

## Description of a new specises of Polydiexodina from Northeast of Elmadağ (Ankara Turkey)\*

Elmadağ (Ankara) Kuzeydoğu'sunda bulunan yeni bir Palydiexodina türünün tamam

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**ABSTRACT :** In this investigation, the description of Polydiexodina erki n. sp. is given which is found abundantly in Upper Permian limestones, and calcareous arenites cropping out at Gensirt hill which is located in NE Elmadağ. The samples were taken from Late Palaeozoic sequence determined in thin sections, and the new species compared with the other well known Polydiexodina species.

**ÖZ :** Bu çalışmada, Elmadağ Kuzeydoğusunda yer alan Gen sırt tepede yaygın olarak görülen Üst Permiyen kireçtaşı ve kalkerli arenitlerinde çok bol olarak bulunan Polydiexodina erki n. sp. türünün tanımı yapılmaktadır. Genç Paleozoyik serilerinden alınan örnekler, incekesitleri yapılarak incelenmiş ve yeni tür, bilinen diğer Polydiexodina türleriyle karşılaştırılmıştır.

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## INTRODUCTION

The area of investigation is situated 41 km northeast of Ankara. Upper Permian sediments crop out widely in the area. The samples were collected from the series between Gensirt and Küçükgensirt hills, which are located 3,5 km NE of Elmadağ (figure 1).

The aim of this investigation is to describe *Polydiexodina erki* n. sp. which were found abundantly in these sediments.

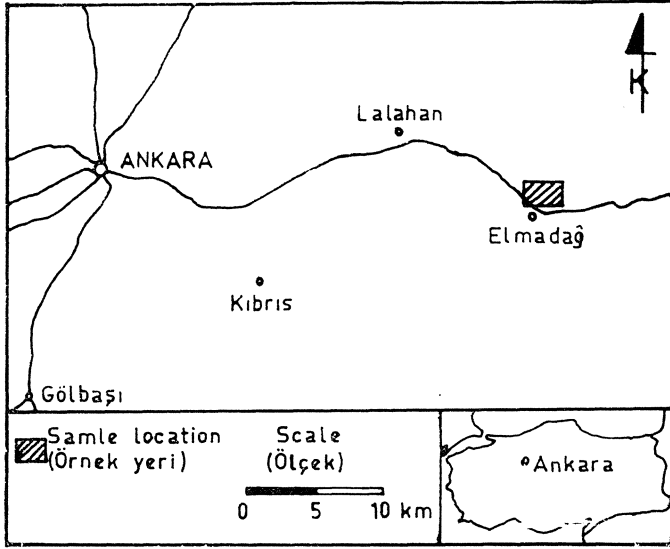


Figure 1: Location map.

Şekil 1: Yer bütüdü haritası.

## MATERIAL AND METHOD

The material of this study is 35 rock samples, which were taken from Upper Permian rocks in order to prepare special thin sections. The 16 thin sections containing axial, equatorial and tangential sections of the new species are used to describe for *Polydiexodina erki* n. sp..

## STRATIGRAPHY

The oldest stratigraphic unit in the area is Carboniferous flysch which contain no fossils. Permian consists of limestones and calcereous arenites. Between these two units, an albite diabase layer 15-20 m thick is present. The strikes and dips of strata are very similar for both Carboniferous flysch and Permian limestones, which is nearly E-W/50°N.

Lower and Middle Permian limestones are gray, hard, and pelletoidal (Folk, 1959), and 75-80 m thick. These limestones contain *Textularia* sp., *Paleotextularia* sp., *Ostracoda* shell sections, and *Nodosinella digitata* Brady, which ranges from Lower to Middle Permian (Cummings, 1955), (figure 2). The Upper Permian faune is richer than the Lower and Middle Permian, and shows an epibole. The strata which contain the epibole, are 3,5-4 m thick, dark colored, ferrous, thin bedded, and rich in fossils. These rocks are absolutely calcareous arenites (Grabau, 1904 in Petti John and others, 1972), and contain *P. erki* n. sp., *Permodiseus* sp., *Giomospira* sp., and *Yanghienia* sp..

