

INNER PLATFORM SEDIMENTS WITH *Praebullalveolina afyonica* SIREL and ACAR AROUND ELAZIĞ REGION (E. Turkey)

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ABSTRACT. - The presence of the Alveolinidae, Peneroplidae and Miliolidae families, which represent the inner platform sediments of Eocene has been rarely reported in the Mediterranean countries and Turkey up to now. The following fossil assemblage *Praebullalveolina afyonica* Sirel & Acar, *Praerhapydionina huberi* Henson, *Peneroplis damesini* Henson, *Peneroplis* aff. *laevigatus* d'Orbigny, *Spirolina* aff. *cylindracea* Lamarck, *Nummulites striatus* (Bruguiere), *Gyroidinella magna* (Le Calvez), *Assterigerina rotula* (Kaufmann), *Halkyardia minima* (Liebus) and Miliolidae have described from the Upper Eocene inner platform sediments around Alatarla, NW Elazığ, E. Turkey. Systematic description and picture of the Anatolian form and the unique alveolinid, *Praebullalveolina afyonica*. Sirel & Acar, of Upper Eocene sediments and also, some pictures of the species, which are only characterized by the Middle-Upper Eocene sequence, have been given.

INTRODUCTION

The porcelaneous foraminifers such as Alveolinidae, Peneroplidae and Miliolidae families which represent inner platform Eocene deposits, have all been recorded in the Mediterranean countries. The same forms of porcelaneous foraminifers of Upper Eocene limestones in the petroleum wells in Iran and Iraq (Henson, 1950); Middle Eocene limestones with *Borelis vonderschmitti* of Vicenza (N. Italy) (Schweighauser, 1951); Middle Eocene limestone with Peneroplidae of Pyrenees (N. Spain) (Caus, 1974); Middle Eocene limestone with *Rhapydionina malatyaensis* Sirel, Miliolidae and Peneroplidae of Malatya (E. Turkey) (Sirel, 1976); Upper Eocene limestones with *Praebullalveolina afyonica* Sirel & Acar, 1982); Middle Eocene limestone containing *Malatyna drobnae* Sirel & Acar, Miliolidae and Peneroplidae in Malatya (E. Turkey) (Sirel & Acar, 1993) have only documented by the authors in the areas mentioned above. In addition, Henson (1950) reported the presence of the Peneroplidae and Miliolidae forms of Upper Eocene from the core samples taken from the petroleum wells in Iran and Iraq. • The sequence containing *Praebullalveolina afyonica* Sirel & Acar, Peneroplidae and Miliolidae, which constitute the subject of the study, are observed around Alatarla village, NW Elazığ (Fig. 1).

The aim of the study is to represent the presence of the new sequence of Upper Eocene inner shelf car-

bonates with Alveolinidae, Peneroplidae and Miliolidae forms and particularly the unique form of Anatolian *Praebullalveolina afyonica* Sirel & Acar, which is rarely seen in the Mediterranean countries and Turkey, found second time around Elazığ region.

Due to the hardness of the rock samples, it is not possible to obtain free individuals. For this reason, the present study is only based on selected random and oriented thin sections. All the thin sections are kept in numbers A1 -20 and A1 -21.

STRATIGRAPHY

The following lithostratigraphic units of the Paleozoic, Mesozoic, Eocene and Miocene ages crop out around the investigated area. In this study, lithostratigraphic and biostratigraphic features of Eocene sequence (Fig. 2), around Alatarla village, have been given in detail.

Paleozoic

Paleozoic rock units are represented by metamorphic rock such as crystallized limestones, calcschists, schist, marble and amphibolites around Elazığ region. However, this sequence is characterized by white jointly and fractured marbles in the study area. The unit is accepted to be allochthonous because of the active tectonic events occurred during late Cretaceous. Contact relationship of the

