THREE NEW SPECIES OF THE GENUS MISEIA AND PROPOSAL OF A NEW SUBFAMILY OF RADIOLITIDAE

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ABSTRACT. — The description of the three new species of Maestrichtian age of the genus *Miseia,* which is for the first time found in Turkey, has been given. It is also proposed a new subfamily *(Joufiinae)* of Radiolitidae which has five genera as Colveraia Klinghardt, Joufia Boehm, Miseia Patrulius, Balabania Karacabey-Öztemür, Kurtinia Karacabey-Öztemür, which have some common characteristics encouraging us to gather them under this new subfamily.

INTRODUCTION

The first appearance of the genus Miseia in Turkey has been observed within the samples collected by İzdar, E. from Ballıkaya (Hekimhan-Malatya); by Pisoni, C. from Balaban (Darende-Malatya). Three new species of Miseia have been established from the rudistid limestone of Maestrichtian age. Some common generic characteristics of the genera Colveraia, Joufia, Balabania, Kurtinia belonging to the family Radiolitidae, but nowadays not included in any subfamily and Miseia which is included into the subfamily Sauvagesiinae by Patrulius, give us the opportunity to discuss their position in the systematic.

SYSTEMATIC STUDY

Order: RUDISTIDA LAMARCK, 1819

Family: RADIOLITIDAE GRAY, 1848

Genus: Miseia PATRULIUS, 1974

Miseia regularis n. sp.

(Plate I, fig. 1-4; Fig. 1)

Derivatio nominis: After the very regular ornamentation on both valves.

Material and depository: Holotype, with partly broken upper and lower valves, is deposited at the Museum of Mineral Research and Exploration Institute of Turkey with no. 1130.

Type locality: Rudistid limestone, Ballıkaya, Hekimhan.

Type level: Maestrichtian (middle ?).

Description: *The upper valve* is slightly convex and the apex area is eroded. The postero-ventral region on both valves is broken away. Shell surface is ornamented with 10 or 11 (E and S costae included) radial, rounded costae and fairly deep intervals as grooves which lie from the

periphery up to the apex (Plate I, fig. 1). Costae and intervals are crossed with very thin and tight growth lines. The growth lamellae can be seen in two places. On the siphonal region, especially near the periphery, the two costae corresponding to E and S are larger and more prominent compared to the others (E siphonal costa has been partly observed). On the eroded parts of the subcentral apex and on the broken side of the shell there are one row of rounded holes which arc partly filled with sediments (Plate I, fig. 2). These are the orifices of the radial canals which Patrulius has mentioned in its paper (Patrulius, 1974, p. 176).

We could not correctly define the general shape of the *lower valve* because the end is broken away. It is probably conical. The dorso-ventral diameter is 2.6 cm. Ornamentation consist of 10 or 11 (E and S costae included) longitudinal, subrounded costae and inbetween grooves larger than costae. Costae and intervals are costulated. There are two slightly thick costules on the costae and 4-5 thinner costules on the intervals (Plate I, fig. 3). Costae and intervals are crossed tightly with growth lines. Ligamental ridge is not marked exteriorly, it corresponds one of the intervals which has not any distinct characteristics from the others. As the shell is broken, the E siphonal band has been observed partly on the upper valve. S siphonal band is a larger and less deeper groove than other intervals and has 8-10 costules. This siphonal groove projecting towards the upper valve at the commissure, form the large and elevated S siphonal costa on the upper valve. The cross-section, passing 1 cm below the commissure, shows that the shell wall is thecker at the cardinal region than the siphonal region. The shell wall is prismatic in structure which consists of large, irregular polygonal cells. Among these polygonal cells there are some cells with one or two edges strongly convex or concave, and some of them are radially elongated. Ligamental ridge has 1 cm long and slightly enlarged distally. At the opposite side of the ligamental ridge and on the inner margin of the shell wall there are two pseudopillars. They do not form inward bulges and they are so close that it seems to be contiguous. Each of them is separated from the prismatic structure by a lamella. The external part of the lamella of the S pseudopillar is straight and parallel to the inner border of the prismatic layer (Plate I, fig. 4). The texture of the pseudopilkr is similar to the prismatic layer. The only difference between them is that the external cells of the pseudopillar are slightly elongated in radial direction. The E pseudopillar is partly preserved. The teeth and myophore apophyses has been not observed.

