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LATE ALBIAN TO EARLY/MID-CENOMANIAN OSTRACODES FROM NORTHERN GALALA PLATEAU, EGYPT

SZCZECHURA, J., ABD-ELSHAFY, E. and BABINOT J.-F.: Late Albian to early/mid-Cenomanian ostracodes from Northern Galala Plateau, Egypt. Acta Palaeont. Polonica, 36, 1, 3—38, 1991.

Middle Cretaceous ostracodes from two sections in the Northern Galala Plateau, western coastal Gulf of Suez (Egypt) are presented. 30 species have been recorded, of which 4 are new: *Asciocythere galalaensis*, *Perissocytheridea ignota*, *Eocytheropteron pecteniferum* and *?Spinoleberis calcalifera*. Most of the species have been known so far from the Albian and/or Cenomanian of the South Tethys, especially the Near East. No species common for these ages from the North and South Tethys i.e. Africa and Europe, have been found. Ostracode associations probably show the late Albian to early/mid-Cenomanian age. The distribution is related to fluctuating conditions within the studied area, from euhaline to brackish/shallow water environments.

Key words: Ostracodes, Albian, Cenomanian, Egypt.

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INTRODUCTION

Few studies on middle Cretaceous ostracodes have seen published hitherto from Egypt. Among ostracode fauna recorded by Van den Bold (1964) from Abu Rawash near Cairo, 8 species were described from the Cenomanian. Later, 12 species were identified by Colin and El Dakkak (1975) as Cenomanian ones at Jebel Nezzazat, Sinai. On the contrary, many publications are available on neighbouring areas, especially the Arabian Peninsula and other areas of Middle East (e.g. Bassoullet and Damotte 1969, Grosdidier 1973, Rosenfeld and Raab 1974, Al-Abdul-Razzaq 1979*a*, *b*, 1980, 1981, 1983, Bismuth *et al.* 1981 Athersuch 1988).

The present study on the coastal Gulf of Suez (Galala Plateau) contributes to the knowledge of the middle Cretaceous ostracode assemblages of Egypt and gives additional data on the stratigraphy in the

sections (outcrops at Khashm El Galala and Ras El Abd). The ostracode associations show a rather late Albian to early/middle Cenomanian age which is slightly older than the age (Cenomanian) indicated previously by Abd-Elshafy and Atta (in press *b*).

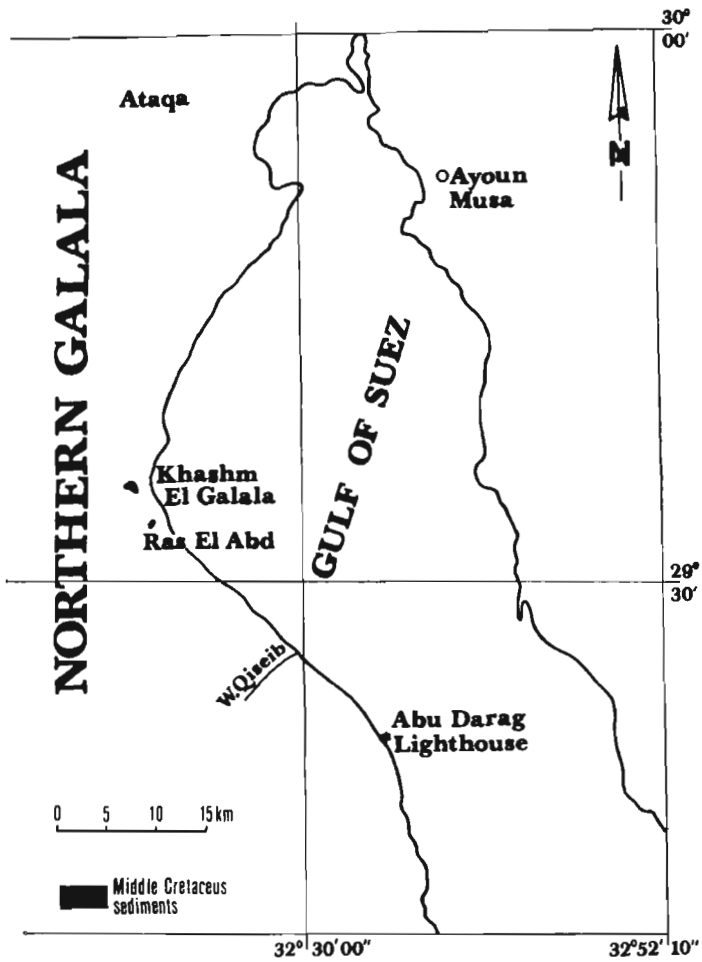

Fig. 1. Location of the studied sections.

The systematics is after Treatise on Invertebrate Paleontology, Part Q, Arthropoda 3, Crustacea, Ostracoda (ed. R. C. Moore (1961).

Abbreaviations used in the descriptions and explanations to the figured specimens (pls. 1—10) are as follows: j — juvenile, a — adult, L — left, R — right, V — valve, C — carapace, F — female, M — male.

The material described is housed at the Institute of Paleobiology, Polish Academy of Sciences in Warsaw (abbrev. ZPAL).

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Uppsala) for their opinions on some systematics problems. SEM photographs were taken at the Electron Microscopy Laboratory, the Nencki Institute of Experimental Biology, Polish Academy of Sciences, Warsaw. Figures were drawn, according to the senior author's original sketches, by Mrs. Danuta Sławik (Institute of Paleobiology, Polish Academy of Sciences, Warsaw).

GEOLOGICAL SETTING

The samples studied come from middle Cretaceous sediments outcropping in Khashm El Galala and Ras El Abd (fig. 1—3), both located

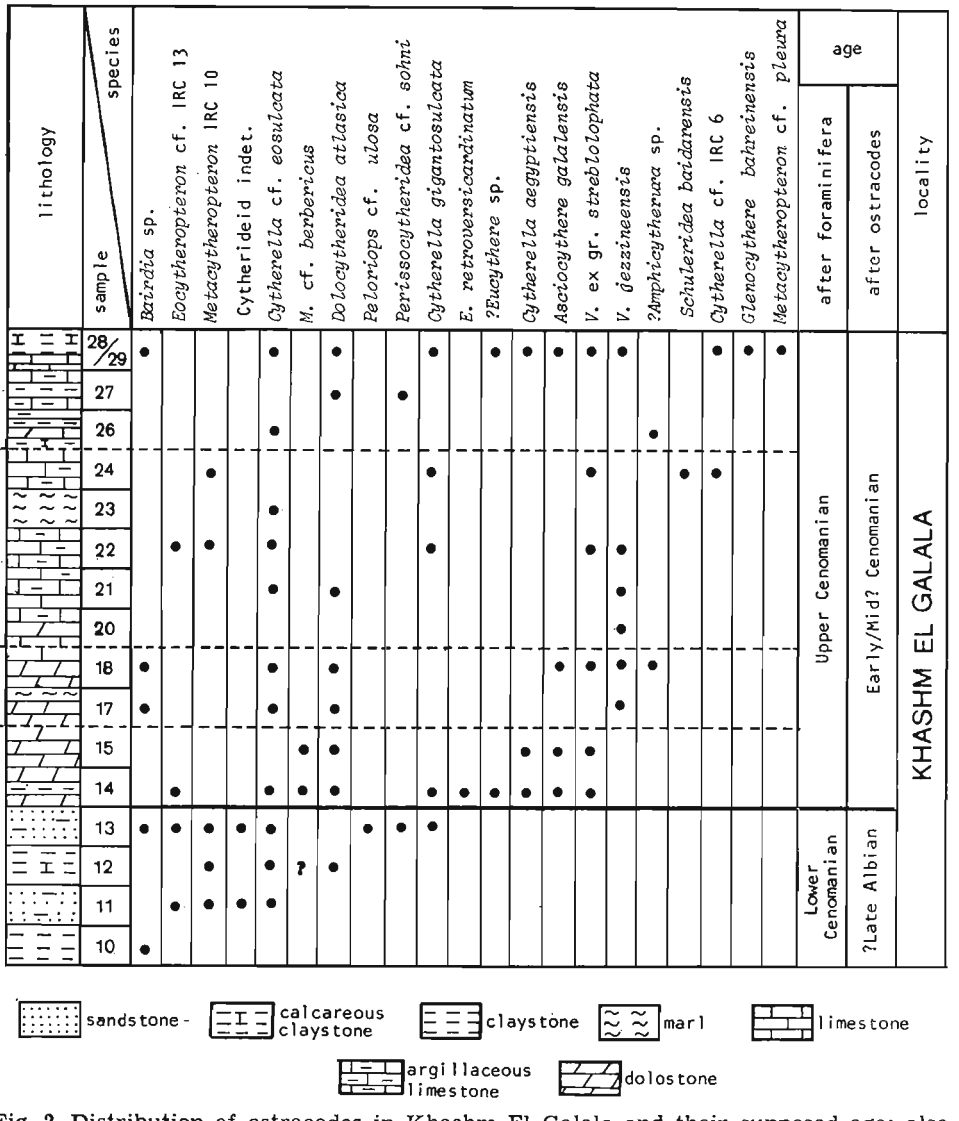

Fig. 2. Distribution of ostracodes in Khashm El Galala and their supposed age; also the age of sediments indicated by foraminifera (Abd-Elshafy and Atta, in press *b*). Interrupted line means lack of samples.

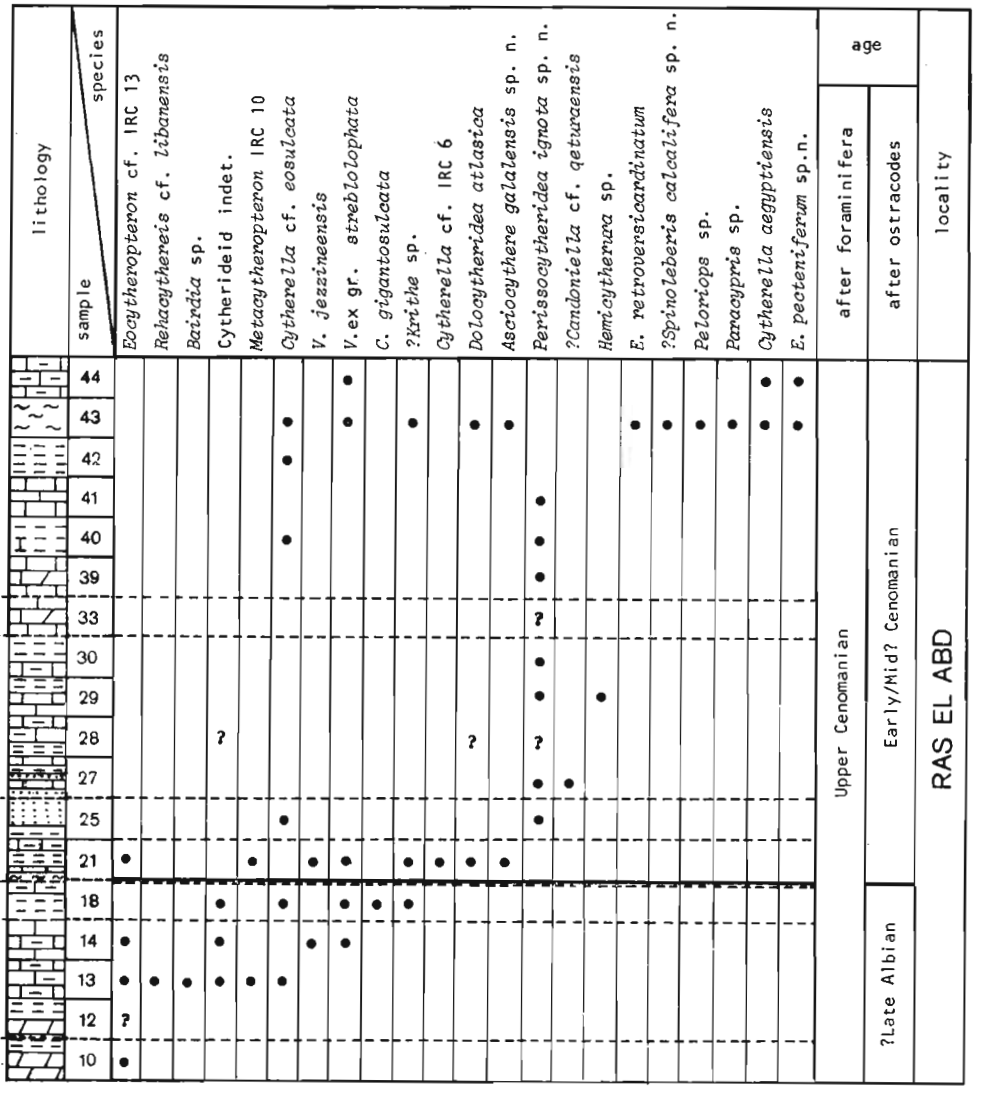

Fig. 3. Distribution of ostracodes in Ras El Abd and their supposed age; also the age of sediments indicated by foraminifera (Abd-Elshafy and Atta, in press *b*). Interrupted line means lack of samples.

on the western coast of the Gulf of Suez, an area belonging to the Northern Galala Plateau. Detailed lithology and age have been recently given on the basis of foraminifera (Abd-Elshafy and Atta in press *a*, *b*) and are also presented herein (see figs. 2, 3). According to these authors, sediments at Khashm El Galala (72 m thick) consist mainly of clastics and carbonates belonging to the Cenomanian. Clastics are represented by sandstones and claystones (34% of the section); carbonates occur as limestones, dolomitic limestones and dolostones (66% of the section). Cenomanian deposits in this section can be lithologically subdivided into