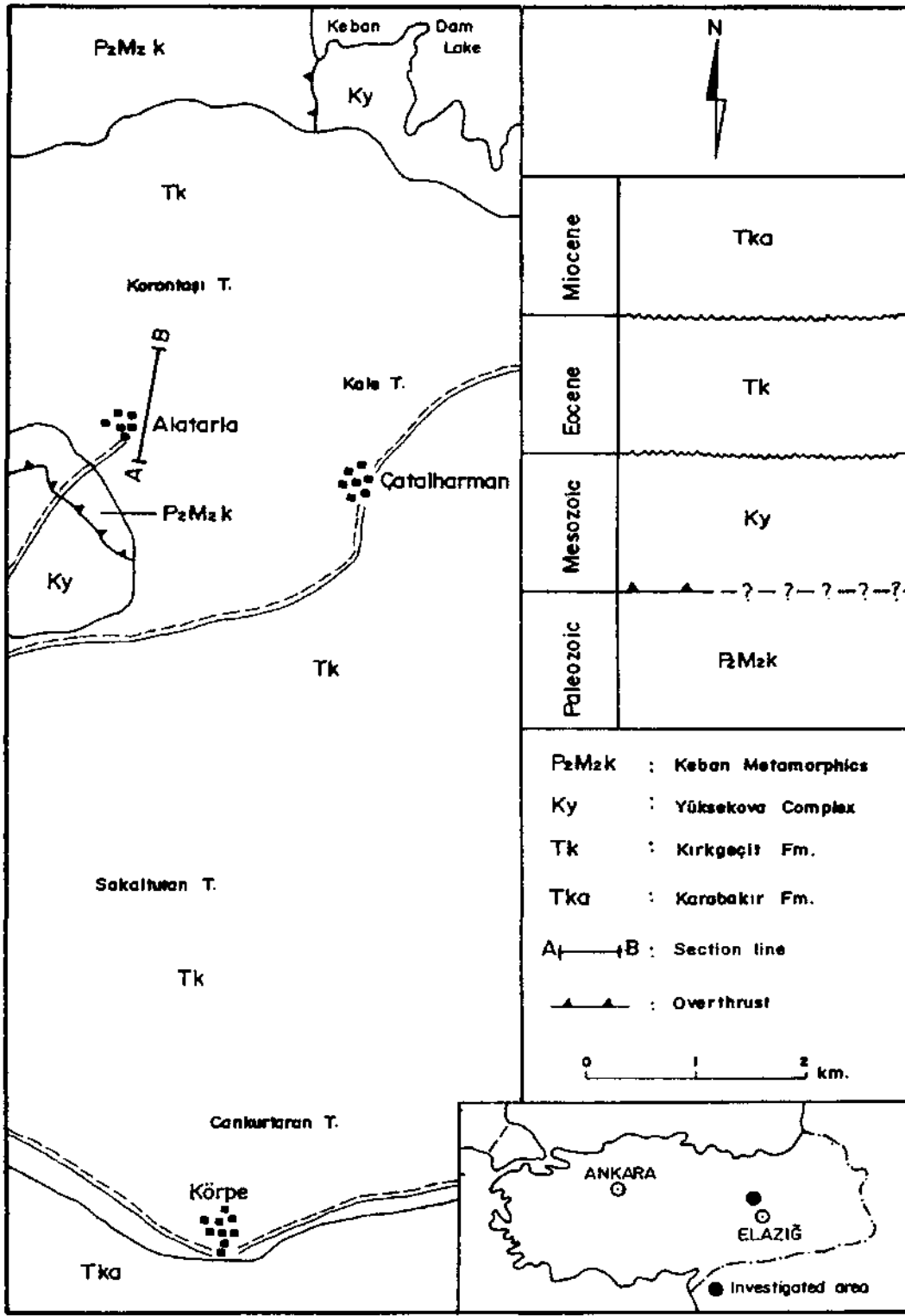


Fig. 1- Geological map of investigated area.