| System (Sistem)    | Series (Seri)               | Thickness (Kalınlık) m | Symbols (Simgeler) | EXPLANATION (AÇIKLAMA)  |  |
|--------------------|-----------------------------|------------------------|--------------------|---|--|
|                    |                             |                        |                    | Lithology (Litoloji)  | Fossils (Fosiller)   |
| PERMIAN (PERMIYEN) | UPPER (ÜST)                 | 30                     | [Symbol]           | Limestone, gray-white, thick bedded.<br>(Gri-beyaz renkli kalın tabakalı kireçtaşı)             |  |
|                    | LOWER + MIDDLE (ALT + ORTA) | 90                     | [Symbol]           | Calcareous arenite, dark colored, thin bedded.<br>(Esmer renkli, ince tabakalı kalkerli arenit) | <i>Polydiexodina erki</i> n.sp., <i>Yanghienia</i> , <i>Giomospira</i> , <i>Permodiscus</i> .      |
|                    |                             | 20                     | [Symbol]           | Pelletoidal limestone, gray colored hard.<br>(Gri renkli, sert pelletoidal kireçtaşı)           | <i>Nodosinella digitata</i> Brady, <i>Textularia</i> , <i>Paleotextularia</i> , <i>Ostracoda</i> . |
| CARB. (KARB.)      |                             | ?                      | [Symbol]           | Albite-Diabase (Albit diyabaz)  |  |
|                    |                             |                        | [Symbol]           | Culm-Flysch Arenit ve kiltaş ardalanmalı Kulm   | Sterile (Fosilsiz)   |

Figure 2: Schematic columnar section for Gensirt tepe (WE Elmadağ) region.

Şekil 2: Gensirt tepe (İD Elmadağ) yöresine özgü şematik dikme kesit.

After the epibole zone of *P. erki* n.sp., the fossil density decreases while the limestone strata thicknesses increase upward in the sequence. Upper Permian ends with an erosion surface. Lithic-arenites (Williams and others, 1954 in Petti John and others, 1972) overlie this erosion surface containing 80 percent Lower, Middle, and Upper Permian limestone fragments, and assumed as Triassic deposits.

## PALEONTOLOGY

## Systematic Study-

- Order : FORAMİNİFERİDA Eichwald 1830  
 Family : FUSULİNİDAE Möller 1878  
 Sub Family : SCHWAGERİNİNAE Dunbar and Henbest 1930  
 Genus : POLYDİEXODINA Dunbar and Skinner 1931

*Polydiexodina erki* n.sp.,

(Holotype: plate I, figure 1-4; plate II, figure 1-5)

Derivatio-nominis : The species is dedicated to A. Suat Erk, Head of the Department of the Geology and Stratigraphy, Faculty of Science, University of Ankara, Turkey.

Type locality : Gensirt, and Küçükgensirt hills, NE of Elmadağ.

Type level : Upper Permian.

## Diagnosis

The tests are very long and wide, proloculi is also very big, the whorl of fifth volution is reduced.

## Description

**Internal Characters.** The shape of tests are long, cylindrical, and gently concave-convex, with rounded poles. All of the determined specimens are A form. The lengths of tests are between 23.10-40.00 mm with an average of 26.80 mm in thin sections (table 1).

The widths of tests which are between 3.26-6.10 mm. with an average of 4.10 mm in thin sections, are more than the other Polydiexodina species.

Form ratios are 3.39-6.79, and average is 5.22.

*P. erki* n. sp. was observed generally having 9 volutions, but sometimes appears being 7, 8, or 9 1/2 volutions in thin sections.

The whorl height of new species is 0.196 mm in first volution, and 0.321 mm in ninth volution. The most important character is decreasing of the whorl height in fifth volution, and increasing again after sixth volution.

Wall thicknesses were observed 0.037 mm in first volution, and 0.086 mm in ninth volution. Wall thicknesses increase regularly from the first to the last volution.

Septal counts counted in 5 specimens, which are 20 in the first, 51 in the fifth, and 78 in the ninth volutions, and they also increase regularly from the beginning to the end.

The area of 10 alveoli measured between 0.156-0.260 mm in 16 specimens, which formed wall structure.

