academy of Sciences, Cracow) during an earlier expedition to Spitsbergen. That collection will be the subject of a joint study by Dr. CZARNIECKI and the present author. The Polakkfjellet material was collected from the Kapp Starostin Formation bed 23 (MAŁKOWSKI 1982) and its attribution to the Permian is doubtless.

In general, the investigated molluscs are poorly preserved. The gastropods, mostly trochospiral, commonly show an eroded apical part, which results in a natural cross section extremely useful specific identifications. Similar preservation of Permian gastropods from Spitsbergen and Alaska was reported by YOCHELSON (1966). The bivalves are preserved as undistorted moulds, sometimes with shell fragments.

Thus far, the mollusc fauna of Spitsbergen is rather poorly known. Some species were merely noted in older reports (de KONINCK 1846, TOULA 1873, 1875). Their descriptions were presented by FREBOLD (1937) and YOCHELSON (1966).

The collection under study gathered by Dr. J. FEDOROWSKI (Laboratory of Invertebrate Paleontology, Adam Mickiewicz's University, Poznań) and K. MAŁKOWSKI, M. Sc. (Institute of Paleobiology, Warsaw) was offered to the author by Professor G. BIERNAT. These persons are here gratefully acknowledged.

The photos were taken by Mrs. D. LENARCZYK and Mrs. J. MODRZEJEWSKA at the Laboratory of Scientific Photography of the Geological Institute, Warsaw. The collection is housed at the Institute of Paleobiology of the Polish Academy of Sciences, Warsaw, abbreviated as ZPAL.

DESCRIPTIONS

GASTROPODS

Superfamily **Bellerophontacea** M'COY 1851
Family **Bellerophontidae** M'COY, 1851
Genus *Bellerophon* MONTFORT, 1808
Bellerophon cf. *vigilii* STACHE, 1877
(pl. 35:2, 4; pl. 36:3, 6)

Material. — two moulds.

Dimensions: shell diameter — 20 mm, last whorl width — 20 mm, umbilical diameter — 7 mm (ZPAL Mo-XIV/14).

Description. — Shell spiral, with convex whorls. A distinct crest splites the last whorl into two equal lobes declining slightly towards the shell center. A shallow furrow is at the part of the penultimate whorl, underriding the last whorl crest. Aperture damaged.

Remarks. — The investigated specimens are very close to the type specimen as illustrated by STACHE (1877, pl. 2/6:2). The free part of the whorl shows, however, a furrow, which was not noted by STACHE. The assignment to *B. vigilii* is tentative because of the lack of aperture and the considerably recrystallized umbilicus.

Occurrence. Spitsbergen, Polakkfjellet: Permian, Kapp Starostin Formation, bed 23. *B. vigilli* STACHE occurs in the Permian Südtirol Kalkfacies (STACHE 1887) and in New Zealand (Waterhouse 1963)

Superfamily **Euomphalacea** KONINCK, 1881
Family **Euomphalidae** KONINCK, 1881
Genus *Straparollus* MONTFORT, 1810
Straparollus (*Leptomphallus*) *micidus* YOCHELSON, 1956
(pl. 36:1-2)

1956. *Straparollus* (*Lepromphalus*) *micidus* YOCHELSON; E. L. YOCHELSON; 220, 12:1-4.

Material. — Two specimens.

Dimensions: shell width — 33 mm, shell height — 18 mm (ZPAL Mo-XIV/4).

Description. — The shell is regularly planispiral, with a flat apex protruding slightly above the last whorl. Early whorls ovate in cross section, with a distinct crest. The last whorl and aperture are circular. Densely spaced growth lines at the whorls.

Remarks. — The investigated specimens are entirely consistent with the holotype illustrated by YOCHELSON, except for their larger size.

Occurrence. — Spitsbergen, Polakkfjellet: Permian, Kapp Starostin Formation, bed 23; United States, Western Texas: Permian, Bone Spring Limestone.

Family **Omphalotrochidae** KNIGHT, 1945
Genus *Babylonites* YOCHELSON, 1956
Babylonites sp.
(pl. 35:3; pl. 36:7)

Material. — Two specimens.