Comparison and remarks: Our new species siffers from species *pajaudi*, *costulata* and *vadensis* of Patrulius by its slightly convex upper valve and strong, large costae on it, and by the ornamentation of the lower valve (Patrulius, 1974). The species now described, in the cross-section through the lower valve, resembles *Miseia costulata* in the texture of the pseudopillars and the largeness of the prismatic cells which form the shell wall. But it goes away from costulata by the form and ornamentation of the upper valve and the very regular ornamentation of the lower valve.

Association: It is found together with *Pironaea praeslavonica* Milov., Slad., Grub., and *Vaccinites loftusi* Wood.

Miseia hekimhanensis n. sp.

(Plate I, fig. 5-8; Fig. 2)

Derivatio riominis: After the type locality name, Hekimhan.

Material and depository: Holotype with upper and lower valve, and two paratypes represented only with their lower valve. Holotype is deposited at the Museum of Mineral Research and Exploration Institute of Turkey with no. 1131,

Fig. 1 - M. regularis n. sp. Transversal section of the lower valve.

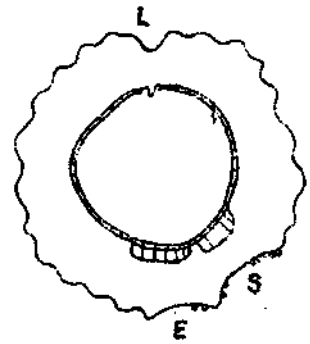

Fig. 2 - M. hekimhanensis n. sp. Transversal section of the lower valve.

Type locality: Rudistid limestone, Ballıkaya, Hekimhan.

Type level: Maestrichtian (middle?).

Description: The *upper valve* is slightly convex. The apex is subcentral. The shell surface is smooth, it has only short costules at the margin of the posterior side. £ and S siphonal bands can be distinguished by two triangular swellings reaching up to apex which are separated by a fairly deep furrow. A deep depression marks the ligament at the dorsal margin (Plate I, fig. 7).

The *lower valve* is low conical. The diameter of the holotype is 2 cm and the height is 1.6 cm. The diameter of the paratype is 1.8 cm. The shell surface is ornamented with subrounded longitudinal costae and grooves narrower than costae. Both are crossed by thin growth lines. The growth lamellae are distinguishable only on the anterior (Plate I, fig. 6). Ligament is represented with a deep groove all along the valve. E and S bands are as large grooves which have 0.5 and 0.6 cm of width at the commissure. The well preserved S siphonal groove is composed of two thin costules at the E side, five at the other side and between them a flat band of 3 mm width bearing only growth lines. The E siphonal band is not well preserved, only two costules have been observed at the S side (Plate I, fig. 5). On the cross-section, the polygonal cells which compose the prismatic layer, are bigger compared to the thickness of the shell wall. In the holotype, at the siphonal region, the number of the cells, in the radial direction, is about three or four (except the cells of the pseudopillar). The inner border cells have thickened wall and are subquadrangular in shape. Pseudopillars, without making the inward bulges, are limited outward with compressed lamella (Plate I, fig. 8). These two lamellae, in holotype, have the same convexity. In paratype the lamella of S is more convex. The inside cells of the pseudopillars are arranged in two rows. The inner row is made of the small subquadrangular and thick walled cells which are similar all over the inner periphery. The outer row is made of slightly elongated in radial direction, large and subrectangular or subsquare cells. The size of the cells of this row is about twice larger than the prismatic layer cells. The number of these cells, in holotype, is 6 in the E pseudopillar and 5 in S pseudopillar. The ligamental ridge is thin and short, no distal enlargement is present. The cardinal teeth are well preserved in the paratype in which the anterior cardinal tooth is bigger than posterior and has subsquare in shape. The myophore apophyses are massive and short, ma is well developed than mp.