Proloculi is rather wide than the other Polydiexodina species. The diameter of proloculus are measured between 0.648-1.376 mm in 13 specimens. The proloculus of 7 specimens are wider than 1 mm. The average width of proloculi is 1.018 mm. Thus we can say, the wall of proloculus of *P. erki* n. sp. were well developed than other Polydiexodina species.

Generally, the median tunnels are seen after fourth volution. The average of tunnel angles are between 33-35 degrees. However, supplementary tunnels are not seen exactly, they are observed in two lines in the 4 specimens.

Figure 3 shows the measurements of the new species compared to other Polydiexodina species.

## Similarities and Differences

In spite of some similarities, *P. erki* n. sp. differs from *P. bithynica* Erk (Erk, 1942) by wider tests, and heigher whorl. The septal counts of volutions of the new species are more than the other Polydiexodina species. A form *P. erki* n. sp. has a wider proloculi than A form of other Polydiexodina species. The B form of the new species could not be seen. In addition, the area of 10 alveoli also wider than the others, and for this reason *P. erki* n. sp. can be distinguished easily by its voluminous wall structure.

All the studied material is from Elmadağ area, and they are in the collections of the Department of Geology-Stratigraphy, Faculty of Science, University of Ankara (Turkey).

| Specimen (Örnek) | Length(Boy) mm | Width (Genişlik) mm | Form ratio (Şekil oranı) | Volutions (Sarılımlar) | Proloculi $\phi$ mm (İlk loca) | 10 alveoli (10 alveol) mm |
|------------------|----------------|---------------------|--------------------------|------------------------|--------------------------------|---------------------------|
| 148.1.1          | 33.00          | 5.50                | 6.00                     | 8                      | -----                          | 0.208                     |
| 148.1.2          | 27.50          | 6.00                | 4.58                     | 9                      | 0.756                          | 0.260                     |
| 148.1.3          | 26.20          | 4.70                | 5.57                     | 8                      | -----                          | 0.254                     |
| 148.1.4          | -----          | 6.10                | -----                    | 7                      | 0.672                          | 0.241                     |
| 148.2.1          | 20.00          | 5.90                | 3.39                     | 9                      | 1.248                          | 0.208                     |
| 148.2.2          | -----          | 3.26                | -----                    | 4 ?                    | 1.184                          | 0.185                     |
| 148.2.3          | 21.30          | 5.10                | 4.18                     | 8                      | 0.961                          | 0.202                     |
| 148.3.1          | 31.90          | 4.70                | 6.79                     | 8                      | -----                          | 0.208                     |
| 148.3.2          | -----          | 2.98                | -----                    | 4 ?                    | 1.280                          | 0.202                     |
| 148.3.3          | -----          | 4.81                | -----                    | 8                      | 1.376                          | 0.202                     |
| 148.6.1          | 29.10          | 4.78                | 6.09                     | 9                      | 0.648                          | 0.195                     |
| 148.6.2          | -----          | 4.60                | -----                    | 9                      | 0.928                          | 0.208                     |
| 148.9.1          | -----          | 4.70                | -----                    | 9                      | 0.790                          | 0.175                     |
| 153.1.1          | 29.00          | 5.70                | 5.09                     | 9                      | 1.152                          | 0.156                     |
| 153.2.1          | 27.90          | 5.25                | 5.31                     | 9 1/2                  | 1.120                          | 0.176                     |
| 152.1.1          | -----          | 5.95                | -----                    | 9 1/2                  | 1.120                          | 0.169                     |

Table 1: The summary table of *P. erki* n. sp. showing microscopical measurements.

Çizelge 1: *P. erki* n. sp.'ye özgü mikroskopik ölçüleri gösteren özet çizelge.