Dimensions: last whorl diameter 35 mm, umbilical diameter 10 mm. (ZPAL Mo-XIV/8).

Description. — Shell conical, with a fairly wide, subsquare in cross section last whorl and distinct umbilicus. Shell surface covered with distinct growth lines.

Remarks. — Only the last whorl is well preserved, which makes impossible more precise identification. The outline of the umbilicus, whorl shape and dimensions substantiate the attribution of the specimen to *Babylonites* YOCHELSON.

Occurrence. — Spitsbergen, Polakkfjellet, Permian, Kapp Starostin Formation, bed 23. Unites States: Permian, Word Formation and Bone Spring Limestone (YOCHELSON 1956).

Genus *Omphalotrochus* MEEK, 1864
Omphalotrochus alleni YOCHELSON, 1956
(pl. 34:1-3)

1956. *Omphalotrochus alleni* YOCHELSON; E. L. YOCHELSON: 233, pl. 14:4-10.
1966. *Omphalotrochus species*; E. L. YOCHELSON: 31, pl. 1:7-8.

Material. — Three specimens with damaged apical parts.

Dimensions: shell diameter (ZPAL Mo-XIV/20) — ca 70 mm.

Description. — Shell large-sized, trochospiral, with free spaces between successive whorls.

The spaces (sutural depressions) are oval in cross section, and increase in size adapically. Whorls convex, fairly wide in proximity of the aperture. The shell thick, especially at the final whorl, fibrous-prismatic in microstructure.

Remarks. — The present author is of the opinion that *Omphalotrochus* species described by YOCHELSON (1966) from the Permian of Spitsbergen is conspecific with *Omphalotrochus alleni* YOCHELSON, 1956, from the Permian Wolfcamp Formation, southwest United States. The investigated specimens from the Treskelodden Formation closely resemble those from the Wolfcamp Formation, USA, and the *Spirifer* Limestones, Spitsbergen in their whorl shape and arrangement, sutural depressions, shell microstructure and dimensions.

Occurrence. — Spitsbergen, Treskelen: Treskelodden Formation, horizon V CL, bed C; United States: Permian, Wolfcamp Formation.

Superfamily **Platyceratacea** HALL, 1859
Family **Platyceratidae** HALL, 1859
Genus *Platyostoma* CONRAD, 1842
Platyostoma cf. *indica* (WAAGEN, 1880)
(pl. 34:4, 5)

Material. — Two specimens with damaged apical parts.

Dimensions: shell diameter — 55 to 75 mm (ZPAL Mo-XIV/18).

Description. — Shell large-sized, low-spired, wide at the base, with convex, tightly arranged whorls. Sutural depressions are very narrow, hardly discernible. Shell thick, prismatic-fibrous in microstructure. Last whorl is very wide, up to half the shell diameter. Apex somewhat displaced eccentrically.

Remarks. — The generic assignment of the species *indica* WAAGEN follows the Treatise (1960 Part I Mollusca I, Gastropoda: 1240). The specimens under study resemble the type material (see WAAGEN 1880) in shell dimensions and shape, whorl cross section and arrangement, apex position relative to the final whorl, etc. The only difference is in whorl number.

Occurrence. — Spitsbergen, Treskelen: Treskelodden Formation, horizon V CL, bed V. *P. indica* (WAAGEN) was originally described from the Permian *Products* Limestone, India (WAAGEN 1880).

Superfamily **Neritacea** RAFINESQUE, 1815
Family **Naritopsidae** GRAY, 1847
Genus *Trachyspira* GEMMELLARO, 1889
Trachyspira cf. *delphinoides* GEMMELLARO, 1889
(pl. 35:1)

Material. — A single mould.

Dimensions: shell height — 30 mm, apical angle — 75° (ZPAL Mo-XIV/12).

Description. — The shell is conical in shape, with tightly arranged, slightly convex whorls. The last whorl is very convex, with a circular aperture somewhat extended adaxially. No umbilicus.

Remarks. — The specimen is entirely consistent in its dimensions, shell form, and aperture outline with the holotype. Nevertheless, it is identified tentatively because of its damaged external ornamentation and apertural margin.