Comparison and remarks: Our new species differs from *pajaudi* by the less convexity of its upper valve and by the different texture of pseudopillars. The less convexity of the upper valve and the presence of L differ the new species from vadensis. The largeness of the cells of the pris-

matic layer and shape and texture of the pseudopillars are the common characteristics of costulata with new species. But it differs from *costulata* with its distinct siphonal bands and by the different ornamentation of the lower valve.

Association: Our new species is associated with *Pironaea praeslavonica* Milov., Slad., Grub, and *Vaccinites loftusi* Wood.

Miscia osculata n. sp.

(Plate II, fig. 1-8)

Derivatio nominis: After the presence of the oscules on the upper valve.

Material and depository: Holotype with two well preserved valves and three paratypes. Holotype is deposited at the Museum of Mineral Research and Exploration Institute of Turkey with no. 1134.

Type locality: Rudistid limestone, Balaban, Darende.

Type level: Maestrichtian.

Description *Upper valve,* with 3 cm of diameter, is moderately convex. Apex is subcentral. The upper valve is broken away at the cardinal region where one row of orifices of the canals have been observed under the lamellar layer. Two inward fold at the periphery mark the siphonal grooves of the lower valve. Two deep and triangular depressions with their bases parallel to the siphonal folds, located 3 mm away from the periphery towards the apex, indicate E, S oscules (Plate II, fig. 1 and 5). The deepest parts of the depressions are situated at the bases of triangles. E oscule is isosceles with nearly 90° apex angle. S triangle is also isosceles but with acute angle. S oscule is deeper than E. Two costae, separated with narrow groove, lying from the oscules up to the apex, correspond E and S siphonal bands.

Lower valve is conical with 3.3 cm height and 3 cm of diameter. The surface is much eroded that the costae are not well distinct. But thin and numerous longitudinal costae (10 in one centimeter), separated with narrower intervals, can be seen near the commissure. Siphonal bands are two contiguous grooves and their width are 1 cm at the commissure. They are covered with thin and tight longitudinal costules (Plate II, fig. 3,7). Ligament is marked by a narrow, longitudinal groove at cardinal region (Plate II, fig. 2). The shape of the cross-section, passing through 0.5 cm below the commissure, is circular (Plate II, fig. 4). The maximum width of the prismatic layer is 8 mm at the cardinal region and minimum width 3 mm at the siphonal region. This layer is composed of 4-8 edged polygonal cells. Most of them have 5-6 edges; the cells with 8 edges are bigger than the others and fairly rare. Ligamental ridge is short and thin. The E pseudopillar has no inward bulge and it is limited outward with long lamella which is parallel to the inner border. Thus, narrow and long E pseudopillar has been formed. Inside and outside of the E pseudopillar lamella, parallel to it, very thin lamellae have been observed. The S pseudopillar has a slight inward bulge and is limited outward with a strongly convex lamella. This position makes S pseudopillar narrow and high. From the inside of the S lamella to the inner border there are six very thin, arched lamellae. The inner cell texture of the pseudopillars is not different from the rest of the prismatic layer. Cardinal teeth and myophore apophyses could not been observed in holotype. In paratype, contrary to holotype, the E pseudopillar has a slight inward bulge, and none at S. Less distinct lamellae which limit the pseudopillars, show the same characteristics as holotype. The cells of the pseudopillars are tending to be arranged parallel to the inner border of the pseudopillars. Well preserved cardinal teeth and myophore apophyses are peripheral and well developed at anterior (Plate II, fig. 6)

Comparison and remarks: *Miseia osculata* n. sp. differs from *costulata* by having different convexity of £ and S lamellae and the texture of the pseudopillars; it also differs from v*adensis* with its less convexity of the upper valve, by the similarity of the pseudopillars texture with the prismatic layer and by the presence of L. The new species resembles to *fajaudi,* but *M.osculata* n. sp. differs from it by minute differences and especially by the presence of the oscules on the upper valve. The presence of these oscules is the distinctive feature of the new species among the all Miseia species (Patrulius, 1974).