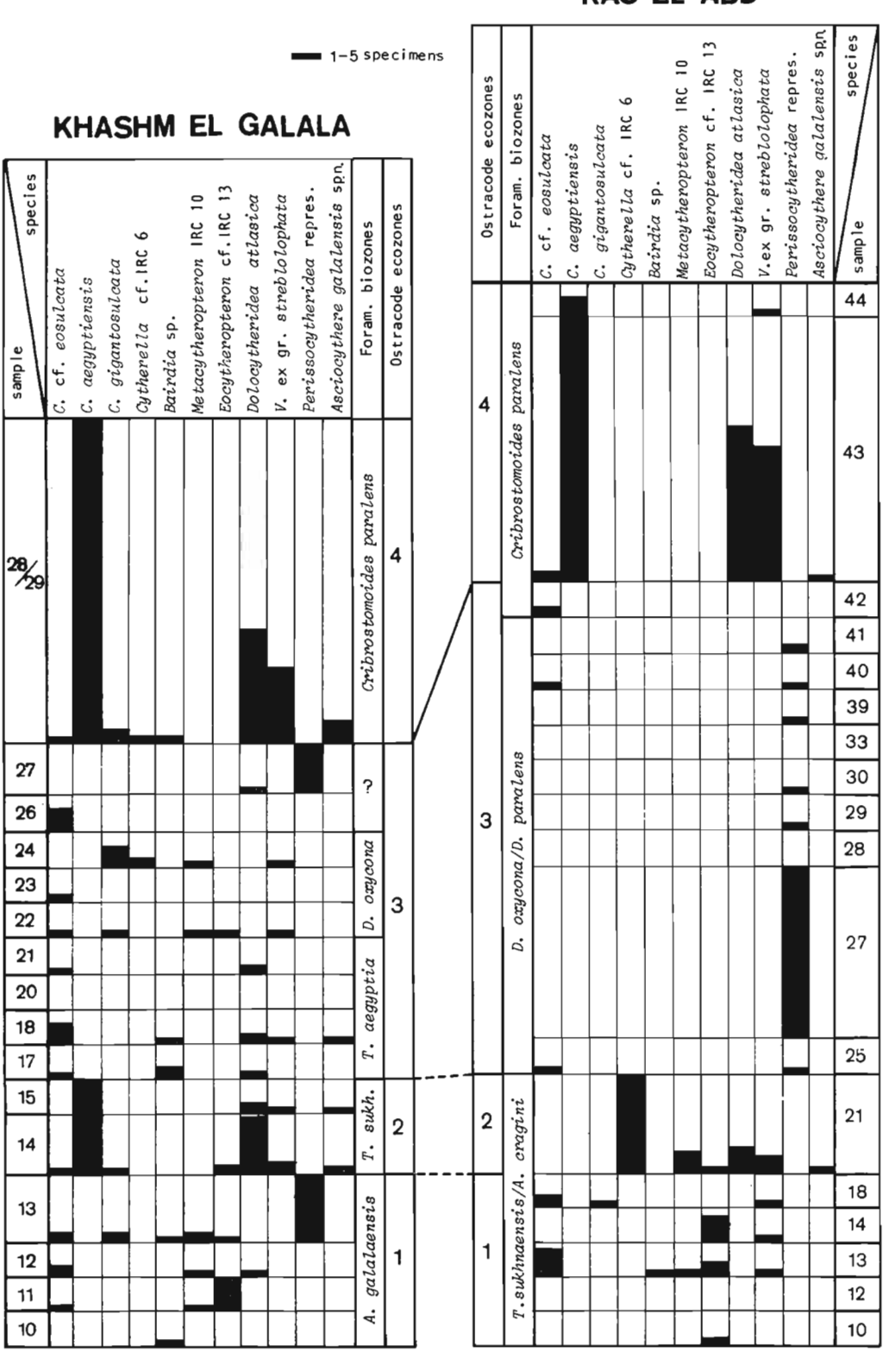

Fig. 4. Quantitative distribution of the selected ostracode species in Khashm El Galala and Ras El Abd sections, and their ecozonal meaning; also the biozonation of sediments as indicated by foraminifera (Abd-Elshafy and Atta, in press *b*).

units, i.e. the lower clastic unit (14 m thick) and the upper carbonate unit (58 m thick).

At Ras El Abd, the 96 m succession includes clastics, (38% of the section), i.e. sandstones and clays, and carbonates 62%, i.e. limestones, dolomitic limestones, argillaceous limestones and dolostones. As mentioned above, this section can also be subdivided into the clastic unit and the carbonate one. The clastic unit is poorly fossiliferous, except some plant remains and a few arenaceous foraminifera; on the contrary, the carbonate unit contains diversified micro- and macrofaunal assemblages.

The middle Cretaceous deposits in these two sections as well as in other areas of the eastern scarp of the Northern Galala were subdivided into the lower Cenomanian with the upper part of sandstones of nubian facies and the upper Cenomanian with the Galala Formation (Abd-El-shafy and Atta, in press *a*, *b*) (figs. 2, 3).

The microfacies as well as macro- and microfaunal data suggest that the sediments were mostly deposited under shallow marine, warm and rather quiet water conditions. Slight oscillations can be observed in the upper Cenomanian, being more uniform near the top of the sections.

OSTRACODE ASSEMBLAGES: A NEW TOOL FOR ENVIRONMENTAL AND STRATIGRAPHICAL INTERPRETATIONS

The studies of ostracode faunas from Khashm El Galala (16 samples) and Ras El Abd (18 samples) allow to determine the environmental conditions and their evolution, as well as to draw new conclusions on stratigraphy. Ecozonal distribution has been proposed and paleobiogeographic affinities discussed.

ENVIRONMENTS

Ostracodes in the studied samples (figs. 2, 3) of both sections differ in quantity and quality. Only in a few samples of calcareous clays from Khashm El Galala, e.g. in sample 28/29 and in sample 43 of marls from Ras El Abd, they are very well preserved (figs 2—4) and belong to diversified taxonomic units; they seem to have lived in probably optimal environmental conditions. On the contrary, many samples contain only a few species, with mostly crushed and/or compressed carapaces, difficult to identify. Within a particular species there are variations in the adult/juvenile and valves/carapaces ratios. However, even in relatively rich samples, high population density occurs in 2—3 dominant ostracode species with large-sized, thick shelled, smooth or heavily ornamented adult carapaces. All these features suggest unstable, shallow-water and/or rather restricted environments (see Brouwers 1988).

Two main ostracode type- assemblages occur in both sections:

— 1°a type with dominating *Cytherella* species (e.g. samples mentioned above); associated species among others belong to *Veeniacythereis, Paracypris, ?Krithe, Hemicytherura, Asciocythere* and *Dolocytheridea.* Almost all those genera mostly indicate a marine origin (van Morkhoven 1962). The genera *Cytherella,* associated with *Metacytheropteron, Veeniacythereis, Dolocytheridea, Eocytheropteron* and *Bairdia* from the middle Cretaceous of Israel (Rosenfeld *et al.* 1988) are referred to marine shallow-water facies. Similarly Al-Abdul-Razzaq (1983) suggests shallow--water, sublittoral conditions for Cenomanian ostracode assemblages, with *Glenocythere, Cythereis (Veeniacythereis* in this paper), *Cytherella, Bairdia, Eocytheropteron, Dolocytheridea* and *Paracypris,* known from Kuwait. This strongly suggests paleoecological affinities with our ostracode assemblage with *Cytherella.*

— 2°a type-assemblage dominated by *Perissocytheridea* species. *Perissocytheridea* has been described from the Miocene of North America and its environment inferred as a brackish one (Stephenson 1938). It is worth noticing that Van Morkhoven tentatively proposed to synonymize that genus with *Iliocythere Klie,* another meso-to polyhaline form. Rosenfeld *et al.* (1988) mentioned also a *Looneyella* species (*Perissocytheridea* in this paper) within Cretaceous non-marine assemblages from Israel. In the Upper Cretaceous of Argentina Uliana and Musacchio (1978) have detected *Perissocytheridea* species with other undoubtedly non-marine forms. At the same time, Dias-Birto *et al.* (1988) found *Perissocytheridea* within the Recent ostracode biofacies from Sepetiba Bay (Brazil, Rio de Janeiro) restricted to the brackish-euhaline, very shallow-water (0—7 m) environment. In comparison, in the sample 27 of Ras El Abd, *Perissocytheridea* is particularly common with some specimens of *Candoniella*-like species, this genus being known from fresh-water deposits. Thus, the alternation of sediments containing marine or brackish-water + transitional forms means that during their deposition, there was some fresh-water influence. This could result from sea-level oscillations and/or tectonic activities as it has been stated in the middle Cretaceous of Southern Tethys by Al-Abdul-Razzaq and Grosdidier (1981), and confirmed by many outhors (for example by Babinot and Bourdillon-de-Grissac, 1987 and Rosenfeld *et al.* 1988).

BIOSTRATIGRAPHY, PALEOGEOGRAPHY AND PALEOBIOGEOGRAPHICAL IMPLICATIONS

Among ostracode species recognized in the studied section, the following appear to be very important for stratigraphical interpretation: *Cytherella aegyptiensis, C. gigantosulcata, C.* cf. IRC 6, *Dolocytheridea atlasica,*

Schuleridea baidarensis, Eocytheropteron retroversicardinatum, Metacytheropteron IRC 10, *Glenocythere bahreinensis* (identified here with *G. reticulata*), *Peloriops* sp., *P.* cf. *ulosa, Veeniacythereis jezzineensis* and *V.* ex. gr. *streblolophata.* These species (except *Cytherella aegyptiensis*) occur already in the Albian and are present up to the mid-Cenomanian. *E. retroversicardinatum, S. baidarensis G. bahreinensis* and *M.* IRC 10 do not extend up to the late Cenomanian (cf. Athersuch 1988). Therefore, the stratigraphical range of the associations seems to be limited within the upper Albian to early/mid-Cenomanian. Nevertheless, special attention must be paid to lateral differences between sections, due to variability of biotopes resulting in extremely wide variability of some species which makes their identification difficult. Consequently, determination of the stratigraphic ranges of these species is troublesome.

Similar ostracode assemblages and analogous evolutions in both sections have been stated. Qualitative composition as well as appearance/disappearance of taxa show that some levels are well marked, corresponding undoubtedly to paleoecological boundaries. Therefore, four subdivisions in both sections are demonstrated; they have an ecozonal sgnificance (see figs. 2—4).

Ecozone 1: characterized by a progressive enrichment in species and especially abundance of *Cytherella* cf. *eosulcata, Eocytheropteron* cf. IRC 13, *Dolocytheridea atlasica, Metacytheropteron* IRC 10, Cytherideid sp. and *Perissocytheridea* representatives.

The occurrence of *Metacytheropteron* IRC 10 can help to determine the age of the ecozone: the species occurs in the Albian (Riché and Prestat 1980) and has also been found in the early Cenomanian (Al-Furaih 1983, Athersuch 1988, Babinot and Bourdillon-de-Grissac 1989). Also *Rehacythereis* cf. *libanensis*, resembling the form known so far from the Albian of Lebenon, and Cytherideid sp. close to the found in the Albian of Iran, may have some importance.

The somewhat restrictive qualitative composition and quantitative dominance of some species (i.e. *Perissocytheridea* representatives) give evidence of a near-shore (internal) marine platform environment with, perhaps, temporarily euryhaline conditions.

Ecozone 2: the base of this subdivision is marked by appearance of new species (sample 14, 15 of Khashm El Galala) with *Cytherella aegyptiensis, Asciocythere galalensis* sp. n., *Veeniacythereis* ex. gr. *streblolophata, Eocytheropteron retroversicardinatum* and *Metacytheropteron* resembling *M. berbericus.* According to bibliographic data available, *Metacytheropteron berbericus* as well as *Veeniacytheris streblolophata* are Cenomanian species. *V. streblolophata* has been described previously in the lower Cenomanian of Kuwait (Al-Abdul-Razzaq 1980), and was also recognized in the deposits of the same age from Oman (*l.c.*). Nevertheless, Grosdidier (1973) points to similar forms in the Albian of Iran. The age of ecozone 2

is probably corresponding to the early/mid-Cenomanian age; the upper Albian age seems to be doubtful.

Taking into account the composition of the assemblage, paleoenvironment is less restricted, marine influence is more dominant especially in Khashm El Galala section. In Ras El Abd section, ecozone 2 is less delineated.

Ecozone 3: in the Khashm El Galala section, disappearance of some species and rather low species diversity as well as distinct dominance of one species (*Perissocytheridea* cf. *sohni*) at the top of the section suggest again a rather weak marine influence, ended by short period of euryhaline conditions. In Ras El Abd section this euryhalinity seems to be persistant throughout ecozone 3.

The age of this ecozone is probably Cenomanian although *Schuleridea baidarensis* is known from the Albian as well as from the lower Cenomanian.

Ecozone 4: in the Khashm El Galala section, appearance of *Glenocythere bahreinensis* is noticed in association with residual species from underlying levels (fig. 2). In Ras El Abd section with the new species *Cytherella aegyptiensis*, *Eocytheropteron retroversicardinatum* and *Paracypris* sp. cooccur. In the Near East, *Glenocythere bahreinensis* occurs in the upper Albian to the early/mid-Cenomanian (in litt.); in view of the age of the former ecozones, ecozone 4 is probably of the early (mid?) Cenomanian age.

The four ecozones, distinguished in both sections, are rather easily comparable to the biostratigraphical zones determined earlier on the basis of foraminifera (Abd-Elshafy and Atta in press *b*). They do not confirm, however, the chronostratigraphical division proposed by these authors. Ostracode assemblages are generally similar to those previously described from other middle Cretaceous area, especially of the Arabian Peninsula; relationships are demonstrated, among others, with Israel (Rosenfeld and Raab 1974), Saudi Arabia (Al-Furaih 1983), Oman (Babinot and Bourdillonde Grissac 1987, Athersuch 1988), Kuwait (Al-Abdul-Razzaq 1979 *a*, *b*, 1980, 1981, 1983), Jordan (Babinot and Basha 1985), but also with Iran (Grosdidier 1973). Many species are also well distributed in all the northwestern part of Africa, Maghreb included. A few taxa are more strictly limited to Arabian Peninsula: *Eocytheropteron retroversicardinatum*, *Metacytheropteron* IRC 10 and *Glenocythere bahreinensis*.

No common species of that stratigraphical interval occur on the northern and southern Tethyan margins. This confirm that a "paleogeographical barrier" existed between two different ostracode paleobioprovinces, i.e. the South European and African-Middle East bioprovinces (*sensu* Babinot 1985). In other groups, especially foraminifera, affinities of faunas of the both margins are evident, even at the specific level (Saint-Marc 1972, Tronchetti 1981).

CONCLUSIONS

From the chronological point of view, the sections can be included into transitional interval from the late Albian to the early/mid-Cenomanian. Following the ostracode references only, the late Cenomanian age is rather excluded. A suggestion can be put forward that the boundary between ecozone 1 (and 2?) and ecozone 3 may be considered as corresponding to the Albian/Cenomanian transitional interval.

The evolution of global assemblages from the paleoecological point of view shows a progressive opening to marine (but near-shore) conditions, starting from ecozones 2 and 3. These data may be reliable to a paleodepth increase or to a relative transgressive trend. On the contrary, ecozone 1 has a regressive character with relative specialization of ostracode assemblages. Following the synthesis recently published by Riché and Prestat (1980: fig. 5), the bipartition of marine tendencies along the sections can be compared with "transgressive-regressive curves" concerning the Albian-Turonian times from the Far and Middle East. In this way, ecozone 1 is reliable with regressive tendency of the late Albian, other ecozones belong to the transgressive trend of early to lower part of the mid-Cenomanian.

The assemblages contain a rather common ostracode species. Almost all of them — except some cases, including four new species: *Asciocythere galalensis, Eocytheropteron pecteniferum, Perissocytheridea ignota* and *?Spinoleberis calcalifera,* are known from the Southern Tethyan margins, especially the Near East. As far as the Cenomanian time is concerned, the area studied in Egypt can be included into the "North African — Middle East ostracode bioprovince".

DESCRIPTIONS

Family **Cytherellidae** Sars, 1866
Genus *Cytherella* Jones, 1849
Cytherella aegyptiensis Colin et El Dakkak, 1975
(pl. 1: 1—6)

1974. *Cytherella* gr. *C. ovata* (Roemer); Rosenfeld and Raab: 3, pl. 1: 3—5.
1975. *Cytherella aegyptiensis* Colin et El Dakkak: 50, pl. 1: 2, 3.