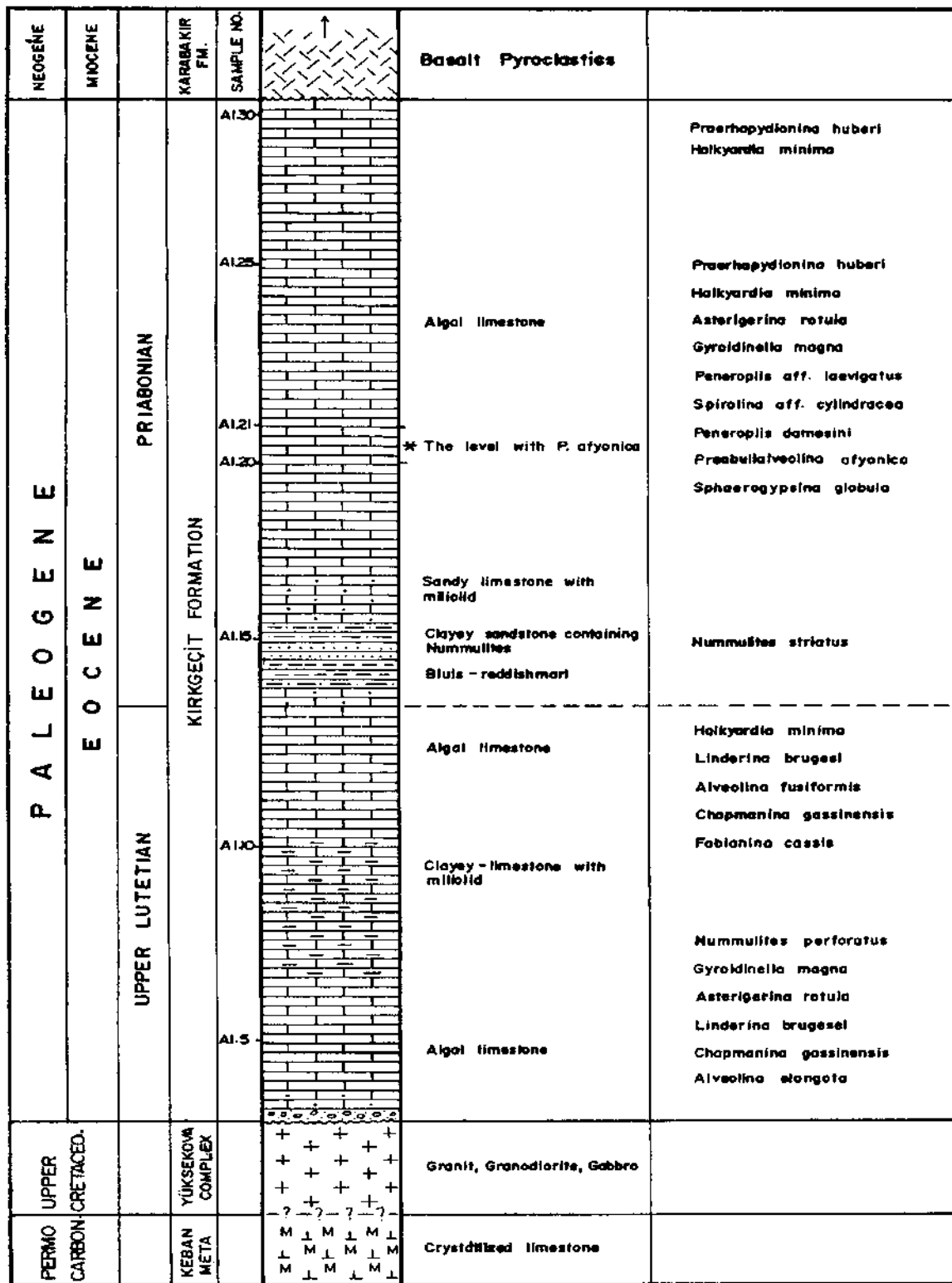


Fig. 2- Columnar section of Eocene sequence around Alataria village, NW Elazığ.

Paleozoic rocks with Mesozoic units are various, however, it is observed that the contact relationship is only tectonic in the study area.

Mesozoic

The unit is mainly represented by gabbro, diorite, granodiorite, granite, diabase, basalt, andesite, pyroclastic rocks and mudstones around the region. However, the main lithology of the investigated area are represented by granite, granodiorite, basalt, andesite and pyroclastics. This magmatic bulk is unconformably covered by younger sedimentary deposits and volcano-clastic rocks.

Eocene

This sequence starts with polygenic heterogeneous, variously colored and medium to thick bedded basal conglomerates, and shows lateral and vertical facies changes. The pebbles of the conglomerates are mainly derived from Paleozoic and Mesozoic aged rock units. This passes upward into clayey-sandy limestones, sandstone, clay and limestones that are all in beige color, fossiliferous and regularly bedded. In the Elaziğ region, the following foraminifers were identified, characterizing upper part of the Middle Eocene and Upper Eocene, the result of the paleontologic investigations carried out on Eocene sequence. These are *Nummulites perforates* (Montfort), *Assilina exponens* (Sowerby), *Alveolina fusiformis* Sowerby, *Alveolina elongata* d'Orbigny, *Sphaerogypsina globula* (Reuss), *Silvestriella tetraedra* (Gümbel), *Maslinella* aff. *chapmani* Galesner & Wade, *Asterigerina rotula* (Kaufmann), *Chapmanina gassinensis* (Silvestri), *Linderina brugesi* Schlumberger, *Fabiania cassis* (Oppenheim), *Halkyardia minima* (Liebus), *Gyroidinella magna* (Le Calvez), *Nummulites fabianii* (Prever), *Nummulites* ex gr. *fabianii*, *Nummulites striatus* (Bruguiere), *Praerhapydionina huberi* Henson, *Peneroplis damesini* Henson, *Praebullalveolina afyonica* Sirel & Acar, *Spirolina* aff. *cylindracea* Lamarck, *Peneroplis* aff. *laevigatus* d'Orbigny, *Peneroplis dusenburyi* Henson, *Heterostegina* sp., *Asterocyclina* sp., *Operculina* sp., *Orbitolites* sp., *Discocyclina* sp., *Peneroplis* sp., Miliolidae and Algae.