Association: In the Rudistid limestone, with our species, it is also determined the following genera and species: *Joufia cappadociensis melitenensis* Kar.- Özt., *Coheraia variabilis* Klingh., *Gorjanovicia* sp., *Vaccinites* aff. *sulcatus* Defr., *Orbitoides* sp,

SYSTEMATIC POSITION OF THE GENUS MISEIA AND PROPOSAL OF A NEW SUBFAMILY

Patrulius includes genus Miseia to the subfamily Sauvagesiinac, because the former has «canale» cardinal teeth as genus *Sauvagesia* (Patrulius, 1974). After our study and as Patrulius mentionned in its publication (p. 176), these two genera have many different characteristics. Because of these differences it is not convenient for us to include genus Miseia into the subfamily Sauvagesiinae. Miseia differs from Sauvagesia mainly by having pseudopillars on the lower valve and canals on the upper valve. By the presence of pseudopillars on the lower valve, Miseia can be related to the subfamily Lapeirousiinae, but these pseudopillars are not typical at Miseia.

Miseia can be compared with the genera *Joufia* and *Kurtinia* which nave canals on the upper valve as Miseia, although their number and disposition are different (Boehm, 1898; Snethlage, 1905; Lupu, 1970). Their common characteristics are to have a canal layer after the outer lamellar layer (Karacabey-Öztemür, 1969, 1980).

Kurtinia, in one way, shows similarity with the genera Jouf ia and Miseia by having canal layer, but on the other hand it shows also similarity with *Balabania* and *Coheraia* by having pseudocanals after the canal layer on the upper valve. By having both characteristics of the genera Miseia, Jouf ia and Balabania, Colveraia, genus Kurtinia can be accepted as a transition form between them.

It is certain that these genera belong to the family Radiolitidae, but nowadays they arc not classified into a subfamily (Moore, 1969). Based on the common special shell structure on the upper valve, it seems more convenient to us, to unite these genera, which have canals or pseudocanals or canals and pseudocanals, into a new subfamily of the family Radiolitidae.

The distinctive characteristics of the new proposed subfamily are:

1. Prismatic shell wall of polygonal cells at the lower valve.
2. Fairly well developed L.
3. Pseudopillars in some forms.
4. Canals or pseudocanals or canals and pseudocanals on the upper valve.

We can include the following genera into new subfamily: Joufia Boehm 1897, Miseia Patrulius 1974, Kurtinia Karacabey-Öztemür 1980, Balabania Karacabey-Öztemür 1980, Colveraia Klinghardt 1921.

We put the name *Joufiinae* to the new subfamily, referring to the genus Joufia, the oldest of the genera included in this new subfamily.