Material. — Over one thousand well preserved specimens, including adult and juvenile valves and carapaces.

Specimens No. ZPAL	O.XXXIII/2	O.XXXIII/6
	aFC	aMC
Length	0.88	0.94
Height	0.60	0.55
Width	0.47	0.47

Variability. — Specimens differ in size and shape, including lateral outline, the latter depending mostly on the extent of overlapping between the left and the right valves and/or valve thickness. Sexual dimorphism distinct, typical of genus.

Occurrence. — Species was established for specimens from the Cenomanian of Jebel Nezzazat, Sinai, Egypt; present in the Cenomanian and Turonian of Israel, Cenomanian of Jordan; at Northern Galala (Egypt) it occurs in Khashm El Galala and Ras El Abd sections, in beds referred here to the Cenomanian. *Cytherella* aff. *aegyptiensis* is recorded from the late Cenomanian of Oman.

Cytherella gigantosulcata Rosenfeld, 1981

(pl. 1: 7—12)

non 1932. *Cytherella sulcata* van Veen: 336, pl. 4: 1—18.
1974. *Cytherella sulcata* Rosenfeld; Rosenfeld and Raab: 5, pl. 1: 2.
1981. *Cytherella sulcata* Rosenfeld; Bismuth *et al.*: 223, pl. 6: 3, 4 (here additional synonymy).
1981. *Cytherella sulcata* Rosenfeld; Al-Abdul-Razzaq and Grosdidier 179, pl. 1: 1.
1981. *Cytherella gigantosulcata* Rosenfeld; Rosenfeld, 896.
?1988. *Cytherella gigantosulcata* Rosenfeld; Athersuch, 1199, pl. 5: 14, 15.

Material. — Fifty three specimens, mostly adult valves and carapaces, rather well preserved.

Dimensions (in mm):

Specimens No. ZPAL	O.XXXIII/7	O.XXXIII/12
	aFC	aMC
Length	0.83	0.80
Height	0.57	0.52
Width	0.49	0.39

Variability. — Rather weak variability concerns indistinctly the size and shape of specimens. Distinct sexual dimorphism typical of the genus.

Remarks. — Species was renamed (see Athersuch 1988) because of homonymy with the species from the Cretaceous of Holland described by van Veen (1932). Specimens from the Cenomanian of Oman assigned by Athersuch to *Cytherella gigantosulcata* seem to be much more angulate in their dorsal view and therefore they are only tentatively included into the synonymy.

Occurrence. — Species known so far from late Albian to middle Cenomanian of North Africa (Tunisia, Algeria) as well as of Near East (Israel, Kuwait, Iran, Saudi Arabia, Jordan, Qatar, Iraq). At Northern Galala it occurs in Khashm El Galala and Ras El Abd sections in beds referred here to Albian, and Khashm El Galala also in layers referred to Cenomanian.

Cytherella cf. *eosulcata* Colin, 1974

(pl. 2: 7, pl. 10: 6)

Material. — Nearly two hundred specimens in many cases well preserved, mostly as adult carapaces.

Dimensions (in mm):

Specimens No. ZPAL	O. XXXIII/19	O.XXXIII/109
	a?MC	a?FC
Length	0.57	0.65
Height	0.36	0.39
Width	0.26	0.31

Remarks. — Specimens referred to *Cytherella cf. eosulcata* appear to be close to those described by Colin (1974), as *C. eosulcata* of the upper Cretaceous of France; they have similar general shape and similar rim along the anterior margin of the left valve. Differences concern the details of the lateral and dorsal outline as well as the way of overlapping the left valve by the right one. Within specimens referred to C. cf. *eosulcata* there are forms somewhat differing in shape (cf. pl. 2: 7 and pl. 10: 6). It is difficult to say, however, if this difference results from the sexual dimorphism or the characteristics of a separate species. Specimens presented on pl. 2: 7 are very rare.

Occurrence. — Northern Galala (Egypt) in beds referred to Albian and Cenomanian in Khashm El Galala and Ras El Abd sections.

Cytherella cf. IRC 6 Grosdidier, 1973

(pl. 2: 1—6)

Material. — About two hundred rather well preserved specimens, including adult and juvenile valves and carapaces.

Dimensions (in mm):

Specimens No. ZPAL	O.XXXIII/16	O.XXXIII/13
	aFC	aMC
Length	0.73	0.75
Height	0.47	0.44
Width	0,26	0.23

Variability. — Small variability concerns the size as well as the lateral and dorsal outline. Distinct sexual dimorphism typical of the genus.

Remarks. — In comparison with *Cytherella* IRC 6, described by Grosdidier (1973) from the Albian and lower Cenomanian of Iran, our form is generally less pointed posteriorly and more truncated posterodorsally. In contrast with *C. khalidrazzaki* Al-Abdul-Razzaq (1981) of the Cenomanian of Kuwait, it is, at first, more compressed laterally. When compared with *Cytherella* sp. (OMN 11) recorded by Athersuch (1988) from Albian of Oman, specimens from Egypt are more compressed and usually less angulate posteriorly in dorsal view.

Occurrence. — At Northern Galala (Egypt) in Ras El Abd and Khashm El Galala sections, in beds referred here to the Cenomanian.

Family **Bairdiidae** Sars, 1888

Genus *Bairdia* McCoy, 1844

Bairdia sp.

(pl. 9: 1)

Material. — Thirty seven rather badly preserved specimens mostly as complete carapaces.

Dimensions (in mm):

Specimen No. ZPAL	O.XXXIII/97
	?aRV
Length	0.94
Height	0.57

Remarks. — Specimens assigned to *Bairdia* sp. display great variability in size and shape. Their state of preservation, however, does not allow us to define them or decide if they represent adult or juvenile forms.

Occurrence. — At Northern Galala (Egypt) in Khashm El Galala and Ras El Abd sections in beds referred here to Albian, and in Khashm El Galala section also in the Cenomanian.

Family **Eucandonidae** Swain, 1961
Genus *Candoniella* Schneider, 1956
?Candoniella cf. *qeturaensis* Honigstein et Rosenfeld, 1985
(pl. 8: 10, 11)

Material. — Twenty eight carapaces, probably mostly adult ones.
Dimensions (in mm):

Specimen No. ZPAL O.XXXIII/96	aC
Length	0.83
Height	0.47
Width	0.31

Variability. — Variability in the size of specimens may result from their being in different stages of ontogenic development. Some variation concerns also the lateral outline of the carapace.

Remarks. — Close similarity confirmed by Dr. Rosenfeld exists between the specimens from Egypt assigned to *?Candoniella* cf. *qeturaensis* and those from the Upper Cretaceous of Israel described by Honigstein and Rosenfeld (1985) and referred to this species; specimens from Egypt generally have a more angularly arched dorsal margin. Since the internal features of specimens are unknown and systematic status of *Candoniella* is questioned (*fide* Swain 1961), the discussed taxon is tentatively referred to *Candoniella*.

Occurrence. — At Northern Galala (Egypt) in Ras El Abd section, in beds referred here to the Cenomanian.

Family **Paracyprididae** Sars, 1923
Genus *Paracypris* Sars, 1923
Paracypris sp.
(pl. 9: 2)

Material. — One complete carapace.
Dimensions (in mm):

Specimen No. ZPAL O.XXXIII/98	?aC
Length	0.70
Height	0.29
Width	0.16

Remarks. — General external features allow us to assign this form to *Paracypris*. Lateral outline of carapace may be compared with that of *Paracypris acuticauda* Rosenfeld, 1974, of the Cenomanian of Israel; the specimens from Egypt, however, have distinctly incised anterodorsal margin. The lack of characteristic features as well as the scarity of the material makes its more precise classification impossible.

Occurrence. — In Northern Galala in Ras El Abd section, in beds referred here to the Cenomanian.

Family **Cytherideidae** Sars, 1925

Genus *Asciocythere* Swain, 1952

Asciocythere galalaensis Szczechura, Abd-Elshafy et Babinot sp. n.

(pl. 2: 8—11, pl. 10: 2)

Holotype: ZPAL O.XXXIII/23; pl. 2: 11.

Type horizon: Galala Formation, early/mid? — Cenomanian.

Type locality: outcrop situated at Ras El Abd locality, in northern Galala, western side of the Gulf of Suez.

Derivation of the name: galalaensis — found in the Galala.

Material. — Forty specimens, mostly adult carapaces and valves, many of them well preserved.

Diagnosis. — *Asciocythere* with strong overlapping (and standing out) of the right valve by the left one, especially along the dorsal and anteroventral margins, and distinct, rather rare and irregularly arranged pits on both sides of carapace.

Dimensions (in mm):

Specimen No.	ZPAL O.XXXIII/23	O.XXXIII/20
	holotype a?FC	a?MRV
Length	0.49	0.57
Height	0.42	0.39
Width	0.29	

Description. — Carapace much compressed laterally, widest centrally and pointed at both ends when seen dorsally, subovate in lateral outline, highest at the middle. Posterior margin less rounded than the anterior one and somewhat truncated in its upper part. Dorsal margin gently arched, ventral margin slightly sinuous, more rounded frontally. Left valve strongly overlaps the right valve, especially along the dorsal and anteroventral margins where it distinctly overhanges this latter. Both lateral sides of carapace covered by distinct but rare and irregularly distributed pits.

Duplicature moderately wide, better developed at the anterior end, without vestibulum. Muscle scars pattern unknown. Hinge margin in the right valve consists of the crenulate bar enlarging terminally; in the left valve accomodation groove may be seen.

Variability. — It concerns mostly the size and shape of carapaces (i.e. length/height ratio and lateral outline), which seem to be the result of the sexual dimorphism within the species; specimens with greater length/height ratio are probably males.

Remarks. — Specimens assigned to *Asciocythere galalaensis* sp. n. seem difficult to compare with those of the so far known species.

Occurrence. — At Northern Galala (Egypt) in Khashm El Galala and Ras El Abd sections, in beds referred here to the Cenomanian.

Genus *Dolocytheridea* Triebel, 1938

Dolocytheridea atlasica Bassoullet et Damotte, 1969

(pl. 3: 1—10, ?11)

1969. *Dolocytheridea atlasica*: Bassoullet et Damotte: 139, pl. 11: 9.

?1973. *Dolocytheridea* cf. *atlasica* Bassoullet et Damotte; Grosdidier: pl. 3: 22.

1974. *Dolocytheridea atlasica* Bassoullet et Damotte; Rosenfeld and Raab: 11, pl. 2: 12, 13.

Material. — About 600 specimens, mostly complete and adult carapaces, in most cases well preserved.

Dimensions (in mm):

Specimens No.	ZPAL O.XXXIII/27	O.XXXIII/26
	aFC	aMC
Length	0.83	0.94
Height	0.60	0.52
Width	0.26	0.20

Variability. — This species is characterized by a large variability of the size and shape of carapaces. Apart from the specimens varying in length/height ratio and dorsal outline, belonging most probably to sexually differentiated forms, there are specimens much differing in lateral outline, i.e. being more or less elongated and, generally, distinctly pointed posteriorly (cf. pl. 3: 1, 3, 4). Some of the latter ones remind those of Cenomanian of Algeria assigned by Majoran (1989) to his new species *"Dolocytheridea" polymorphica*. Specimens from Egypt, however, are more ovate in lateral outline, being at the same time (generally) rarely and coarsely punctate.

Remarks. — Of the forms presented here only those with less elongated posterior end are most similar to the holotype of *Dolocytheridea atlasica*. Specimen figured on pl. 3: 11 only tentatively may be assigned to that species. Generally filled with rock inner sides of valves make better classification of the studied material impossible. *Dolocytheridea* cf. *atlasica* recorded by Grosdidier (1973) from the upper Albian and Cenomanian of Iran also varying much in size seems to be conspecific with form discussed here.

Occurrence. — Albian and Cenomanian of Iran, late Albian — middle Cenomanian of Oman, lower Cenomanian of Jordan, entire Cenomanian of Israel, upper Cenomanian of Algeria. In Egypt it was found in the Cenomanian of Sinai; at Northern Galala it occurs in Khashm El Galala section in beds referred here to Albian and Cenomanian, while in Ras El Abd section in Cenomanian only.

Genus *Schuleridea* Swartz et Swain, 1946
Schuleridea baidarensis Damotte et Saint-Marc, 1972
(pl. 10: 4)

1972. *Dordoniella? baidarensis* Damotte et Saint-Marc: 290, pl. 2: 23.
1973. *Dordoniella*? cf. *baidarensis* Damotte et Saint-Marc IRC15; Grosdidier: pl. 5: 44 a—g.
1974. *Dordoniella? D. baidarensis* Damotte et Saint-Marc; Rosenfeld and Raab: 12, pl. 2: 20—22, pl. 4: 11.
1988. *Schuleridea baidarensis* (Damotte et Saint-Marc); Athersuch: 1203, pl. 1: 22.

Material. — One complete carapace.

Dimensions (in mm):

Specimen No.	ZPAL O.XXXIII/107
	?aC
Length	0.52
Height	0.34
Width	0.26

Remarks. — Specimens of that species vary much in size and morphology, especially in their left valve. It appears that the forms figured by Grosdidier (1973) and referred to various taxa, e.g. *Schuleridea* IRR30, *Schuleridea*? IRT23, and *Dordoniella*? IRJ15, recorded from the Neocomian up to lower Cenomanian of Iran, represent closely related species.

Occurrence. — *Schuleridea baidarensis* is known from the Albian of Lebanon and Oman, the late Albian of Iran, the Aptian — lower Cenomanian of Israel and Ceno-

manian of Sinai (Egypt). At Northern Galala it occurs in Khashm El Galala section, in beds referred here to the Cenomanian.

Genus *Perissocytheridea* Stephenson, 1938
Perissocytheridea cf. *sohni* (Rosenfeld, 1974)
(pl. 6: 12)

Material. — One hundred and fifty three specimens, mostly adult carapaces, rather badly preserved.

Dimensions (in mm):

Specimen No. ZPAL O.XXXIII/74	aMC
Length	0.60
Height	0.29
Width	0.26

Variability. — Considerable variability concerns mostly the shape (especially the lateral outline) and length/height ratio and it is most probably the result of sexual dimorphism. Slightly varying ornamentation seems to reflect different state of preservation.

Remarks. — The similarity of that form to *Loonyella sohni* Rosenfeld (*in* Rosenfeld and Raab 1974) from the Cenomanian and Turonian of Israel, was confirmed by this author (Dr. Rosenfeld's personal communication). In comparison with specimens referred to *L. sohni* the specimens from Egypt seem to be less alate laterally. The general appearance of specimens and especially the lack of caudal process typical of *Looneyella* seems to prove that species does not belong to that genus.

Occurrence. — In Northern Galala in Khashm El Galala section in layers referred here to Albian as well as Cenomanian.