Occurrence. — Spitsbergen, Polakkfjellet: Permian, Kapp Starostin Formation, bed 23. *T. delphinoides* GEMMELLARO was described from the Permian of Sicily.

BIVALVES

Superfamily **Mytilacea** RAFINESQUE, 1815
Family **Mytilidae** RAFINESQUE, 1815
Genus *Liebea* WAAGEN, 1881

The systematic position of the genus *Liebea* WAAGEN is controversial. Accordingly to the Treatise on Invertebr. Pal., (Part N. 1969, N 291), it is to be attributed to the family Myalinidae FRECH, 1891, of the superfamily Ambonychiacea Miller 1817. In turn, LOGAN (1967) assigned the genus *Liebea* to the family Mytilidae RAFINESQUE, 1815, of the superfamily Mytilacea RAFINESQUE, 1815. The latter opinion is indeed supported by the phylogenetic relationship of *Liebea* to the genus *Mytilus*, as indicated by the hinge structure and shell shape.

Liebea cf. *indica* WAAGEN, 1881
(pl. 34:6)

Material. — A single specimen.

Dimensions: shell length — 32 mm (ZPAL Mo-XIV/10).

Description. — The shell is considerably elongate, with an arcuate ridge running from the beak towards the mid-length of the ventral margin. The beak is pointed, turned towards the hinge margin. The shell surface is damaged; its well preserved area bear, densely spaced growth lines. The hinge is damaged; sockets elongate, a little widened at the ends, teeth smooth (eroded).

Remarks. — LOGAN (1967) tentatively included *Liebea indica* to the synonymy of *Liebea squamosa* (SOWERBY). *L. indica* differs from the latter species in several morphological characteristics, as it was already noted by WAAGEN (1881). According to this author, *L. indica* closely resembles those specimens of *L. squamosa* assigned by GOLDFUSS (1834-1840) to *Mytilus hausmanni*. The two species differ, however, in margin outline, shell dimensions, and hinge structure.

The genus *Liebea* comprises a few species. Its most characteristic features are: asymmetrical shell and internal ligament leaving a distinct furrow or denticulated hole at a mould and at the hinge surface of a shell. The investigated specimen is a single valve and hence, it is only tentatively identified.

Occurrence. — Spitsbergen, Treskelen: Treskelodden Formation, horizon IV CL, bed I. *L. indica* WAAGEN was described from the Permian *Products* Limestone, India (WAAGEN 1881).

Liebea septifer (KING, 1850)
(pl. 36:5)

1850. *Mytilus septifer* KING; W. KING: 161, pl. 14:8-13.
1967. *Liebea squamosa* SOWERBY; A. LOGAN: 38, pl. 5:1-13 (complete synonymy is given here).
1971. *Liebea septifer* (KING); J. KŁAPCIŃSKI: 109, pl. 14:8-13.

Material. — A single well preserved specimen.

Dimensions: shell length — 45 mm, shell height — 35 mm, shell convexity — 22 mm (ZPAL Mo-XIV/1).

Description. — The shell is convex, equivalve, with a distinct, somewhat prosogyrous beak. A well developed umbonal septum and byssal gape are situated in the hinge depression. Both valves are smooth, except for distinct growth lines.

Remarks. — The investigated specimen most closely resembles the form identified by KŁAPCIŃSKI (1971) as *Liebea septifer* (KING). LOGAN (1967) included the species *septifer* KING

to the synonymy of *Liebea squamosa* (SOWERBY), which seems to the present author controversial.

Occurrence. — Spitsbergen, Polakkfjellet: Permian, Kapp Starostin Formation, bed 23; Great Britain: Permian, Cold Hill Limestone; Poland, Fore-Sudetic monocline: Zechstein.

Superfamily **Edmondiacea**, KING, 1850
Family **Edmondiidae** KING, 1850
Genus *Edmondia* de KONINCK, 1843
Edmondia sulcata (PHILLIPS, 1836)
(pl. 36:4)

1836. *Sanguimolaria sulcata* PHILLIPS; J. PHILLIPS: 316, pl. 5:5.
1850. *Edmondia sulcata* (PHILLIPS); W. KING: 163, pl. 20:1-4.
1958. *Edmondiella sulcata* (PHILLIPS); H. ŻAKOWA: 92, pl. 5:7a-b.
1972. *Edmondia sulcata* (PHILLIPS); F. REHOR: 83, pl. 48:6-8.