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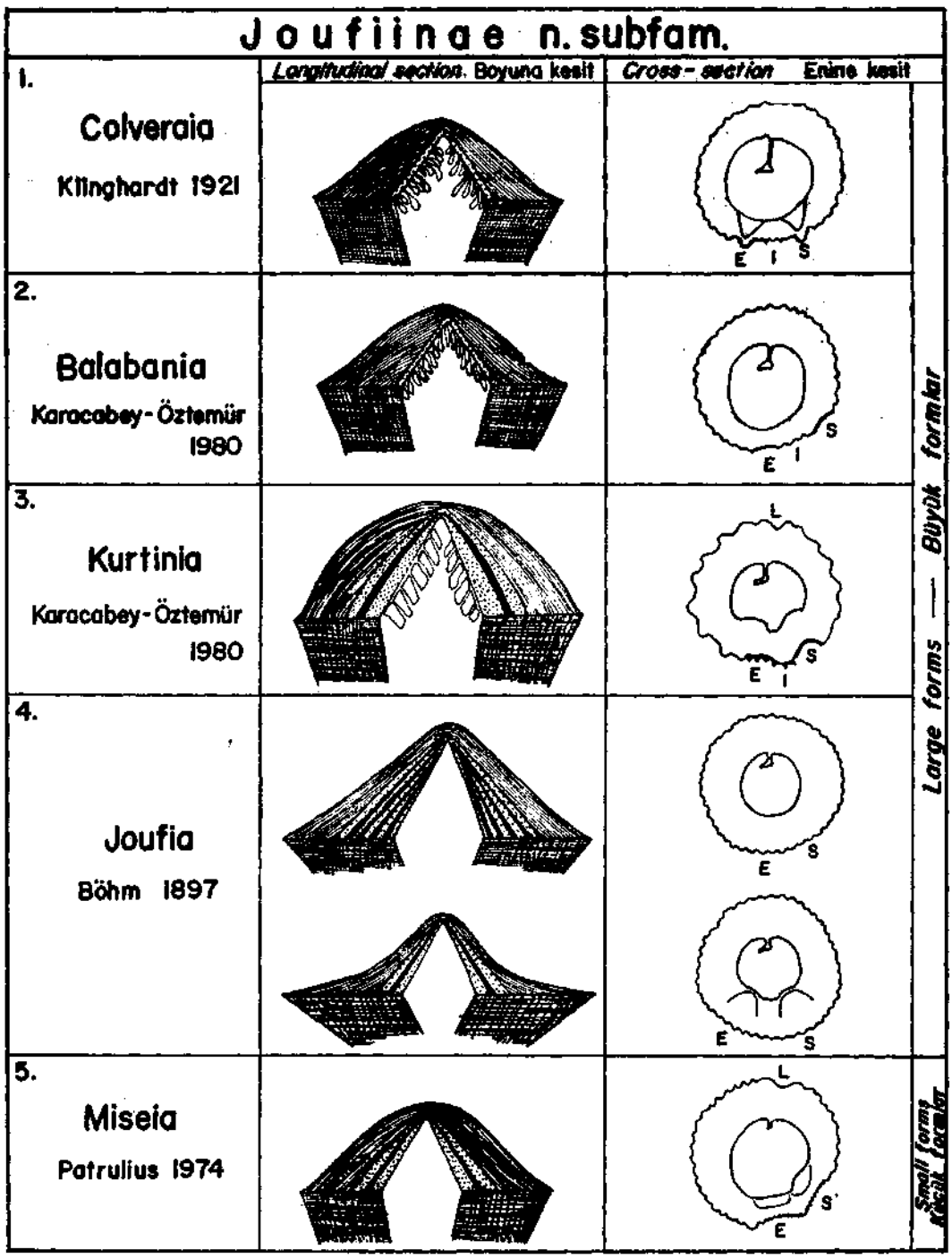

Schematic diagram of the longitudinal and cross-section of the genera which are included in the new subfamily Joufinaer.

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P L A T E S

PLATE-I

Miseia regularis n. sp.