Similar sequence, that is seen around Alatarla village (NW Elaziğ), is composed of clayey limesto-

nes which consist of algae and miliolid at the base of the unit. Also the following fossil assemblages were described from this unit; *Nummulites perforates* (Montfort), *Alveolina elongata* d'Orbigny, *Alveolina fusiformis* Sowerby, *Fabiania cassis* (Oppenheim), *Halkyardia minima* (Liebus), *Gyroidinella magna* (Le Calvez), *Asterigerina rotula* (Kaufmann), *Linderina brugesi* Schlumberger and *Chapmanina gassinensis* (Silvestri). According to these fossils, Upper Lutetian age was given to unit. Some workers such as Bieda (1963), Bombita & Moisescu (1968), Blondeau (1972), Rahaghi & Schaub (1976) and Schaub (1981) also express the age of the *Nummulites perforates* (Montfort) as Upper Lutetian. Moreover, the age of *Alveolina elongata* d'Orbigny and *Alveolina fusiformis* Sowerby are reported to be Upper Lutetian. Moreover, the age of *Alveolina elongata* d'Orbigny and *Alveolina fusiformis* Sowerby are reported to be Upper Lutetian by Hottinger (1960), Adams (1962) and Dizer (1965). The upper part of the section includes nummulitic clayey limestone, sandy limestones containing miliolid and algal limestones that comprise *Nummulites striatus* (Bruguiere), *Asterigerina rotula* (Kaufmann), *Sphaerogypsina globula* (Reuss), *Gyroidinella magna* (Le Calvez), *Halkyardia minima* (Liebus), *Praerhapydionina huberi* (Henson), *Peneroplis* aff. *laevigatus* d'Orbigny, *Peneroplis damesini* Henson, *Spirolina* aff. *cylindracea* Lamarck, *Praebullalveolina afyonica* Sirel & Acar. In accordance with these foraminifer, this part of the sequence is Upper Eocene in age. *Nummulites striatus* (Bruguiere) is characteristic form of the Upper Eocene age according to Nemkov (1967), Ferrer (1971), Blondeau (1972) and Schaub (1981). However, in the type locality of *Praebullalveolina afyonica* Sirel & Acar, Sirel and Acar (1982) record the age of the section as Upper Eocene according to the fossil assemblages; *Nummulites fabianii* (Prever), *Nummulites fabianii retiates* (Roveda), *Gyroidinella magna* (Le Calvez), *Halkyardia minima* (Liebus), *Chapmanina gassinensis* (Silvestri), *Peneroplis* aff. *glynnjonesi* Henson, *Peneroplis* aff. *damesini* Henson.

Miocene

This unit generally consists of basalts, tuffs, agglomerates, limestones and sandstones. Also, the unit unconformably rest on the limestones of the Upper Eocene and the older rock units.

SYSTEMATIC DESCRIPTION

Order : Foraminiferida Eichwald, 1830
Suborder : Miliolina Delage & Herouard, 1986
Superfamily : Miliolacea Ehrenberg, 1839
Family : Alveolinidae Ehrenberg, 1839
Genus : *Praebullalveolina* Sirel & Acar
Type species : *Praebullalveolina afyonica* Sirel & Acar

Description

The observed test is small, porcelaneous, slightly natuloid or ovoid in shape (Plate I, figs. 6-8). In general, the diameter of spherical forms varies between 0.498-1.07 mm. Index of elongation (Axial diameter / Equatorial diameter) is 1-1.05. The number of whorls in a 1.07 mm diameter is 7. The first chamber is very small and can not be measured. The apertural face bear both one row of main aperture and one row of secondary aperture. Main apertures provide the relation of two chambers (Plate I, figs. 1-4, 9-11); the secondary apertures combine one row alveole to preseptal passage of previous chamber (Plate I, figs. 1,3,4,9 and 10).