Perissocytheridea ignota Szczechura, Abd-Elshafy et Babinot sp. n.
(pl. 6: 6—11)

Holotype: ZPAL O.XXXIII/71; pl. 6: 9.

Type horizon: Galala Formation, early/mid?-Cenomanian.

Type locality: outcrop at Northern Galala, Ras El Abd locality, western side of the Gulf of Suez, Egypt.

Derivation of name: Lat. *ignota* — unknown.

Material. — About 260 specimens, mostly adult carapaces, rather badly preserved.

Diagnosis. — Carapace typical of *Perissocytheridea*, with a weak lateroventral inflation extending gently to the posterior end. Valve surface slightly reticulated and covered by faint and densely distributed pits. Tiny ribs forming most pronounced elements of ornamentation tend to be parallel to the valve length but join at valve ends. Sexual dimorphism prominent.

Dimensions (in mm):

Specimens No. ZPAL O.XXXIII/73	aMC	O.XXXIII/71 holotype, AFC
Length	0.60	0.52
Height	0.34	0.31
Width	0.31	0.34

Description. — Carapace subovate in lateral outline, somewhat obliquelly rounded anteriorly, narrowly rounded below midheight posteriorly. Dorsal margin slightly

sinuate, overhanging hinge line posteriorly. Ventral margin almost straight in males, whereas rounded, obscuring contact margin, except the anterior part, in females. Eye tubercles weakly developed. Ventral inflation occurs in females, while postero-dorsal inflation in males. Ventral side flattened. Median sulcus rather weakly pronounced. Muscle scars field more or less distinctly marked. Lateral valve surface densely and faintly pitted, reticulated and covered by tiny ribs coinciding terminally and tending to be parallel to the valve length. Tiny ribs, parallel to the valve margin, occur also on the ventral side. Duplicature rather narrow. Muscle scars pattern invisible. Hinge margin seems to be of merodont type.

Variability. — Distinct variability of the size, shape and ornamentation of carapaces result from intraspecific variability, sexual dimorphism and/or environmental changes. Some almost smooth-valved individuals occur.

Remarks. — In comparison with *Perissocytheridea sohni* Rosenfeld, specimens belonging to *P. ignota* sp. n. have lateroventral inflation rather than lateroventral ridge, which extends gently to the posterior end; they also have the main elements of ornamentation (ribs) that appear to be subparallel to the length axis.

Occurrence. — In Northern Galala (Egypt) in Ras El Abd section in beds referred here to the Cenomanian.

Genus *Eucythere* Brady, 1868

?*Eucythere* sp.

(pl. 9: 6, 7)

Material. — Three carapaces, probably juvenile ones.

Dimensions (in mm):

Specimens No. ZPAL	O.XXXIII/102	O.XXXIII/103
	?jC	?jC
Length	0.60	0.40
Height	0.34	0.31
Width	0.26	0.26

Remarks. — Minute size as well as thin wall of carapaces suggest that they represent juvenile forms. Thus, their generic and specific affiliations are doubtful. The general appearance and the type of valve ornamentation are like those in *Protobuntonia* or *Eucythere* representatives. Their external appearance may be compared to that of specimens from the Upper Cretaceous of Algeria referred by Viviere (1985, unpublished doctor thesis) to *Eucythere rementosa*, and of specimens from the Cenomanian of that country (Algeria) referred by Majoran (1989) to *Eucythere*? sp.

Occurrence. — In Northern Galala, in Khashm El Galala section in beds referred here to the Cenomanian.

Genus *Krithe* Brady, Crosskey and Robertson, 1874

?*Krithe* sp.

(pl. 9: 3)

Material. — Eleven specimens, mostly as adult valves, rather badly preserved.

Dimensions (in mm):

Specimen No. ZPAL	O.XXXIII/99
	aRV
Length	0.75
Height	0.34

Remarks. — The state of preservation of individuals as well as the lack of any characteristic features make the proper identification of that form difficult. Representatives of this genus are rather unknown so far from the middle Cretaceous deposits of southern Tethys.

Occurrence. — In Northern Galala (Egypt) in Ras El Abd section in beds referred here to the Albian and the Cenomanian.

Cytherideid indet.

(pl. 10:3)

Material. — Nineteen specimens, mostly complete carapaces in most cases badly preserved.

Dimensions (in mm):

Specimen No. ZPAL O.XXXIII/106	aLV
Length	0.60
Height	0.36

Remarks. — In their external appearance, the specimens resemble individuals referred to *Dolocytheridea atlasica* Bassoullet et Damotte, they are, however, more triangular, higher and more truncated posteriorly. In these respects they seem to be close to those representing *Pontocyprella* IRE 15 described by Grosdidier (1973) from the Albian of Iran. Merodont hinge in specimens from Egypt does not correspond, however, to that in *Pontocyprella*. In comparison with *"Dolocytheridea" polymorphica* Majoran (1989) of the Cenomanian of Algeria, specimens from Egypt seem to be more triangular in side view, having at the same time more narrowly rounded anterior margin.

Occurrence. — In Northern Galala (Egypt) in Khashm El Galala and Ras El Abd sections, in beds referred here to the Albian.

Family **Cytheruridae** G. W. Müller, 1894
Genus *Eocytheropteron* Alexander, 1933
Eocytheropteron retroversicardinatum Al-Abdul-Razzaq, 1980

(pl. 4: 1—4)

1980. *Eocytheropteron retroversicardinatum* Al-Abdul-Razzaq: 444, pl. 1: 1—8, pl. 2: 1—3.

1988. *Eocytheropteron retroversicardinatum* Al-Abdul-Razzaq; Athersuch: 1201, pl. 1: 11.

Material. — Eleven specimens representing adult valves and carapaces.

Dimensions (in mm):

Specimen No. ZPAL O.XXXIII/38	aC
Length	0.52
Height	0.31
Width	0.23

Remarks. — In comparison with specimens referred to this species by Athersuch (1988) from the Cenomanian of Oman, our specimens ornamental pits are not arranged in rows as is seen (especially) in the anteromedian part of specimens from that country.

Occurrence. — Early Cenomanian of Kuwait, middle Cenomanian of Oman;

similar form is described by Grosdidier (1973) as IRK 13 from the Albian of Iran. In Northern Galala (Egypt) it occurs at Khashm El Galala and Ras El Abd sections in beds referred here to the Cenomanian.

Eocytheropteron cf. IRC 13 Grosdidier, 1973

(pl. 5: 9—12)

Material. — One hundred and sixteen specimens, mostly as adult carapaces, generally badly preserved.

Dimensions (in mm):

Specimen No. ZPAL O.XXXIII/62 a?FC	
Length	0.57
Height	0.29
Width	0.29

Variability. — It concerns the size, shape and ornamentation of carapaces; variable length/height ratio as well as rather triangular or ovate lateral outline of valves may be the result of sexual dimorphism. The main elements of ornamentation tend to be parallel to the valve outline, i.e. they form rather triangle-like or concentric pattern. Furrow below the eye tubercle on the right valve and median sulcus below the dorsal margin in the left valve are not always well developed.

Remarks. — Similar shape, morphology and ornamentation as well as similar variability concerning these features may be observed in specimens from the Albian of Iran, described by Grosdidier (1973) as *Eocytheropteron* IRC 13. In specimens from Egypt first of all in contrast with those from Iran — fain ventral ribs do not join near the anteroventral margin.

Close similarity seems to exist also between the Egyptian species and *Neocythere*? *bisulcata* Rosenfeld, 1974, of the lower Cenomanian of Israel. The former is also very similar to that of the Cenomanian of Tunisia referred by Bismuth *et al.* (1981) to *Neocythere*? cf. *bisulcata*. The comparison of the original material would be useful to decide the proper taxonomic relation between the discussed species.

Unknown features of the inner side of the valve do not allow us to determine the generic assignement of the species with certainty. Elevated and crenulated terminal elements of the hinge margin of the larger, left valve suggest that it represents *Eocytheropteron*.

Occurrence. — In Northern Galala (Egypt), in Khashm El Galala and in Ras El Abd sections, in sediments referred here to the Albian and the Cenomanian.

Eocytheropteron pecteniferum Szczechura, Abd-Elshafy et Babinot sp. n.

(pl. 5: 1—8)

Holotype: ZPAL O.XXXIII/52; pl. 5: 1.

Type horizon: Galala Formation, early/mid? — Cenomanian.

Type locality: outcrop at Northern Galala, Ras El Abd locality, western side of the Gulf of Suez, Egypt.

Derivation of name: Lat. *pecteniferum* — comb bearing.

Material. — Eighty specimens, mostly adult carapaces, in many cases well preserved.

Dimensions (in mm):

Specimens No. ZPAL	O.XXXIII/52	O.XXXIII/56
	holotype, aFC	aMC
Length	0.44	0.47
Height	0.29	0.23
Width	0.23	0.26

Diagnosis. — Ribs subconcentric close to the valve margin and rather meandric in their middle. Somewhat oblique anterodorsal and median sulcus developed in both valves, whereas comb-like ridge behind the anterior cardinal angle occurs only in the left valve. Sexual dimorphism distinct.

Description. — Carapace of shape typical of the genus with distinct up-turned caudal process above its midheight. Maximum height anteriorly, greatest width posteroventrally. Valves differ in size and shape, the left one being larger and overlapping the right one especially along the anterodorsal margin. Left valve supported behind its anterior cardinal angle with comb-like ridge. Dorsal margin straight, ventral margin rounded and slightly concave in its middle part. Anterior margin broadly and rather obliquely rounded, posterior margin elongated and pointed above midheight. Lateral sides, moderately inflated except the most external admarginal parts, covered by subconcentric ribs near the valve margin, while rather meandric in their centres. Somewhat inflated ventral side bears 8 ribs, parallel to the contact line. On the dorsal side of the left valve there exists a loop-shaped rib behind the comb-like ridge; posteriorly it passes into the dorsal rib stretching along the contact line, while frontally it attains the anterior rib, i.e. one of the concentric, protruding ribs, which separates anterodorsal and median sulcus. Median and anterodorsal sulcus occur also no right valve. Spaces between the main ornamental elements finely pitted. Duplicature rather morrow, wider posteriorly. Hinge typical of the genus, i.e. consisting of crenulate, longitudinal terminal elevations and crenulated furrow at the middle, in the right valve.

Variability. — It concerns the size of specimens, their shape and details of ornamentation. More elongated forms, probably males, have additional rib bordering posteriorly the lateral valve inflation.

Remarks. — In comparison with *Eocytheropteron* cf. IRC 13 Grosdidier 1973 the new species has more rhomb-like shaped (in lateral outline) carapace with higher situated and more up-turned caudal process, more coarsely ornamented sides, and comb-like ridge in front of the dorsal margin of the left valve.

Occurrence. — In Northern Galala in Ras El Abd section, in layers referred here to the Cenomanian.

Genus *Metacytheropteron* Oertli, 1957

Metacytheropteron IRC 10 Grosdidier, 1973

(pl. 4: 5—10)

1973. *Metacytheropteron* IRC 10 Grosdidier: pl. 6: 50 a—c.
1988. *Metacytheropteron* IRC 10 Grosdidier; Athersuch: 1201, pl. 1: 8, 9.

Material. — Forty six specimens, mostly adult valves and carapaces, in most cases well preserved.

Dimensions (in mm):

Specimens No. ZPAL	O.XXXIII/40	O.XXXIII/42
	aFC	aMRV
Length	0.52	0.52
Height	0.34	0.29
Width	0.34	

Remarks. — This species appears to be very close to *?Neocythere hevyonensis* Rosenfeld, 1974, of the lower Cenomanian of Israel.

Occurrence. — Albian and lowermost Cenomanian of Iran, Albian and lower Cenomanian of Oman. At Northern Galala (Egypt) in Khashm El Galala and Ras El Abd sections, in beds referred here to the Albian as well as the Cenomanian.

Metacytheropteron cf. *berbericus* (Bassoullet et Damotte, 1969)

(pl. 4: 15, pl. 10: 1)

Material. — Four badly preserved specimens.

Dimensions (in mm):

Specimen No. ZPAL	O.XXXIII/51
	aC
Length	0.55
Height	0.26
Width	0.31

Remarks. — The specimens seem to be conspecific with those described as *Cytheropteron (recte Metacytheropteron) berbericus* from the Upper Cenomanian of Algeria, the latter ones, however, are not adequately illustrated. Bismuth *et al.* (1981) include into this species specimens found by Grosdidier (1973) in the Albian and lower Cenomanian of Iran and named by him *Metacytheropteron parnesi* Sohn. At the same time Al-Furaih (1983) put the latter one into synonymy of his new species, of the Cenomanian of Saudi Arabia, *Metacytheropteron pleura*. Unfortunately Al-Furaih (*l.c.*) do not compare both species, i.e. *Metacytheropteron berbericus* and *M. pleura*; in our opinion *M. berbericus* has more pronounced, less numerous and more arched lateral ribs. According to Athersuch (1988) all of the above mentioned forms may be conspecific.

Occurrence. — *Metacytheropteron berbericus* is broadly known in north Africa and Arabian Peninsula, from Albian and Cenomanian beds. It is also recorded in the Cenomanian of Portugal. Colin and El Dakkak (1975) list *M. berbericus* of the Cenomanian of Jebel Nezzazat (Sinai, Egypt).

At Northern Galala *M.* cf. *berbericus* occurs in Khashm El Galala section in beds referred here to the Albian (tentatively) and the Cenomanian.

Metacytheropteron cf. *pleura* Al-Furaih, 1983

(pl. 4: 11—14)

Material. — Six carapaces, most probably adult ones, rather badly preserved.

Dimensions (in mm):

Specimens No. ZPAL	O.XXXIII/47	O.XXXIII/48
	aFC	aMC
Length	0.52	0.57
Height	0.23	0.26
Width	0.31	0.26

Variability. — Distinct differences concerning length/height/width ratio within specimens referred to that taxon may be the result of their sexual differentiation.

Remarks. — Remarks as those on *Metacytheropteron* cf. *berbericus* (see above). Specimen presented on pl. 10: 1 is almost identical with that figured by Majoran (1989: pl. 6: 1) and referred to *M. berbericus*; specimens from Egypt have more elongated posterior end.

Occurrence. — At Northern Galala (Egypt) in Khashm El Galala section, in beds referred here to the Cenomanian. *Metacytheropteron pleura* is described from the Cenomanian of Saudi Arabia.

Genus *Hemicytherura* Elofson, 1941

Hemicytherura sp.

(pl. 9: 5)

Material. — One probably adult carapace.

Dimensions (in mm):

Specimen No. ZPAL O.XXXIII/101	?aC
Length	0.31
Height	0.13
Width	0.13

Remarks. — General appearance as well as the main external mophological features of the specimen suggest that it belongs to *Hemicytherura*; details of its morphology and ornamentation are obscure. Representatives of this genus has not been recorded so far from the Middle Cretaceous of southern Tethys.

Occurrence. — At Northern Galala (Egypt) in Ras El Abd section in beds referred here to the Cenomanian.