Material. — Two specimens.
Dimensions: shell length — more than 60 mm, shell height — 40 mm, shell convexity — 25 mm (ZPAL Mo-XIV/2).

Description. — The shell is elongate, convex, with the beak displaced far anteriorly. Anterior and posterior margins are rounded. The beak does not protrude beyond the hinge margin. The valve surface is covered with concentric folds with growth lines between them.

Remarks. — The species is reported from both the Carboniferous and Permian, but more commonly from the Carboniferous. CHERNYSHEV (1950) erected a new genus, *Edmondiella*, for this particular species but the latter name has not been accepted by later authors.

Occurrence. — Spitsbergen, Polakkfjellet: Permian, Kapp Starostin Formation, bed 23; Great Britain: Permo-Carboniferous; Czechoslovakia: Carboniferous, Ostrava Beds; Poland, Wałbrzych region: Carboniferous.

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EXPLANATION OF THE PLATES 34-36

PLATE 34

Omphalotrochus alleni YOCHELSON
Treskelodden Formation, horizon V CL, bed C

1a. Fragment of whorl, umbilical view; *b* apical view; ZPAL Mo-XIV/11.
2. Apical view of two specimens, ZPAL Mo-XIV/20.
3. Fragment of whorl, apical view; ZPAL Mo-XIV/16.

Platyostoma cf. *indica* (WAAGEN)
Treskelodden Formation, horizon V, bed V

4. Apical view; ZPAL Mo-XIV/19.
5. Apical view; ZPAL Mo-XIV/18.

Liebea cf. *indica* WAAGEN
Treskelodden Formation, horizon IV, bed I

6. Left valve; ZPAL Mo-XIV/10.

All figures × 1

PLATE 35

Polakkfjellet, Kapp Starostin Formation, bed 23
Trachyspira cf. *delphinoides* GEMMELLARO

1*a* Apertural view, × 2. *b* side view, × 2; ZPAL Mo-XIV/12.

Bellerophon cf. *virgilli* STACHE

2*a* apertural view, × 2; *b* side umbilical view, × 2; ZPAL Mo-XIV/14.

Babylonites sp.

3. Axial hollow view, × 1; ZPAL Mo-XIV/5.

Bellerophon cf. *virgilli* STACHE

4*a* side umbilical view, × 2; *b* side view, × 2; ZPAL Mo-XIV/13.

Edmondia sulcata (PHILLIPS)

5. Fragment of valve, × 1; ZPAL Mo-XIV/3.

PLATE 36

Polakkfjellet, Kapp Starostin Formation, bed 23
Straparollus (*Leptomphalus*) *micidus* YOCHELSON

1. Apical view, × 2; ZPAL Mo-XIV/4.
2. Apical view, ×2; ZPAL Mo-XIV/9.

Bellerophon cf. *virgilii* STACHE

3.*a* side umbilical view, × 2; *b*. apertural view, × 2; ZPAL Mo-XIV/5.
6. side umbilical view, × 2; ZPAL Mo-XIV/7.

Edmondia sulcata (PHILIPPS)

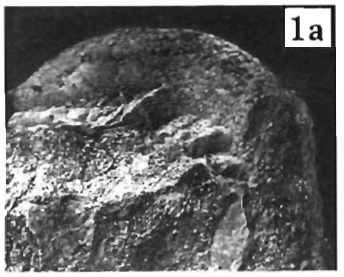
4.*a* side view, × 1; *b* apical view, × 1; ZPAL Mo-XIV/2.

Liebea septifer (KING)

5.*a* side view, × 1; *b* apical view, × 1; ZPAL Mo-XIV/1.

Babylonites sp.