This alveolinid, found in Elaziğ region, was pointed in the genus *Praebullalveolina* Sirel & Acar, because of two rows apertures being seen in their equatorial sections (Plate I, figs. 1,4,9,10). Our species is similar to *Praebullalveolina afyonica* Sirel & Acar with small, spherical, slightly ovoid and natuloid in shape. Therefore, the Elaziğ forms, that particularly constitute the main subject, are named as "*Praebullalveolina afyonica* Sirel & Acar".

DISCUSSION AND RESULTS

In all the Mediterranean countries, porcelaneous foraminifers which characterized the Upper Eocene age inner platform sediments have not been reported earlier except with few researches. So far, the presence of the Upper Eocene inner platform facies have not been reported in Turkey apart from Sirel and Acar (1982). The sequence which observed around Alatarla village (NW Elaziğ) is an excellent example for both Turkey and Mediterranean

countries with its foraminifer assemblage. The sequence, that is completely composed of algal limestones containing *Nummulites perforatus* (Montfort), *Alveolina elongata* d'Orbigny, *Alveolina fusiformis* Sowerby, conformably rest on top of the late Lutetian (Fig. 2). The same sequence is also characterized by *Nummulites striatus* (Bruguiere), *Praebullalveolina afyonica* Sirel & Acar and *Peneroplis damesini* Henson of late Eocene.

The unique Anatolian alveolinid form of the Upper Eocene, *Praebullalveolina afyonica* Sirel & Acar, has been secondly reported and distinguished in Elaziğ area apart from its own type locality. The algal limestones, that *Praebullalveolina afyonica* Sirel & Acar was found in Elaziğ area, show great similarity with the sequence characteristics, stratigraphy, foraminifer assemblage and *Praebullalveolina afyonica* Sirel & Acar form of Upper Eocene in Afyon area (Sirel & Acar, 1982).

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PLATES

PLATE -I

Praebullalveolina afyonica Sirel & Acar

Fig. 1 Equatorial section (A1-20/2), X84.

Fig. 2 Oblique section, nearly equatorial (A1-20/6), X52.

Fig. 3 Equatorial section, nearly centered (A1-20/9),
X50.

Fig. 4 Equatorial section, (A1-21/2), X90.

Fig. 5 Subequatorial section (A1-6), X63.

Fig. 6 Tangential section (A1-20/5), X47.

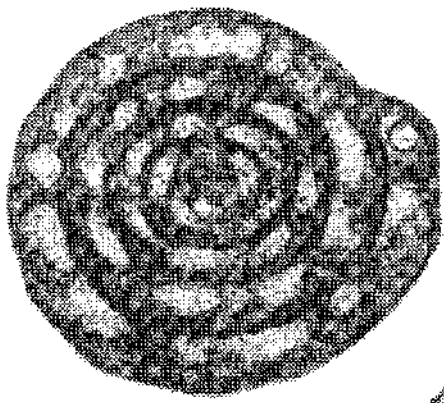
Fig. 7 Axial section, (A1-20/3), X41.

Fig. 8 Axial section, (A1-21/1), X61.

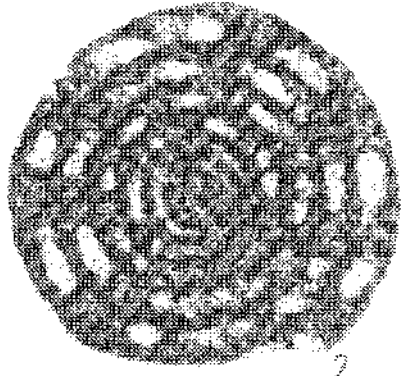
Fig. 9 Equatorial section, nearly centered (A1-20/1),
X62.

Fig 10 Equatorial section (A1-20/4), X52.

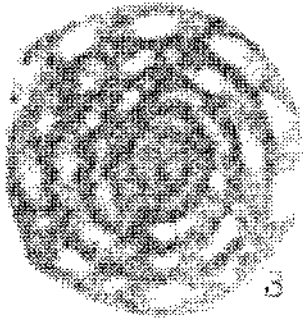
Fig. 11 Equatorial section (A1-20/10), X61.