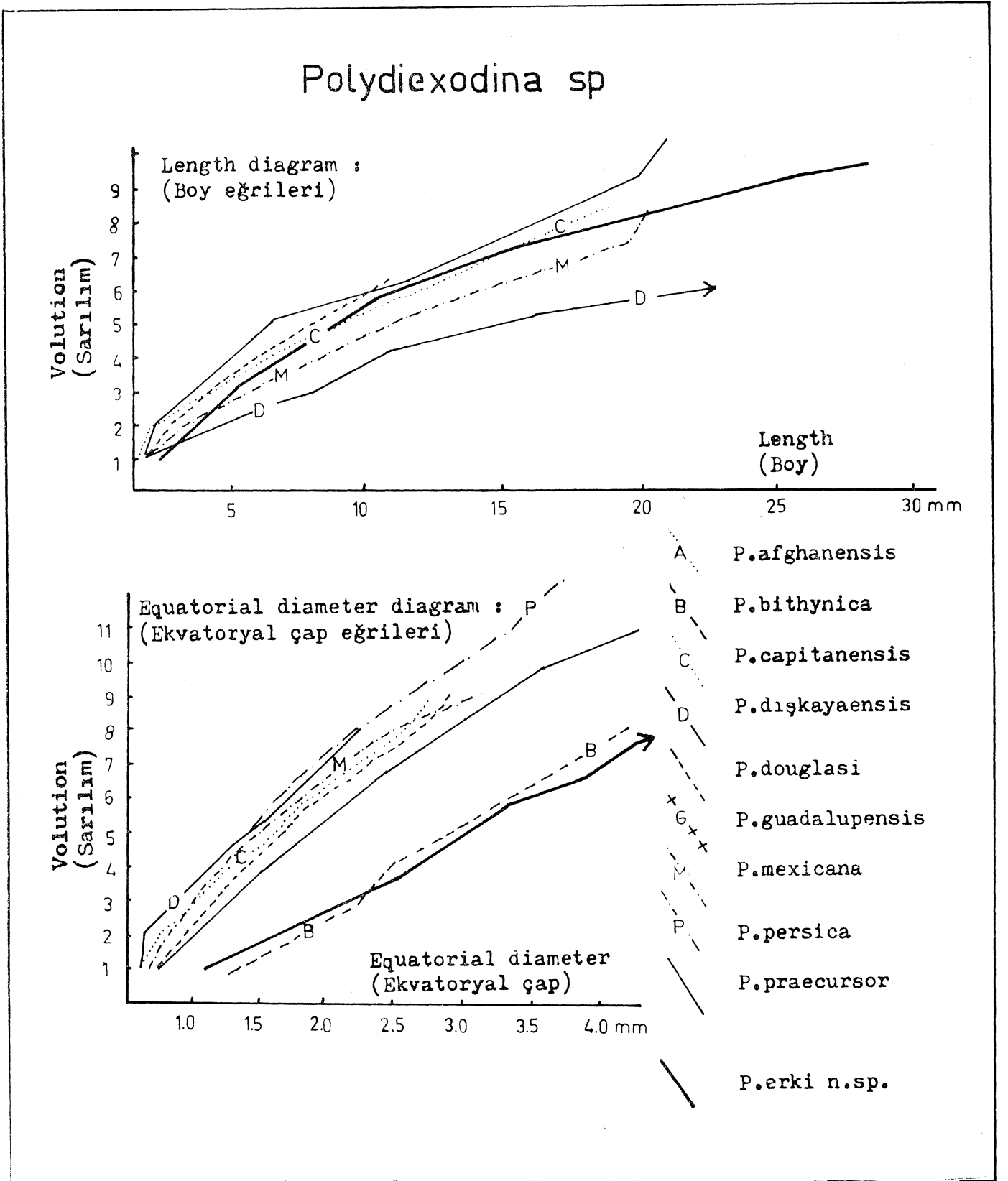


Figure 3: The comparison diagrams for *Polydiexodina* species (after Lloyd, 1963).

Şekil 3: *Polydiexodina* türlerine özgü kıyaslama eğrileri (Lloyd, 1963'den).