7. Apical view, × 1; ZPAL Mo-XIV/8.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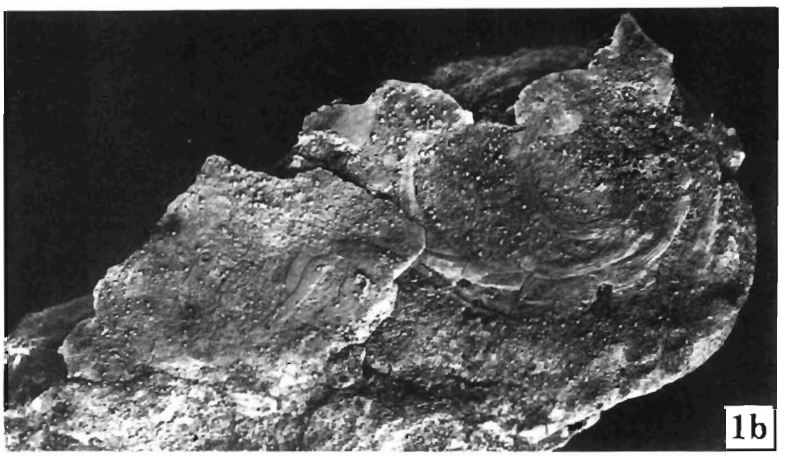
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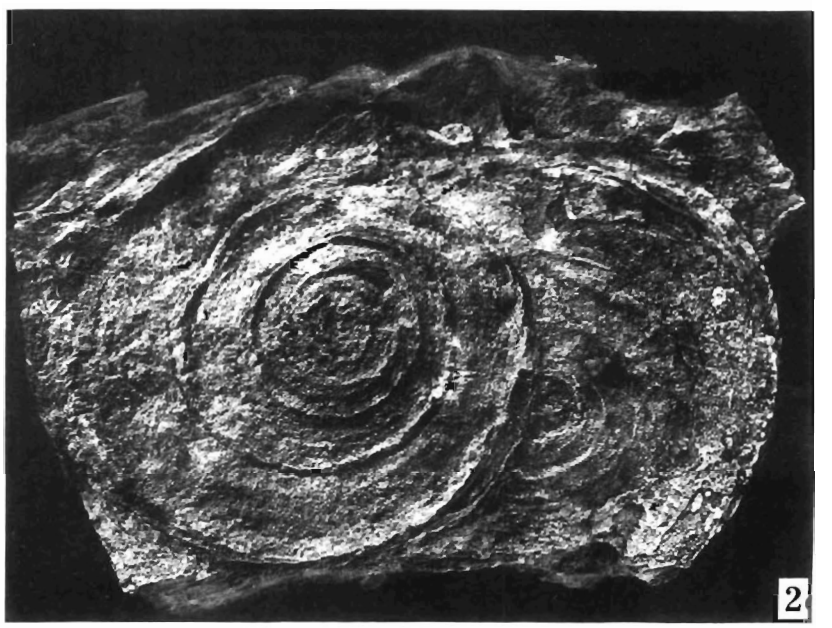
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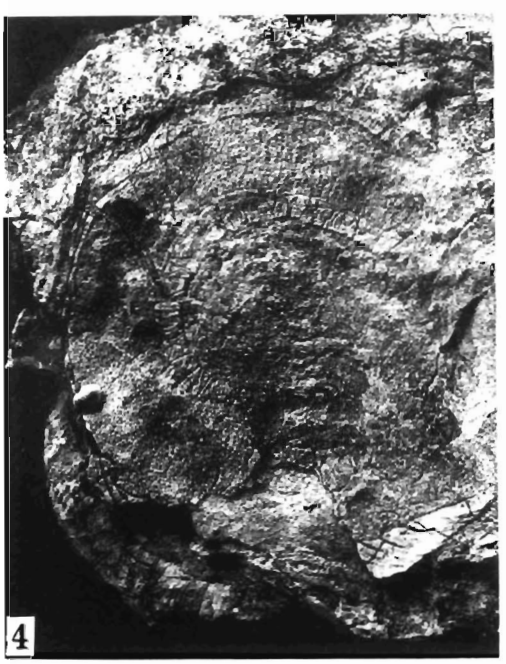
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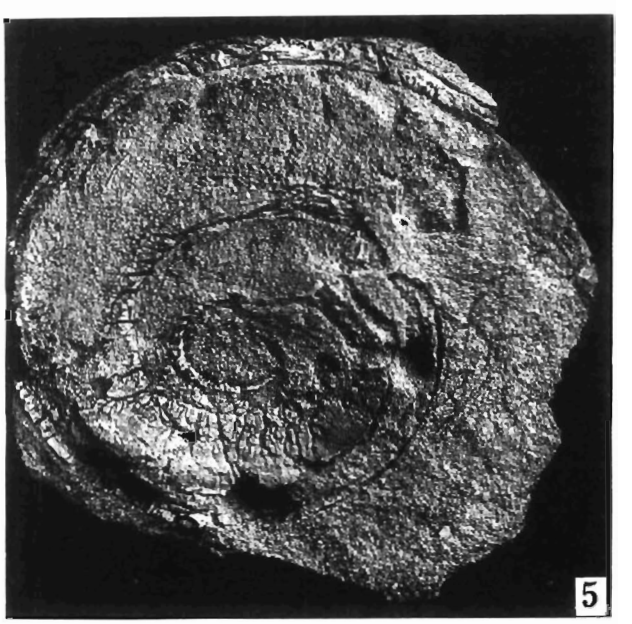
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1a