Family **Schizocytheridae** Howe, 1961

Genus *Amphicytherura* Butler et Jones, 7957

?*Amphicytherura* sp.

(pl. 9: 4)

Material. — Two carapaces probably adult ones.

Dimensions (in mm):

Specimen No. ZPAL O.XXXIII/100	a?C
Length	0.49
Height	0.29
Width	0.26

Remarks. — Lateral outline and morphology of specimens resemble those characteristic of *Amphicytherura*. However, the lack of the median rib, typical of *Amphicytherura*, and unknown type of the hinge margin, require caution in their generic assignement. Ornamentation (compare on pl. 9: 4a) seems to differ from those of the species known so far.

Occurrence. — At Northern Galala (Egypt), in Khashm El Galala section, in beds referred here to the Cenomanian.

Family **Trachyleberididae** Sylvester-Bradley, 1948

Genus *Glenocythere* Al-Abdul-Razzaq, 1979

Glenocythere bahreinensis Al-Abdul-Razzaq, 1979

(pl. 6: 1—5)

1973. *Nigeria* IRJ 14 Grosdidier: pl. 7: 63.
1973. *Cythereis* IRC 2 Grosdidier: pl. 8: 65.

1979*a*. *Glenocythere bahreinensis* Al-Abdul-Razzaq: 921, pl. 1: 1—6, pl. 3: 1.
1979*a*. *Glenocythere reticulata* Al-Abdul-Razzaq: 927, pl. 2: 1—4, pl. 3: 2, 3.
1981. *Glenocythere reticulata* Al-Abdul-Razzaq; Al-Abdul-Razzaq and Grosdidier: 188, pl. 2: 6.
1981. *Glenocythere bahreinensis* Al-Abdul-Razzaq; Al-Abdul-Razzaq and Grosdidier: 188, pl. 2: 6.
1983. *Glenocythere bahreinensis* Al-Abdul-Razzaq; Al-Furaih: 3, pl. 1: 4, 5.
1988. *Glenocythere reticulata* Al-Abdul-Razzaq; Athersuch: 1201, pl. 4: 7, 8.
1988. *Glenocythere bahreinensis* Al-Abdul-Razzaq; Athersuch: 1201, pl. 4: 3, 4.

Material. — Thirteen specimens, adult valves and carapaces, some well preserved. Dimensions (in mm):

Specimens No. ZPAL	O.XXXIII/63	O.XXXIII/65
	aFC	a?MC
Length	0.83	0.94
Height	0.60	0.52
Width	0.47	0.57

Variability. — Conspicuous variability concerns the size, shape and ornamentation of carapaces. Specimens vary in length/height/width ratio and most probably represent different sexes. There co-occur distinctly reticulated forms, almost smooth forms and those with intermediate features.

Remarks. — *Glenocythere bahreinensis* and *G. reticulata* were distinguished by Al-Abdul-Razzaq, 1979, as species differeing in ornamentation and having somewhat different stratigraphical range. This discrimination was accepted later by Al-Abdul-Razzaq and Grosdidier (1981) and Athersuch (1988). Since in the sample from Egypt both forms coexist and there are forms intermediate in ornamentation we treat them as conspecific; it is probable that the type of their ornamentation depends of the environment. The name of the discussed species has been chosen arbitrarily from two names introduced simultaneously by Al-Abdul-Razzaq (1979*a*). Because of extremely variable shape, size morphological details and ornamentation, the discussed forms presented by diverse authors indicated in synonymy, appear to belong to particularly polymorphic and polytypic species or group of closely related (difficult to separate) taxa.

Occurrence. — *Glenocythere reticulata* is known from Albian-middle Cenomanian of Iran, lower Cenomanian of Kuwait and Lebanon, middle Cretaceous of the Arabian Gulf Coast and ?Albian-?middle Cenomanian of Oman. *Glenocythere bahreinensis* is recorded in ?Albian-lower Cenomanian of Oman and Arabian Gulf Coast, Albian-middle Cenomanian of Iran, lowest Cenomanian on Kuwait, lower Cenomanian of Lebanon and Cenomanian of Saudi Arabia. At Northern Galala (Egypt) *Glenocythere bahreinensis* occurs in Khashm El Galala section, in beds referred here to the Cenomanian.

Genus *Peloriops* Al-Abdul-Razzaq, 1979

Peloriops sp.

(pl. 8: 8)

Material. — One complete carapace.
Dimensions (in mm):

Specimen No. ZPAL	O.XXXIII/93
	aC
Length	0.91
Height	0.47
Width	0.31

Remarks. — The representative of that species resembles those referred to *Cythereis (recte Peloriops) pustulata*, described by Rosenfeld (1974) from the Cenomanian of Israel and *Peloriops sphaerommata* Al Abdul Razzaq (1974) from the Cenomanian of Kuwait. Similar observations concerning relationships of the mentioned species are made by Bismuth *et al.* (1981), Athersuch (1988) and Majoran (1989); they even suggest the similarity of *P. sphaerommata* to other species distinguished. In 1983 Al-Abdul-Razzaq decided to put *P. sphaerommata* into synonymy of *P. ziregensis*. Majoran (1989) doubted, however, if these species are really conspecific, and tentatively referred his specimens from the Cenomanian of Algeria (N.B. some of them, e.g., those figured in pl. 14: 9, 11 almost identical to the specimen from Northern Galala) to *P. ziregensis?* Differences between the above compared species concern mostly the size and details of ornamentation of specimens and seem to be the result of intraspecific variability. Since there is no clear photograph of the holotype of *P. ziregensis* and only one specimen represents *Peloriops* sp. in ostracode collection of Egypt, its taxonomy is not certain.

Occurrence. — *P. sphaerommata* is known from the lower Cenomanian of Kuwait and early Cenomanian of Oman. *P. ziregensis* occurs in Cenomanian of Algeria and Israel and is reported by Riché and Prestat (1980) from the Albian and Cenomanian of Near and Middle East. Similar forms are known, however, from other countries of North Africa and Arabian Peninsula from Vraconian. At Northern Galala *P.* sp. occurs in Ras El Abd section, in beds referred to the Cenomanian.

Peloriops cf. *ulosa* Al-Abdul-Razzaq, 1979

(pl. 8: 9)

Material. — One ?adult carapace.

Dimensions (in mm):

Specimen No. ZPAL	O.XXXIII/94
	?aC
Length	0.57
Height	0.26
Width	0.21

Remarks. — In comparison with the holotype of *Peloriops ulosa* described by Al-Abdul-Razzaq from the Cenomanian of Kuwait (1979b) specimen from Egypt has somewhat different ornamentation, mostly in its posterior part.

Occurrence. — At Northern Galala (Egypt) in Khashm El Galala section in sediments referred here to Albian.

Genus *Rehacythereis* Gründel, 1973

Rehacythereis cf. *libanensis* (Bischoff, 1963)

(pl. 8: 4—7)

Material. — Eighteen carapaces, probably only adult ones, some of them well preserved.

Dimensions (in mm):

Specimens No. ZPAL	O.XXXIII/92	O.XXXIII/91
	aFC	aMC
Length	0.52	0.60
Height	0.26	0.26
Width	0.23	0.23

Variability. — Variability concerns first of all the carapace length/height ratio

which may result from their sexual dimorphism. They have also differently developed morphological elements, especially ribs bordering all valve margins. However, the forms may represent different ontogenetical stages (cf. pl. 8: 4 and 7).

Remarks. — Lateral valve outline, especially parallel and somewhat arched dorsal and ventral margins, abruptly truncated posterior margin and slightly obliquely, rather narrowly rounded anterior margin are like those in some *Cythereis* (*recte Rehacythereis*) *libanensis* Bischoff (1963: e.g. specimen in pl. 13: 102) of the Albian of Lebanon. Dorsal outline as well as some morphological details (especially median rib frontally overcrossing muscle tubercle) allow to distinguish the Egyptian form from that of Lebanon. Specimens referred by Bischoff (*l.c.*) to *C. libanensis* seem to represent more than one species.

Occurrence. — At Northern Galala, in Ras El Abd section, in beds referred here to the Albian.

Genus *Spinoleberis* Deroo, 1966

?*Spinoleberis calcalifera* Szczechura, Abd-Elshafy et Babinot sp. n.

(pl. 8: 1—3)

Holotype: ZPAL O.XXXIII/88; pl. 8: 3.

Type horizon: Galala Formation, early/mid?-Cenomanian.

Type locality: outcrop situated at Ras El Abd locality in Northern Galala, western side of the Gulf of Suez, Egypt.

Derivation of the name: Lat. *calcalifera* — spur-bearing.

Material. — Eight carapaces, probably only adult ones, well preserved.

Diagnosis. — Carapace wedge-shaped in lateral outline, much compressed, with two tubercles on dorsal margin, median rib behind the muscle node and high ventral rib dichotomously branching off in its posterior part, where it forms a loop-like structure. Tiny ribs, six in number, join the muscle node with the elevated (rimmed) anterior margin and eye tubercle.

Dimensions (in mm):

Specimens No.	ZPAL O.XXXIII/86 aC	O.XXXIII/88 holotype aC
Length	0.55	0.60
Height	0.34	0.31
Width	0.23	0.26

Description. — Carapace wedge shaped in lateral view, much compressed laterally, highest frontally, widest posteroventrally. Both valves have similar size and shape, although the left valve overlaps the right one. Anterior margin broadly rounded, posterior margin obliquely elongated and pointed close to the ventral margin. Posterior end reminds a spur-like structure. Dorsal and ventral margins almost straight and tend to be coinciding. Eye tubercle well developed. Distinct knob occurs in the middle of dorsal margin in both valves. More prominent knob exists also in the posterior cardinal angles of valves. Median rib rather long but separated from the muscle tubercle. Ventral rib, most prominent of all lateral morphological elements, highest posteriorly where it dichotomously branches and forms a loop-like structure, better seen on ventral side of the carapace. Ventral rib disappears below the muscle scars field. Six tiny, radially spreading ribs, connect the muscle tubercle with the eye tubercle and the anterior margin. Anterior as well as posterior margins thickened and dentate. Indistinct reticulation covers spaces between the main morphological elements, mostly in the central parts of valves. Internal features unknown.

Variability. — Collected specimens vary indistinctly, mostly in their ornamentation, perhaps as a result of their different preservation.

Occurrence. — At Northern Galala (Egypt) in Ras El Abd section in beds referred here to the Cenomanian.

Genus *Veeniacythereis* Gründel, 1973

Veeniacythereis jezzineensis (Bischoff, 1963)

(pl. 7: 4, 9: 11, pl. 10: 5)

1963. *Cythereis jezzineensis* Bischoff: 42, pl. 16: 128—130.
1969. *Cythereis mahrebensis* Bassoullet et Damotte: 133, pl. 1: 2.
1973. *Cythereis jezzineensis* Bischoff; Grosdidier, pl. 7: 64.
1974. *Veeniacythereis jezzineensis* (Bischoff); Rosenfeld and Raab, 21, pl. 3: 28—30 not 31, 32.
1975. *Cythereis jezzineensis* Bischoff; Colin and El-Dakkak, pl. 1: 11, 12.
1981. *Veeniacythereis mahrebensis* (Bassoullet et Damotte); Bismuth *et al.* 232, pl. 10: 1, 2.
1981. *Veeniacythereis jezzineensis* (Bischoff); Al-Abdul-Razzaq and Grosdidier, 179, pl. 1, 2.
1981. *Veeniacythereis mahrebensis* (Bassoullet et Damotte); Al-Abdul-Razzaq and Grosdidier, 182, pl. 1: 3.
1983. *Veeniacythereis jezzineensis* (Bischoff); Rosenfeld and Raab, 59, pl. 2: 1, 2, 8, 9, *non* pl. 1: 3—15, pl. 2: 3—7, 10—13.
1988. *"Veeniacythereis" jezzineensis* (Bischoff); Majoran, 699, pl. 4: 1—6.
1988. *Veeniacythereis jezzineensis* (Bischoff); Athersuch, 1203, pl. 3: 9, 10.

Material. — Sixteen specimens, mostly adult carapaces, in general badly preserved.

Dimensions (in mm):

Specimens No. ZPAL	O.XXXIII/83	O.XXXIII/84
	aC	aC
Length	1.04	0.86
Height	0.60	0.44
Width	0.47	0.39

Variability. — Conscpicuous variability concerns the size of specimens as well as their morphology and ornamentation. Carapaces are only coarsely pitted in their frontal part or both pitted and radially ribbed. Addorsal projections variously prominent and developed.

Remarks. — Systematic relation between *Veeniacythereis jezzineensis* (Bischoff, 1963), *V. mahrebensis* (Bassoullet et Damotte, 1969) and *V. streblolophata* Al-Abdul-Razzaq et Grosdidier, 1981 was the subject of numerous and generally controversial opinions of various authors (cf. summation of these opinions, e.g., by Majoran (1988) and Athersuch (1988)). Specimens included to *V. jezzineensis* from Egypt are rather scarce but when we look at their variability and their ontogenetic development, *V. jezzineensis* and *V. mahrebensis* seem to be conspecific, while *V. streblolophata* is a separate species; a similar point of view was represented by other students e.g. Majoran (1988). The following features appear as useful, diagnostic ones: continuous dorsal rib and smooth frontal part of lateral sides in *V. streblolophata*, whereas separate posterodorsal protuberances and ornamented frontal part of the valves in *V. jezzineensis*. Juvenile representatives of *V. jezzineensis* (pl. 7: 11) different from those of *V. streblolophata* (pl. 7: 6) enable us to disagree with the opinion of Rosenfeld and Raab (1983) that *V. streblolophata* is a larval form of *V. jezzineensis*.

Amphidont hinges prove that small specimens of *V. streblolophata* (pl. 7: 8) represent adult forms.

Occurrence. — *V. jezzineensis* (as understood here) is largely known from the late Albian to middle Cenomanian of Lebanon and Israel, early Cenomanian of Iran and Kuwait, late Cenomanian of Tunisia and Algeria, Cenomanian of Jordan and Oman, Middle Cretaceous of the Arabian Gulf Coast between Iraq and Qatar. In Egypt, it was recorded in the Cenomanian of Jebel Nezzazat (Sinai) and at Northern Galala, in Ras El Abd section in beds referred here to the Albian and the Cenomanian, while in Khashm El Galala section only in the Cenomanian.

Veeniacythereis ex gr. *streblolophata* (Al-Abdul-Razzaq et Grosdidier, 1981)

(pl. 7: 1—3, 5—8)

Material. — Three hundred and eighty six specimens, mostly well preserved adult carapaces.

Dimensions (in mm):

Specimens No. ZPAL	O.XXXIII/75	O.XXXIII/80
	aC	aLV
Length	0.62	0.75
Height	0.39	0.44
Width	0.31	0.34

Variability. — Variability concerns mostly the size, lateral outline and morphology of specimens. Among the specimens from Ras El Abd the most numerous are those more inflated laterally and provided with more prominent ventral, median and dorsal ribs (cf. pl. 7: 1). In Khashm El Galala they are rather compressed laterally and with less developed lateral ribs (pl. 7: 3). Thus, it seems that the external appearance of specimens referred to *V. streblolophata* is of local meaning.