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## PLATE I

- Figure 1: *Polydiexodina erki* n. sp., axial section, holotype (148.1.1)  
 Figure 2: *Polydiexodina erki* n. sp., axial section, holotype (148.10)  
 Figure 3: *Polydiexodina erki* n. sp., equatorial section, holotype (152.1.1)  
 Figure 4: *Polydiexodina erki* n. sp., tangential section, (148.6.2)

## LEVHA I

- Şekil 1: *Polydiexodina erki* n. sp., eksenel kesit, holotip (148.1.1)  
 Şekil 2: *Polydiexodina erki* n. sp., eksenel kesit, holotip (148.10)  
 Şekil 3: *Polydiexodina erki* n. sp., eksenel dik kesit, holotip (152.1.1)  
 Şekil 4: *Polydiexodina erki* n. sp., teğetsel kesit, (148.6.2)

## PLATE II

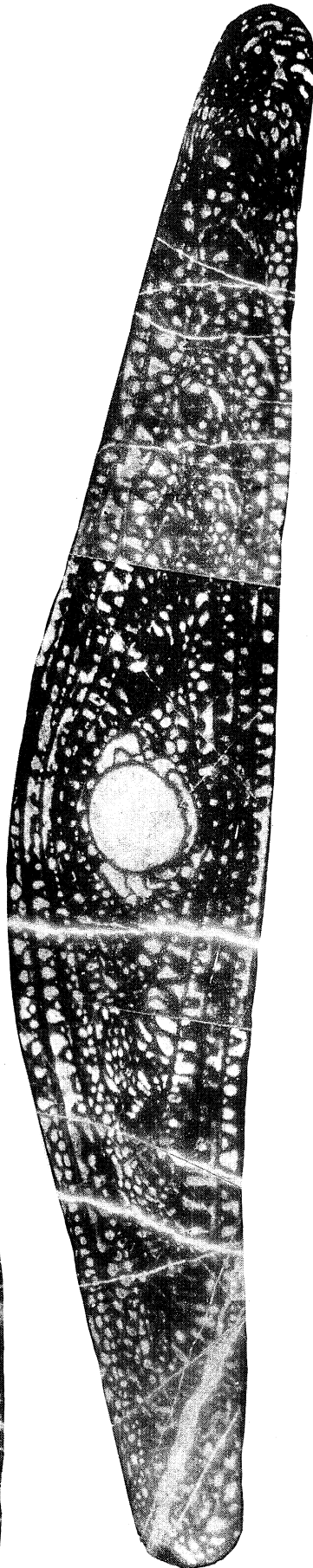
- Figure 1: *Polydiexodina erki* n. sp., equatorial section, containing proloculi of the holotype (152.1.1)  
Figure 2: *Polydiexodina erki* n. sp., tangential section, containing sinuousness (153.2.1)  
Figure 3: *Polydiexodina erki* n. sp., tangential section, containing upright sections of alveoli (148.3.1)  
Figure 4: *Polydiexodina erki* n. sp., axial section, containing decrease of whorl height of fifth volution (153.1.1)  
Figure 5: *Polydiexodina erki* n. sp., equatorial section, shows all structure (152.1.1)

## LEVHA II

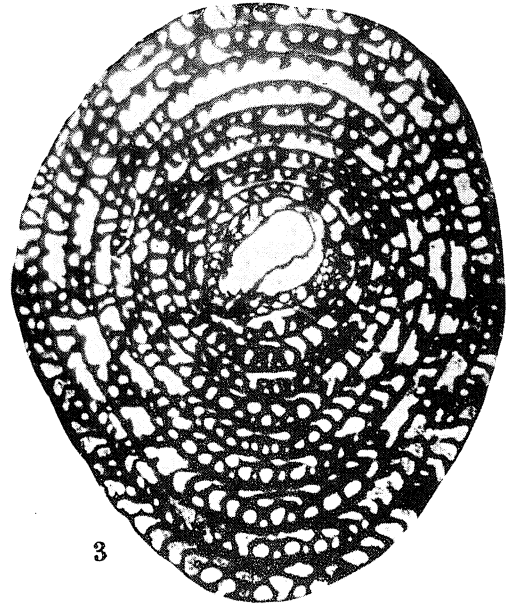
- Şekil 1: *Polydiexodina erki* n. sp., holotipin ilk locasını içeren eksene dik kesit (152.1.1)  
Şekil 2: *Polydiexodina erki* n. sp., bölme dalgalanmalarını içeren teğetsel - kesit (153.2.1)  
Şekil 3: *Polydiexodina erki* n. sp., alveollerin dikey kesitlerini içeren teğetsel kesit (148.3.1)  
Şekil 4: *Polydiexodina erki* n. sp., beşinci sanlımdaki daralmayı içeren aksenal kesit (153.1.1)  
Şekil 5: *Polydiexodina erki* n. sp., kabuk yapısını içeren eksene dik kesit (152.1.1)