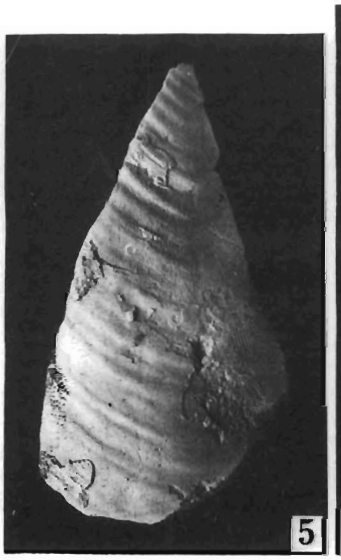

1b


2a


3


4a

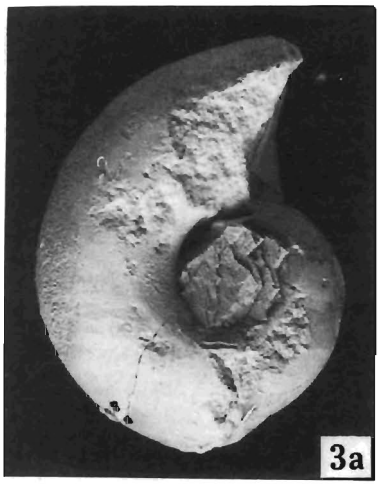

2b

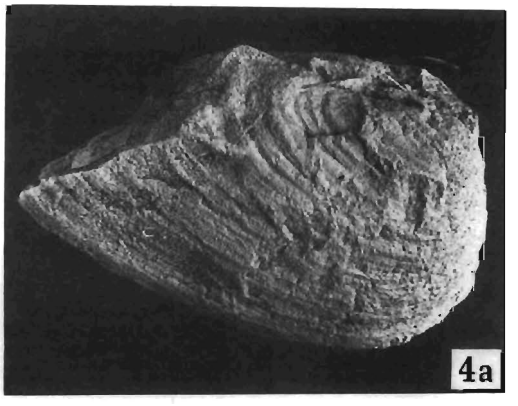

5


4b

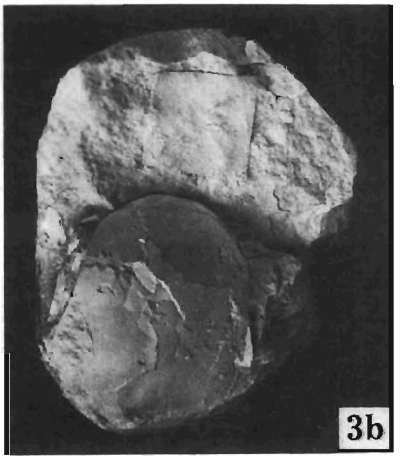

1


2


3a


4a


4b


3b


6


5a


5b


7