Remarks. — The history of studies and taxonomic (very controversial) conclusions concerning *Veeniacythereis streblolophata* was extensively summarized, among others, by Majoran (1988) and Athersuch (1988). Specimens from Egypt, rather uniform in their ornamentation pattern, are very close to those assigned by Grosdidier (1973) to *Cythereis* IRE3; by Rosenfeld and Raab (1974: pl. 3: 31—33 non 28—30) to *Veeniacythereis jezzineensis;* by Bismuth *et al.* (1981) to *V. streblolophata schista*; by Al-Abdul-Razzaq and Grosdidier (1981) to *V. streblolophata*; by Rosenfeld and Raab (1983: pl. 1: 3—15 and pl. 2: 3—7, 10—13, *non* pl. 1: 1, 2, pl. 2: 12, 8, 9) to *V. jezzineensis*; by Al-Furaih (1983) to *Phyrocythere streblolophata*; by Majoran (1988) to *"Veeniacythereis"* sp. nov.? and *"V."* aff. *streblolophata*, and by Athersuch (1988) to *V. streblolophata streblolophata* as well as *V. streblolophata schista.*

Since *V. streblolophata* seems to be largely a polymorphic and polytypic form its subspecies discriminated so far have been neglected and are referred here to *V. streblolophata* group. Undoubtedly, juvenile representatives of *streblolophata* (as well as *V. jezzineensis* (pl. 7: 6) contradict the opinion of Rosenfeld and Raab (1983) that *V. streblolophata* is a larval form of *V. jezzineensis* (see also remarks on *V. jezzineensis*, above).

Occurrence. — *V. streblolophata* (including subspecies) is known from the Albian-early Cenomanian of Iran and Cenomanian of Tunisia, Kuwait, Israel, Saudi Arabia and Oman. *V.* aff. *streblolophata* is found in the Cenomanian of Algeria. At Northern Galala it occurs in Ras El Abd section, in sediments referred here to the Albian and Cenomanian, while in Khashm El Galala in the Cenomanian only.

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PÓŹNOALBSKIE — WCZESNO/ŚRODKOWOCENOMAŃSKIE MAŁŻORACZKI Z PŁASKOWYŻU PÓŁNOCNEJ GALALI (EGIPT)

Streszczenie

Opracowano małżoraczki z osadów środkowej kredy, występujących na zachodnim brzegu Zatoki Suezkiej (Egipt). Małżoraczki pochodzą z dwóch odsłonięć (Ras El Abd i Khashm El Galala) (figs. 1—3) z osadów, których dolna część zaliczana jest do facji Piaskowców. Nubijskich, a górna część — do formacji Galala. W oparciu o otwornice Abd-Elshafy i Atta (w druku *a*, *b*) zaliczyli dolną część osadów do dolnego cenomanu natomiast górną do górnego cenomanu.

Opisano 30 gatunków małżoraczków, w tym 4 nowe: *Asciocythere galalaensis*, *Perissocytheridea ignota*, *Eocytheropteron pecteniferum* i *Spinoleberis calcalifera*. Analiza ilościowego i jakościowego rozprzestrzenienia małżoraczków pozwoliła wydzielić 2 zespoły (jeden zdominowany przez *Cytherella*, drugi zdominowany przez *Perissocytheridea*), występujące przemiennie w badanych profilach (fig. 4) i pozwalające wydzielić 4 ekozony. Uważa się, że wydzielone ekozony są odbiciem fluktuacji w zasoleniu, dynamice i głębokości zbiornika; ekozona z wyraźną obecnością *Cytherella* odpowiada środowisku morskiemu (euhalinowemu), natomiast ekozona z *Perissocytheridea* charakteryzuje środowisko brakiczne.

Wyróżnione ekozony pokrywają się w znacznym stopniu z biozonami wyróżnionymi w badanych odsłonięciach w oparciu o otwornice (Abd-Elshafy i Atta, w druku *b*). Małżoraczki sugerują jednak nieco starszy wiek osadów (figs. 2, 3), tj. górnoalbski — wczesno/środkowocenomański.

Uznaje się, że ekozona 1 (w oparciu o małżoraczki zaliczona do albu) reprezentuje środowisko regresywne, natomiast ekozona 2 (?3) (na podstawie małżoraczków zaliczona do cenomanu) wyraża stopniowe tendencje w kierunku otwartego morza. Sugerowane tendencje w rozwoju środowiska środkowokredowego są w zgodzie z proponowanymi „krzywymi transgresji-regresji" dotyczącymi albu-turonu na Środkowym i Dalekim Wschodzie opracowanymi przez Riché i Prestat (1980).

Z rozprzestrzenienia regionalnego badanych małżoraczków wynika, że są one ograniczone do Afryki północnej i Bliskiego Wschodu, wykazując większe podobieństwo do synchronicznych małżoraczków z tego drugiego obszaru. Należą one zatem do północnoafrykańsko-bliskowschodniej prowincji małżoraczkowej wydzielonej przez Babinot (1985).

EXPLANATION OF PLATES 1—10

Plate 1

Cytherella aegyptiensis Colin et El Dakkak

1. aFC, left lateral view, ZPAL O.XXXIII/1, ×40.
2. aFC, dorsal view, ZPAL O.XXXIII/2, ×40.
3. aFC, right lateral view, ZPAL O.XXXIII/3, ×40.
4. aMC, left lateral view, ZPAL O.XXXIII/4, ×40.
5. aMC, dorsal view, ZPAL O.XXXIII/5, ×40.
6. aMC, right lateral view, ZPAL O.XXXIII/6, ×40.

Cytherella gigantosulcata Rosenfeld

7. aFC, right lateral view, ZPAL O.XXXIII/7, ×43.
8. aFC, dorsal view, ZPAL O.XXXIII/8, ×43.
9. aFC, left lateral view, ZPAL O.XXXIII/9, ×43.
10. aMC, right lateral view, ZPAL O.XXXIII/10, ×43.
11. aMC, dorsal view, ZPAL O.XXXIII/11, ×43.
12. aMC, left lateral view, ZPAL O.XXXIII/12, ×43.

All specimens are from the Khashm El Galala section, sample no. 28/29

Plate 2

Cytherela cf. IRC 6 Grosdidier

1. aMC, right lateral view, ZPAL O.XXXIII/13, ×65.
2. aMC, dorsal view, ZPAL O.XXXIII/14, ×60.
3. aFRV, inner view, ZPAL O.XXXIII/15, ×65.
4. aFC, right lateral view, ZPAL O.XXXIII/16, ×57.

5. aFC, dorsal view, ZPAL O.XXXIII/17, ×50.
6. aFC, left lateral view, ZPAL O.XXXIII/18, ×60.

Cytherella cf. *eosulcata* Colin

7. a?MC, *a* left lateral view, *b* dorsal view, ZPAL O.XXXIII/19, ×68, ×58.

Asciocythere galalaensis Szczechura, Babinot et Abd-Elshafy sp. n.

8. a?MRV, inner view, ZPAL O.XXX/20, ×74.
9. a?MC, right lateral view, ZPAL O.XXXIII/21, ×85.
10. a?MC, dorsal view, ZPAL O.XXXIII/22, ×80.
11. a?FC, left lateral view, holotype, ZPAL O.XXXIII/23, ×86.

Specimens figured in: 1—6 are from the Ras El Abd section, sample no. 21; 7—11 from the same section, sample no. 43

Plate 3

Dolocytheridea atlasica Bassoullet et Damotte

1. aFC, right lateral view, ZPAL O.XXXIII/24, ×40.
2. aFC, dorsal view, ZPAL O.XXXIII/25, ×45.
3. aMC, right lateral view, ZPAL O.XXXIII/26, ×46.
4. aFC, right lateral view, ZPAL O.XXXIII/27, ×43.
5. aMC, dorsal view, ZPAL O.XXXIII/28, ×45.
6. a?MC, right lateral view, ZPAL O.XXXIII/29, ×45..
7. aFV, inner view, *a* hinge margin, *b* general view, ZPAL O.XXXIII/30, ×50, ×160.
8. aFC, ventral view, ZPAL O.XXXIII/31, ×50.
9. aFV, outer view, ZPAL O.XXXIII/32, ×45.
10. aMC, ventral view, ZPAL O.XXXIII/33, ×45.

Dolocytheridea ?atlasica Bassoullet et Damotte

11. aFLV, outer view, ZPAL O.XXXIII/34, ×40.

All specimens are from the Ras El Abd section, sample no. 43

Plate 4

Eocytheropteron retroversicardinatum Al-Abdul-Razzaq

1. aC, right lateral view, ZPAL O.XXXIII/35, ×60.
2. aC, ventral view, ZPAL O.XXXIII/36, ×55.
3. aC, dorsal view, ZPAL O.XXXIII/37, ×50.
4. aC, left lateral view, ZPAL O.XXXIII/38, ×67.

Metacytheropteron IRC 10 Grosdidier

5. aFC, right lateral view, ZPAL O.XXXIII/39, ×75.
6. aFC, oblique ventral view, ZPAL O.XXXIII/40 ×67.

7. aFC, dorsal view, ZPAL O.XXXIII/41, ×70.
8. aMRV, outer view, ZPAL O.XXXIII/42, ×80.
9. aFLV, outer view, ZPAL O.XXXIII/43, ×80.
10. aFRV, inner view, ZPAL O.XXXIII/44, ×80.

Metacytheropteron cf. *pleura* Al-Furaih

11. aFC, ventral view, ZPAL O.XXXIII/47, ×67.
12. aMC, ventral view, ZPAL O.XXXIII/48, ×70.
13. aFC, somewhat oblique right lateral view, ZPAL O.XXXIII/49, ×75.
14. aMC, left lateral view, ZPAL O.XXXIII/50, ×80.

Metacytheropteron cf. *berbericus* (Bassoullet et Damotte)

15. aC, right lateral view, ZPAL O.XXXIII/51, ×78.

Specimens figured in: 1—4 are from the Ras El Abd section, sample no. 43; 5—10 — from the same section, sample no. 21; 11—14 — from the Khashm El Galala section, sample no. 28/29; 15 — from the same section, sample no. 15

Plate 5

Eocytheropteron pecteniferum Szczechura, Abd-Elshafy et Babinot sp. n.

1. aFC, right lateral view, holotype, ZPAL O.XXXIII/52, ×80.
2. aFC, dorsal view, ZPAL O.XXXIII/53, ×85.
3. aFC, ventral view, ZPAL O.XXXIII/54, ×80.
4. aFC, left lateral view, ZPAL O.XXXIII/55, ×82.
5. aMC, right lateral view, ZPAL O.XXXIII/56, ×90.
6. aMC, dorsal view, ZPAL O.XXXIII/57, ×70.
7. aRV, *a* general inner view, *b* hinge margin, ZPAL O.XXXIIII/58, ×80, ×170.
8. aMC, ventral view, ZPAL O.XXXIII/59, ×72.

Eocytheropteron cf. IRC 13 Grosdidier

9. a?FLV, outer view, ZPAL O.XXXIII/59, ×60.
10. a?FC, right lateral view, ZPAL O.XXXIII/60, ×65.
11. a?FC, dorsal view, ZPAL O.XXXIII/61, ×60.
12. a?FC, left lateral view, ZPAL O.XXXIII/62, ×68.

Specimens figured in: 1—9 are from the Ras El Abd section, sample no. 43; 9 — from the same section, sample no. 14; 10—12 — from the Khashm El Galala section, sample no. 11

Plate 6

Glenocythere bahreinensis Al-Abdul-Razzaq

1. aFC, right lateral view, ZPAL O.XXXIII/63, ×50.
2. aFC, dorsal view, ZPAL O.XXXIII/64, ×45.
3. aMC, left lateral view, ZPAL O.XXXIII/65, ×46.

4. aFRV, outer view, ZPAL O.XXXIII/66, ×48.
5. aFC, left lateral view, ZPAL O.XXXIII/67, ×50.

Perissocytheridea ignota Szczechura, Abd-Elshafy et Babinot sp. n.

6. aFC, dorsal view, ZPAL O.XXXIII/68, ×59.
7. aFC, right lateral view, ZPAL O.XXXIII/69, ×70.
8. aMC, dorsal view, ZPAL O.XXXIII/70, ×60.
9. aFC, left lateral view, holotype, ZPAL O.XXXIII/71, ×83.
10. aFC, ventral view, ZPAL O.XXXIII/72, ×80.
11. aMC, left lateral view, ZPAL O.XXXIII/73, ×70.

Perissocytheridea cf. *sohni* (Rosenfeld)

12. aMC, right lateral view, ZPAL O.XXXIII/74, ×67.

Specimens figured in: 1—5 are from the Khashm El Galala section, sample no. 28/29; 6—11 — from the Ras El Abd section, sample no. 27; 12 — from the Khashm El Galala section, sample no. 13

Plate 7

Veeniacythereis ex. gr. *streblolophata* (Al-Abdul-Razzaq et Grosdidier)

1. aC, left lateral view, ZPAL O.XXXIII/75, ×68.
2. aC, dorsal view, ZPAL O.XXXIII/76, ×60.
3. aC, left lateral view, ZPAL O.XXXIII/77, ×65.
5. aC, dorsal view, ZPAL O.XXXIII/78, ×55.
6. jC, right lateral view, ZPAL, ZPAL O.XXXIII/79, ×76.
7. aC, right lateral view, ZPAL O.XXXIIII/80, ×57.
8. aLV, *a* inner view, *b* outer view, ZPAL O.XXXIII/81, ×53, ×54.

Veeniacythereis jezzineensis (Bischoff)

4. AC, right lateral view, ZPAL O.XXXIII/82, ×40.
9. aC, left lateral view, ZPAL O.XXXIII/83, ×42.
10. aC, left lateral view, ZPAL O.XXXIII/84, ×40.
11. jLV, outer view, ZPAL O.XXXIII/85, ×45.

Specimens figured in: 1, 5—7, 9 are from the Khashm El Galala section, sample no. 28/29; 2—4 from the Ras El Abd section, sample no. 21, 8 — from the same section, sample no. 43; 10 — from the Khashm El Galala section, sample no. 18; 11 — from the Ras El Abd section, sample no. 14

Plate 8

?*Spinoleberis calcalifera* Szczechura, Abd Elshafy et Babinot sp. n.

1. aC, right lateral view, ZPAL O.XXXIII/86, ×78.
2. aC, dorsal view, ZPAL O.XXXIII/87, ×70.
3. aC, left lateral view, holotype, ZPAL O.XXXIII/88, ×75.

Rehacythereis cf. *libanensis* (Bischoff)

4. aMC, left lateral view, ZPAL O.XXXIII/89, ×65.
5. aFC, dorsal view, ZPAL O.XXXIII/90, ×60.
6. aMC, right lateral view, ZPAL O.XXXIII/91, ×65.
7. aFC, left lateral view, ZPAL O.XXXIII/92, ×65.

Peloriops sp.