Fig. 1 - Upper valve, external view, holotype, X 1

Fig. 2 - Upper valve, lateral view, holotype, x 2

Fig. 3 - Lower valve, holotype, X 1

Fig. 4 - Lower valve, cross-section, holotype, X 3

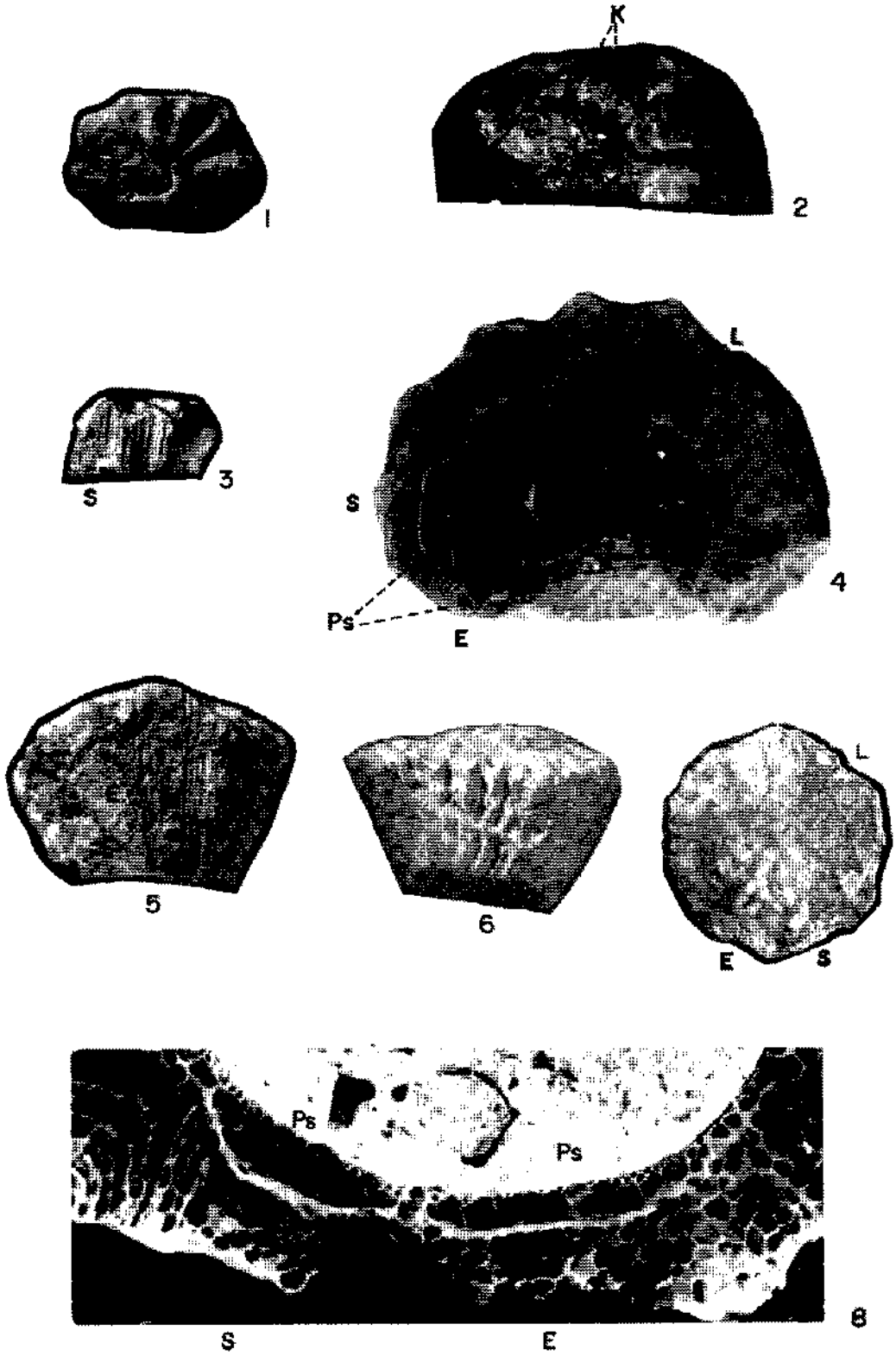
Miseia hekimhanensis n. sp.

Fig. 5 - Lower valve, external view of the siphonal region, holotype, X 2

Fig. 6 - Lower valve, anterior view, holotype, x 2

Fig. 7 - Upper valve, external view, holotype, X 1,5

Fig. 8 - Lower valve, transversale thin-section, holotype, x 8


K
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2
3
S
L
S
4
Ps
E
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6
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E
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Ps
S
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8

PLATE - II

Miseia osculata n. sp.