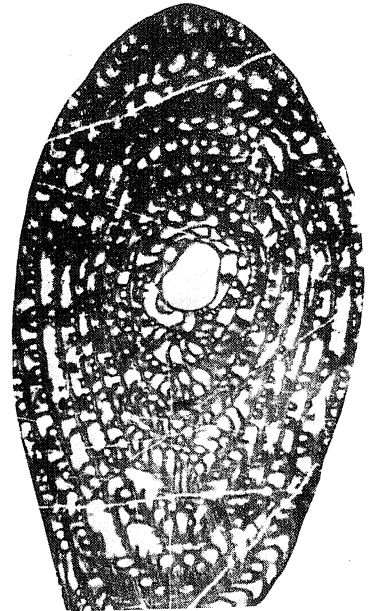
1



2



3



4

5 mm

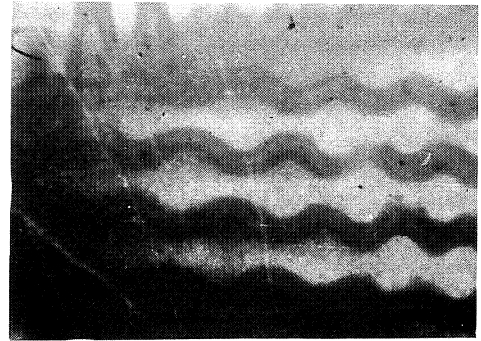




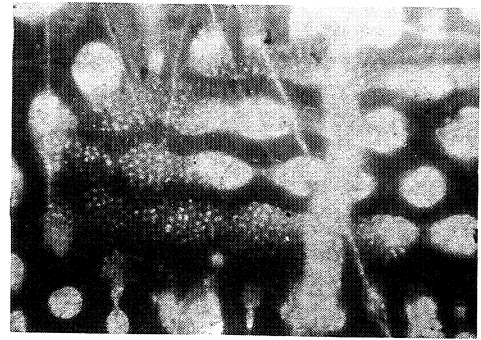


1

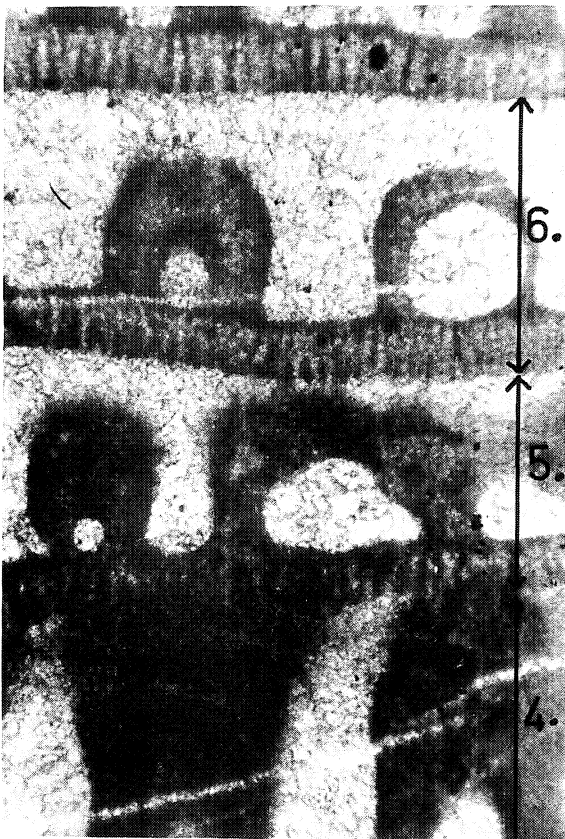
1mm.



2



3



4

0.5 mm.



5