8. aC, *a* dorsal view, *b* left lateral view, ZPAL O.XXXIII/93, ×38, ×44.

Peloriops cf. *ulosa* Al-Abdul-Razzaq

9. ?aC, right lateral view, ZPAL O.XXXIII/94, ×65.

?*Candoniella* cf. *qeturaensis* Honigstein et Rosenfeld

10. aC, dorsal view, ZPAL O.XXXIII/95, ×37.
11. aC, right lateral view, ZPAL O.XXXIII/96, ×50.

Specimens figured in: 1—3, 8 are from the Ras El Abd section, sample no. 43; 4—7 — from the same section, sample no. 13; 9 — from the Khashm El Galala section, sample no. 13; 10, 11 — from the Ras El Abd section, sample no. 27

Plate 9

Bairdia sp.

1. ?aRV, outer view, ZPAL O.XXXIII/97, ×38.

Paracypris sp.

2. ?aC, right lateral view, ZPAL O.XXXIII/98, ×60.

?*Krithe* sp.

3. aRV, *a* inner view, *b* outer view, ZPAL O.XXXIII/99, ×52, ×47.

?*Amphicytherura* sp.

4. ?aC, *a* left lateral view, *b* right lateral view, ZPAL O.XXXIII/100, both ×80.

Hemicytherura sp.

5. ?aC, left lateral view, ZPAL O.XXXIII/101, ×120.

?*Eucythere* sp.

6. ?jC, *a* left lateral view, *b* dorsal view, ZPAL O.XXXIII/102, ×70, ×55.
7. ?jC, left lateral view, ZPAL O.XXXIII/103, ×79.

Specimens figured in: 1 is from the Khashm El Galala section, sample no. 13;

2, 3 — from the Ras El Abd section, sample no. 43; 4 — from the Khashm El Galala section, sample no. 26; 6, 7 — from the Khashm El Galala section, sample no. 28/29.

Plate 10

Metacytheropteron cf. *berbericus* (Bassoullet et Damotte)

1. aRV, outer view, ZPAL O.XXXIII/104, ×50.

Asciocythere galalaensis Szczechura, Abd-Elshafy et Babinot sp. n.

2. a?FRV, *a* inner view, *b* hinge margin, ZPAL O.XXXIII/105, ×76, ×150.

Cytherideid indet.

3. aLV, *a* outer view, *b* inner view, ZPAL O.XXXIII/106, both ×65.

Schuleridea baidarensis Damotte et Saint-Marc

4. ?aC, *a* right lateral view, *b* left lateral view, ZPAL O.XXXIII/107, both ×63.

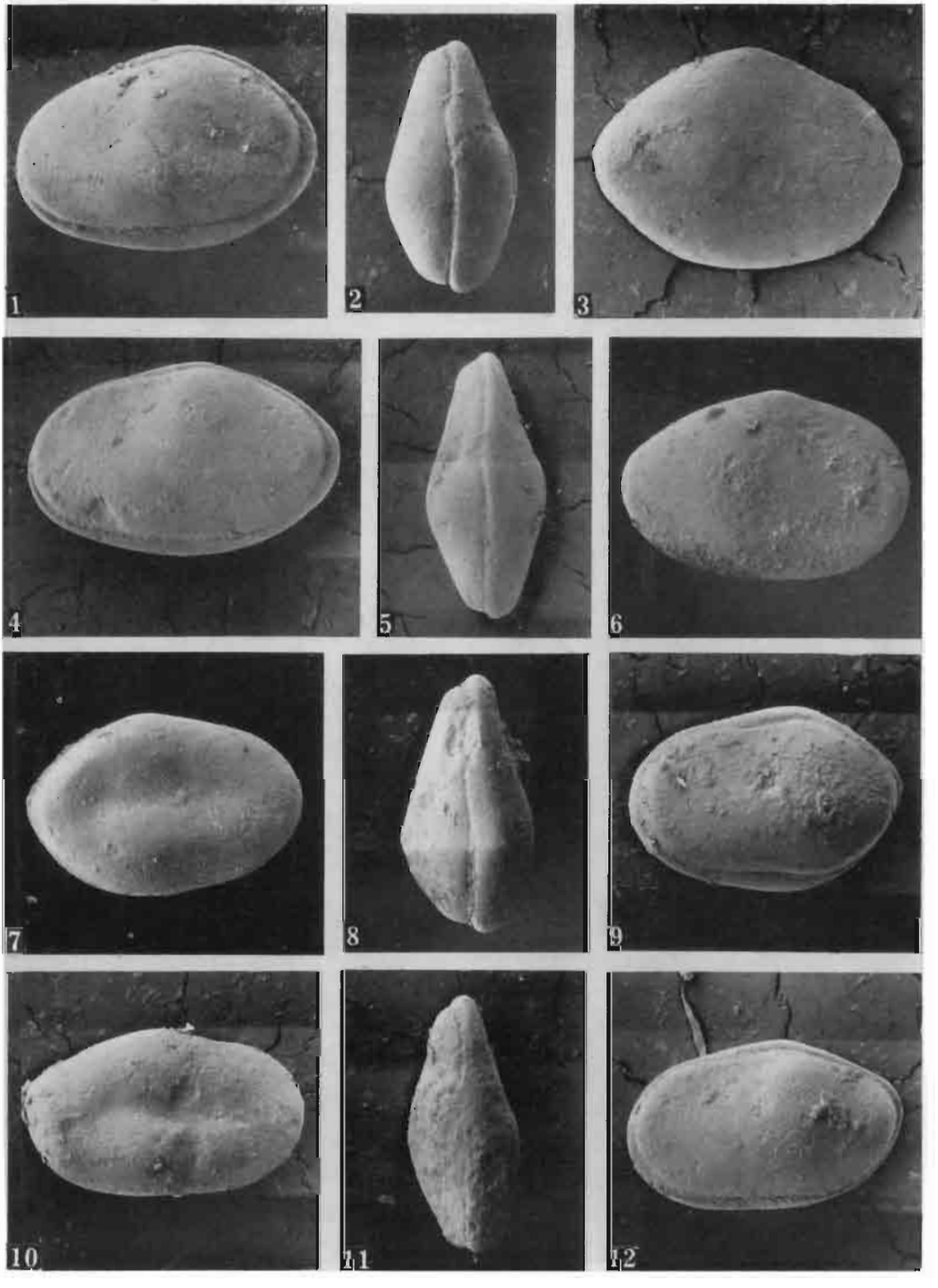
Veeniacythereis jezzineensis (Bischoff)

5. aC, right lateral view, ZPAL O.XXXIII/108, ×40.

Cytherella cf. *eosulcata* Colin

6. a?FC, *a* right lateral view, *b* left lateral view, *c* dorsal view, ZPAL O.XXXIII/109, ×60, ×46, ×58.