Fig. 1 - Upper valve, external view, holotype, x 1

Fig. 2 - External view of the cardinal region, holotype, x 1

Fig. 3 - External view of the siphonal region, holotype, x 1

Fig. 4 - Lower valve, cross-section, holotype, X 1

Fig. 5 - Upper valve, external, view, paratype, x 1

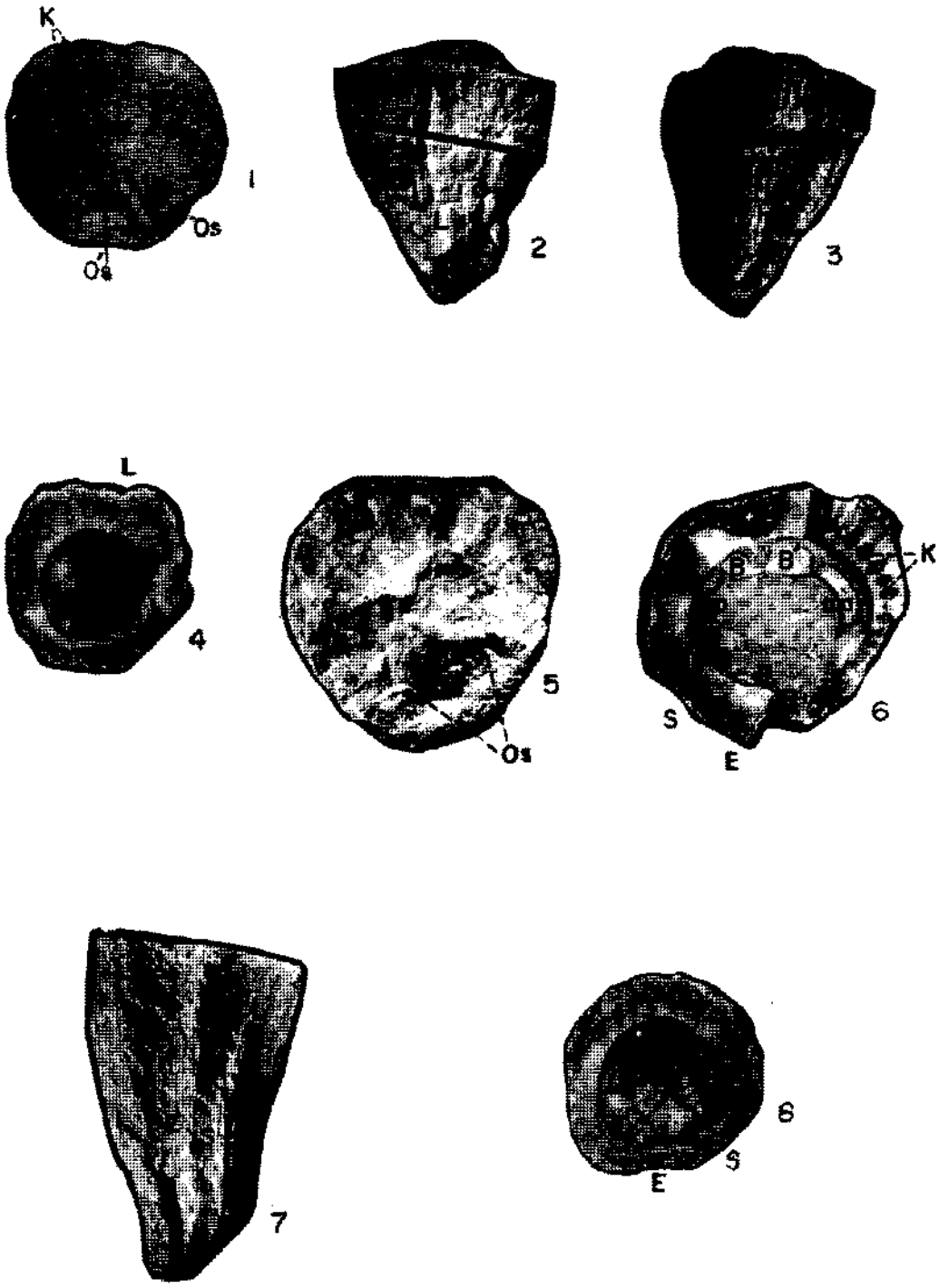
Fig. 6 - Cross-section, passing near the commissure, paratype, x 1

Fig. 7 - Lower valve, external view of the siphonal region, paratype, x I

Fig. 8 - Lower valve, cross-section, paratype, X 1

Explication of symbols in the plates

K : Orifices of canals
Os: Oscules
O's,Os: Anterior, posterior oscules
E,S: Anterior, posterior siphonal grooves
L: Ligamental groove
B',B: Anterior, posterior cardinal teeth
ma,mp: Anterior, posterior myophore apophyses
Ps: Pseudopillars


K
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