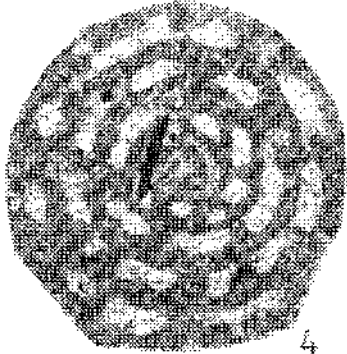
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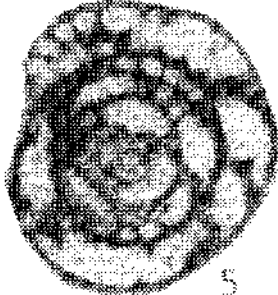
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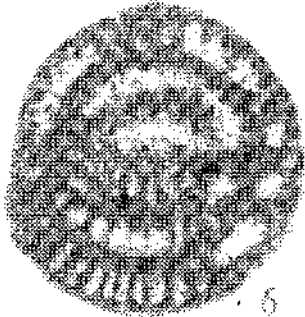
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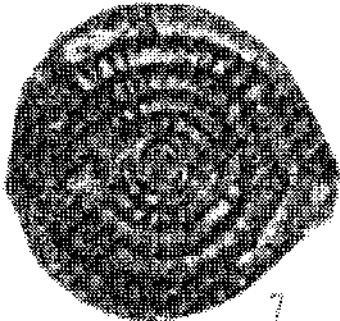
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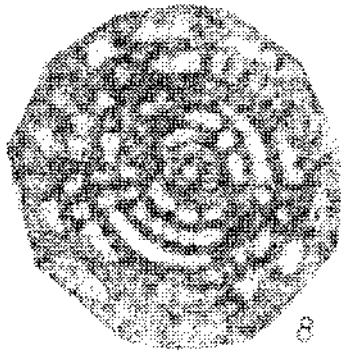
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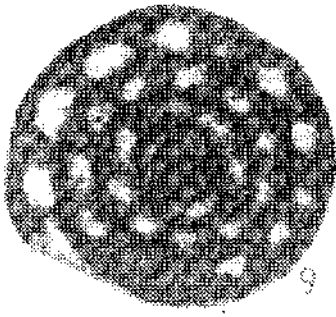
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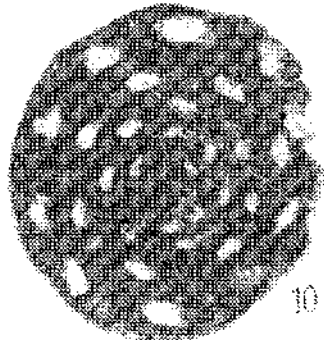
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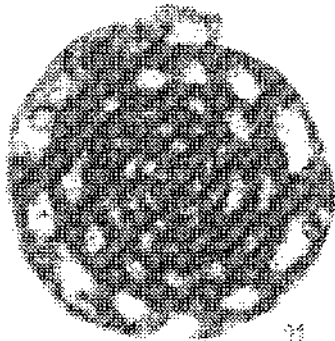
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PLATE -II

Nummulites perforatus (Montfort)

- Fig. 1 Equatorial section, microspheric form (A1-9/1), X2
Fig. 2 Axial section, microspheric form (A1-9/2), X2
Fig. 3 Equatorial section, microspheric form (A1-9/3), X2

Nummulites striatus (Bruguiere)

- Fig. 4 Surface view, macrospheric form (K4-2/1), X6
Fig. 5 Equatorial section, macrospheric form (K4-2/3), X9
Fig. 6 Equatorial section, macrospheric form (K4-2), X10

Praerhapydionina huberi Henson

- Fig. 7 Transversal section, slightly oblique (A1-21/10), X52.
Fig. 8 Tangential section (A1-21/8), X44
Fig. 9 Vertical section (A1-21/6), X48
Fig. 10 Vertical section (A1-21/12), X38
Fig. 11 Tangential section (A1-21/7), X38

Alveolina fusiformis Sowerby

- Fig. 12 Axial section, macrospheric form (A1-5), X20
Fig. 13 Subaxial section, macrospheric form (A1-12), X20
Fig. 14 Axial section, macrospheric form (Üç-3), X17

Alveolina elongata d'Orbingy

- Fig. 15 Axial section, macrospheric form (Üç-1/4), X24