Specimen figured in: 1 is from the Khashm El Galala section, sample no. 14; 2 — from the same section, sample no. 28/29; 3 — from the same section, sample no. 13; 4 — from the same section, sample no. 24; 5 — from the Ras El Abd section, sample no. 21; 6 — from the Khashm El Galala section, sample no. 26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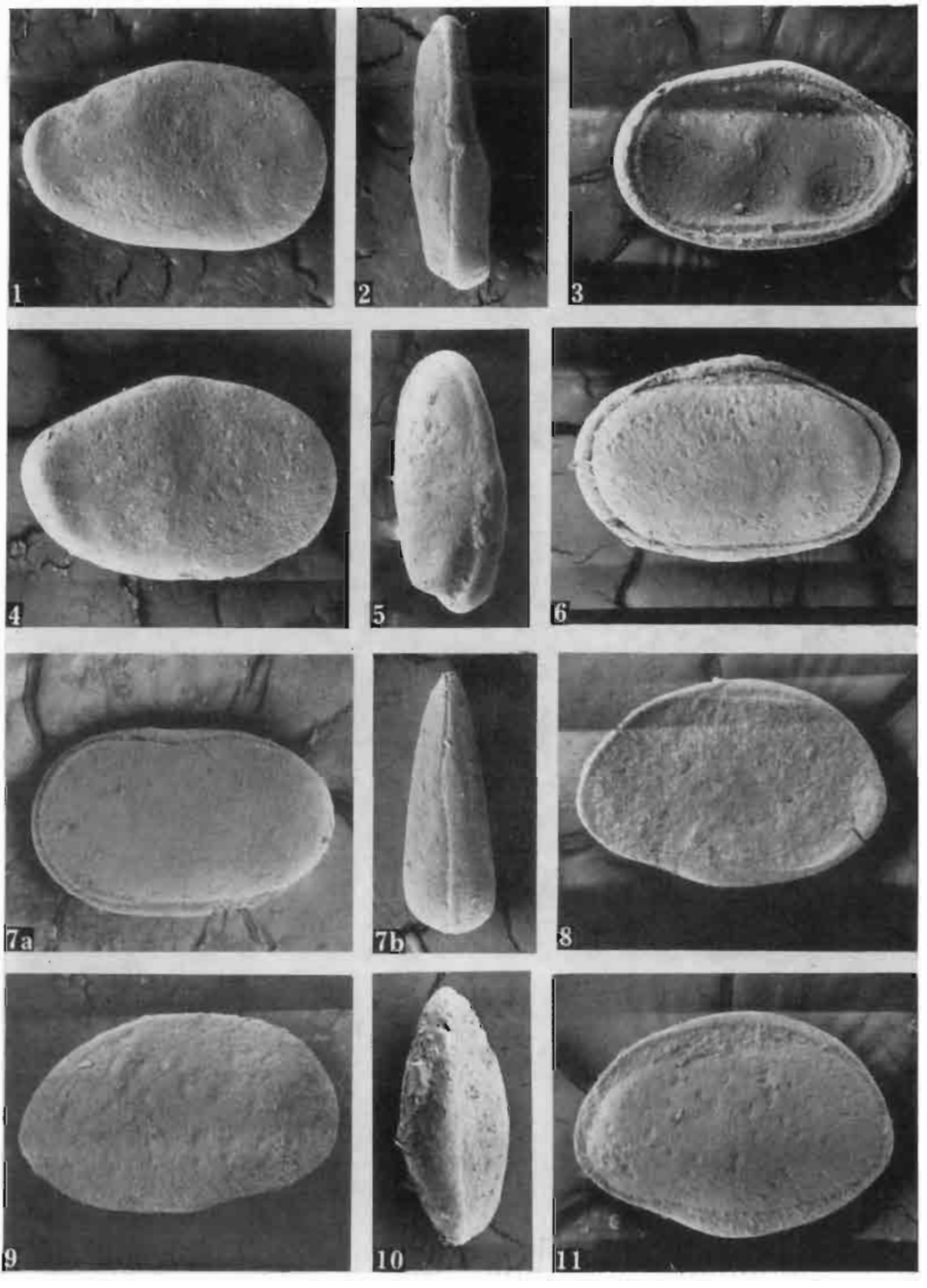
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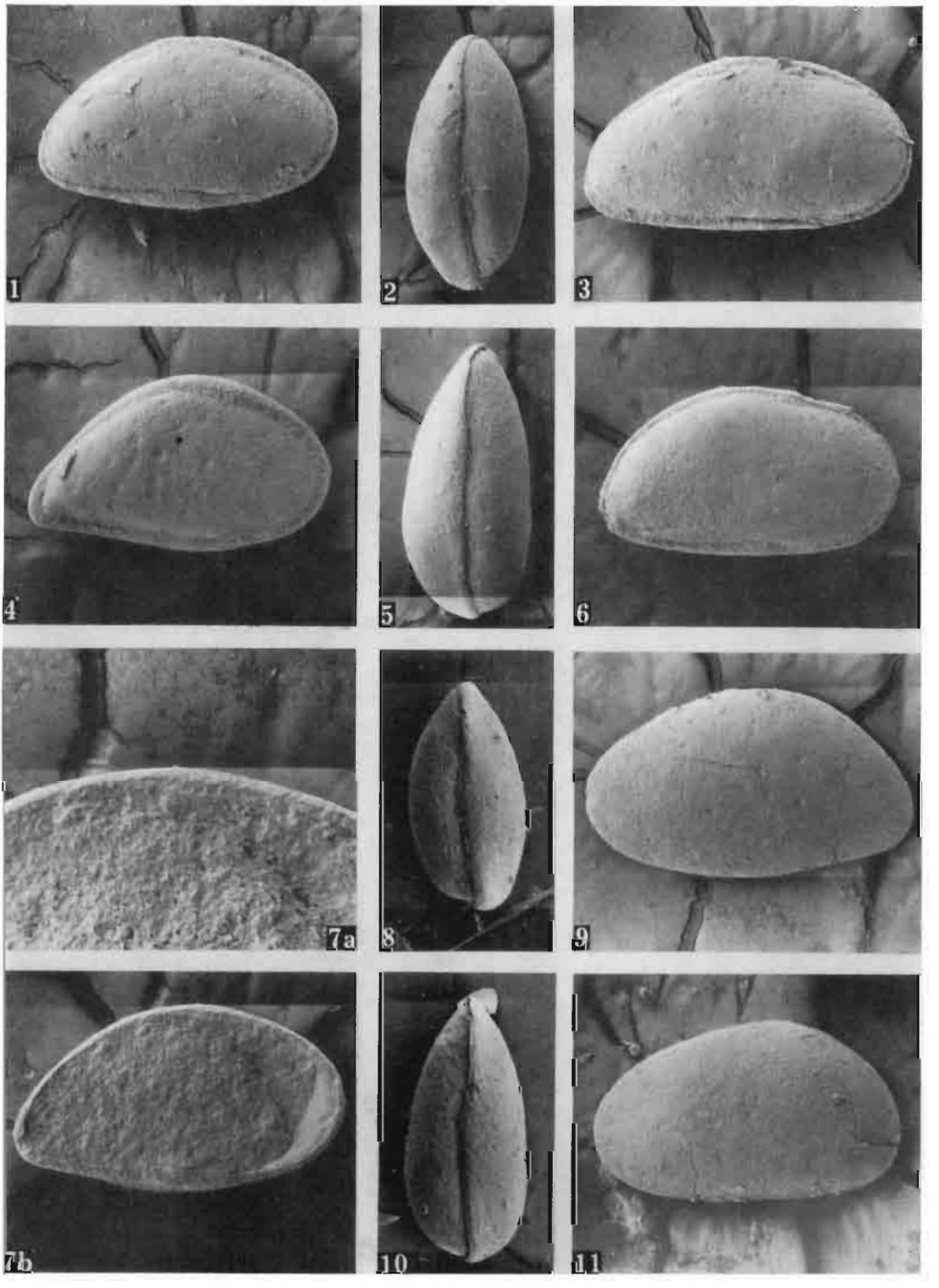
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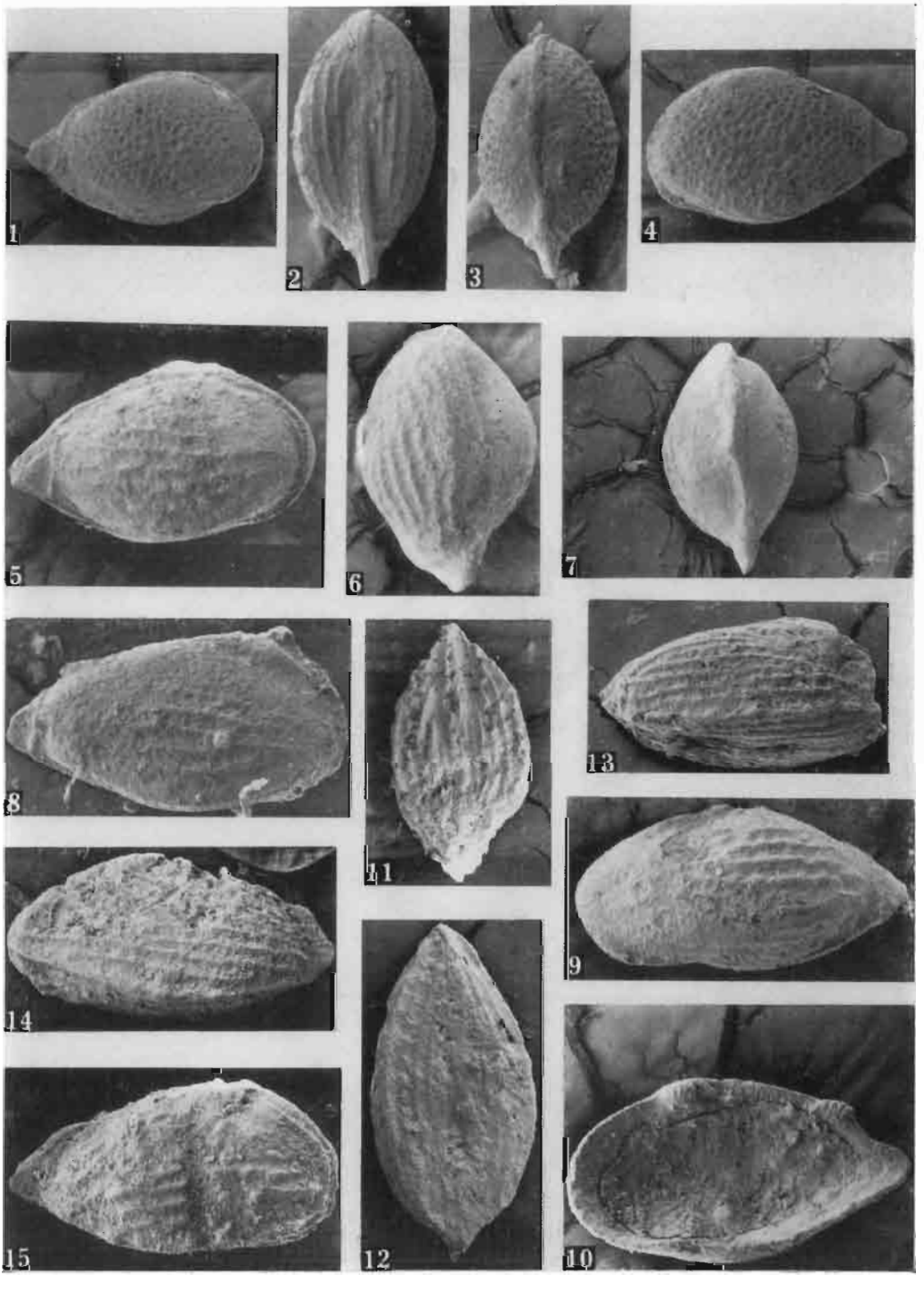
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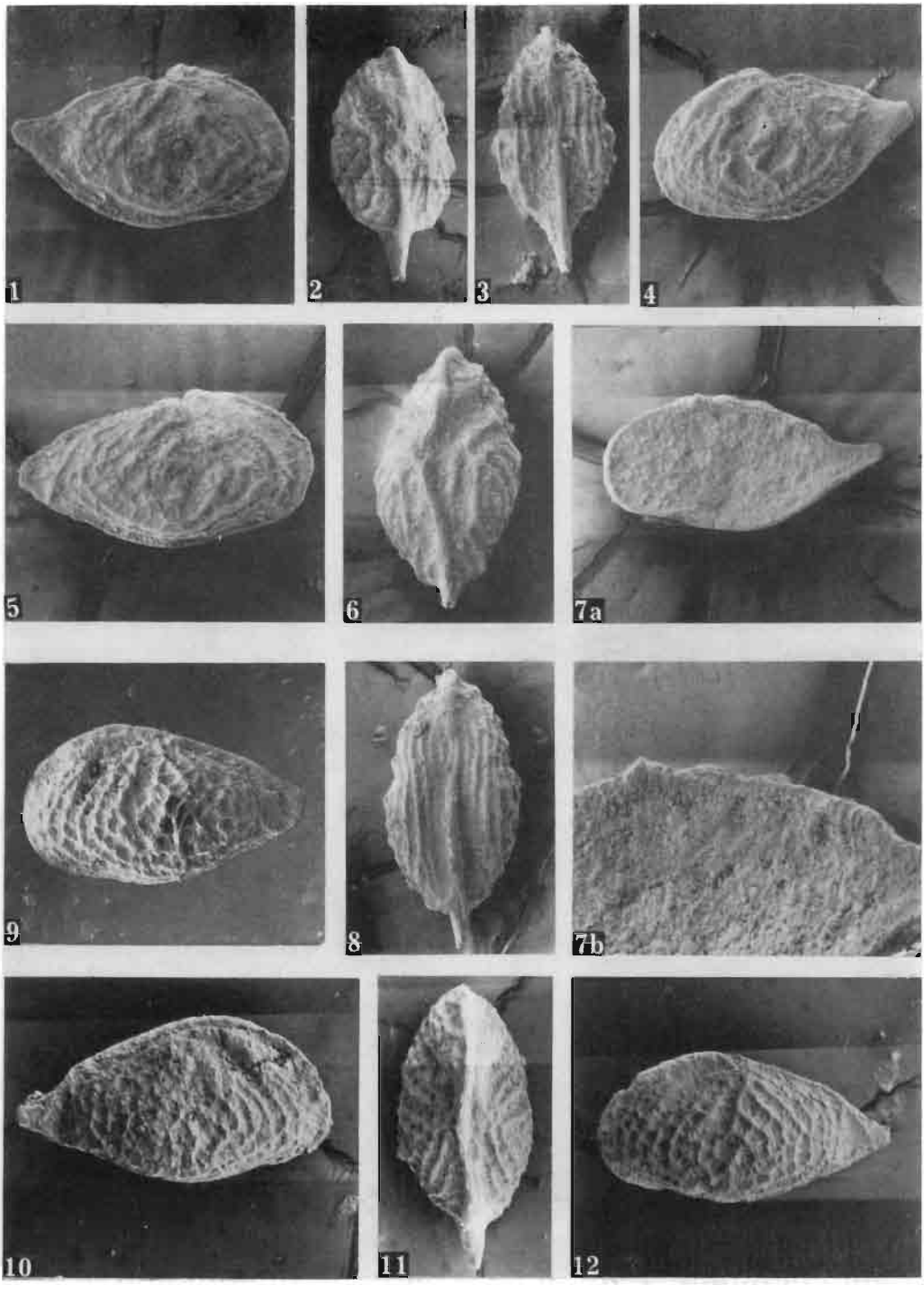
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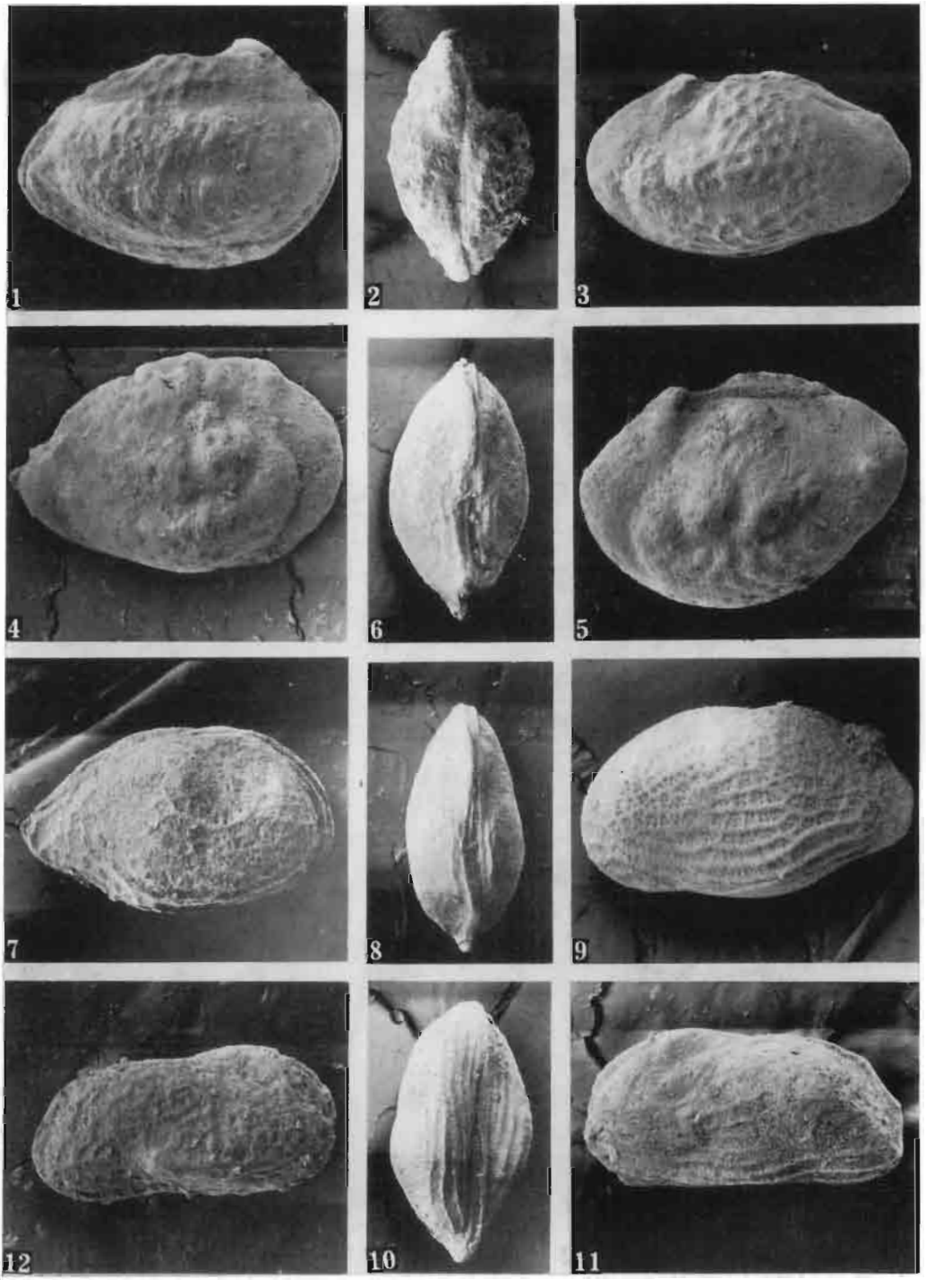
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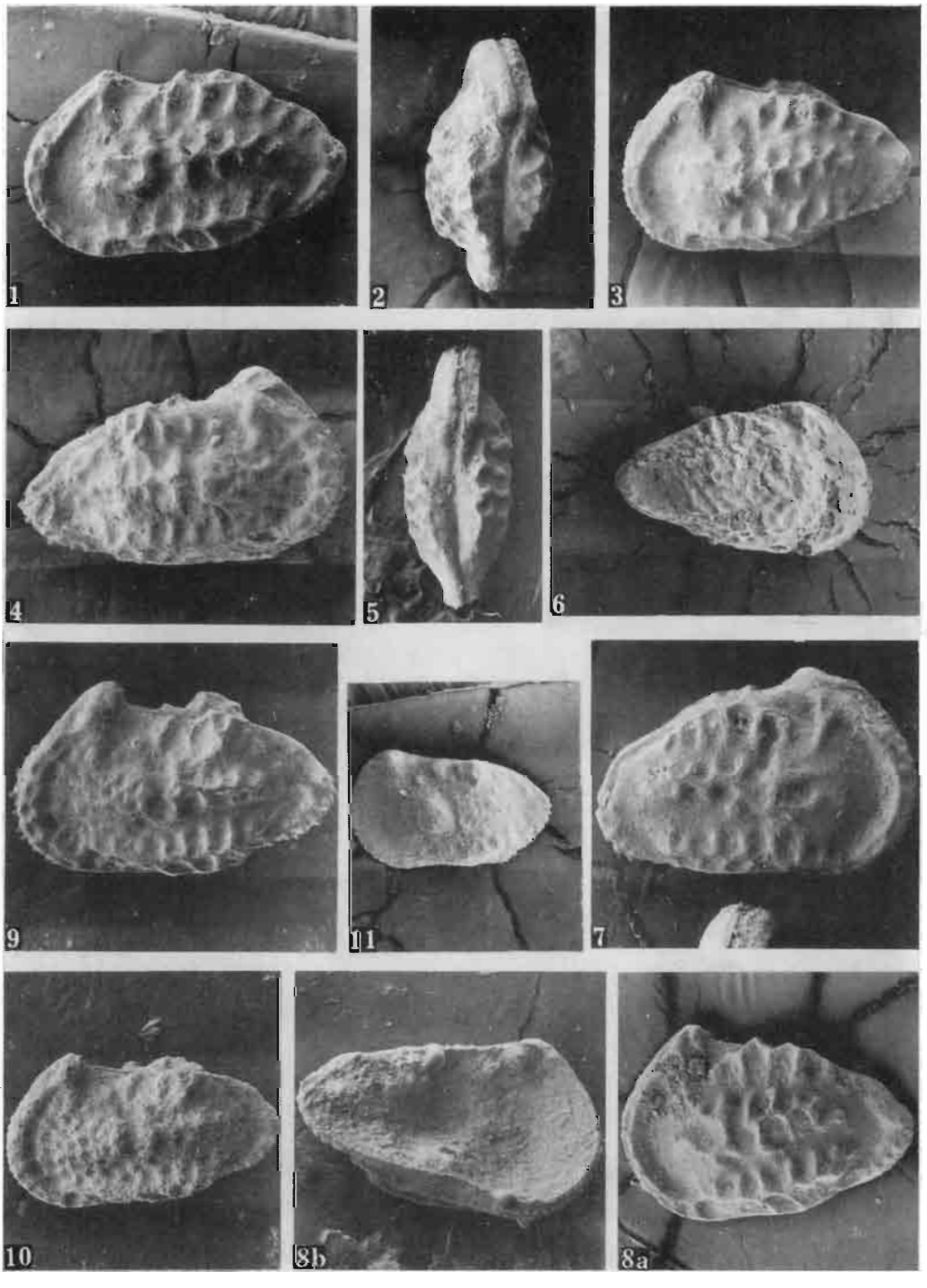
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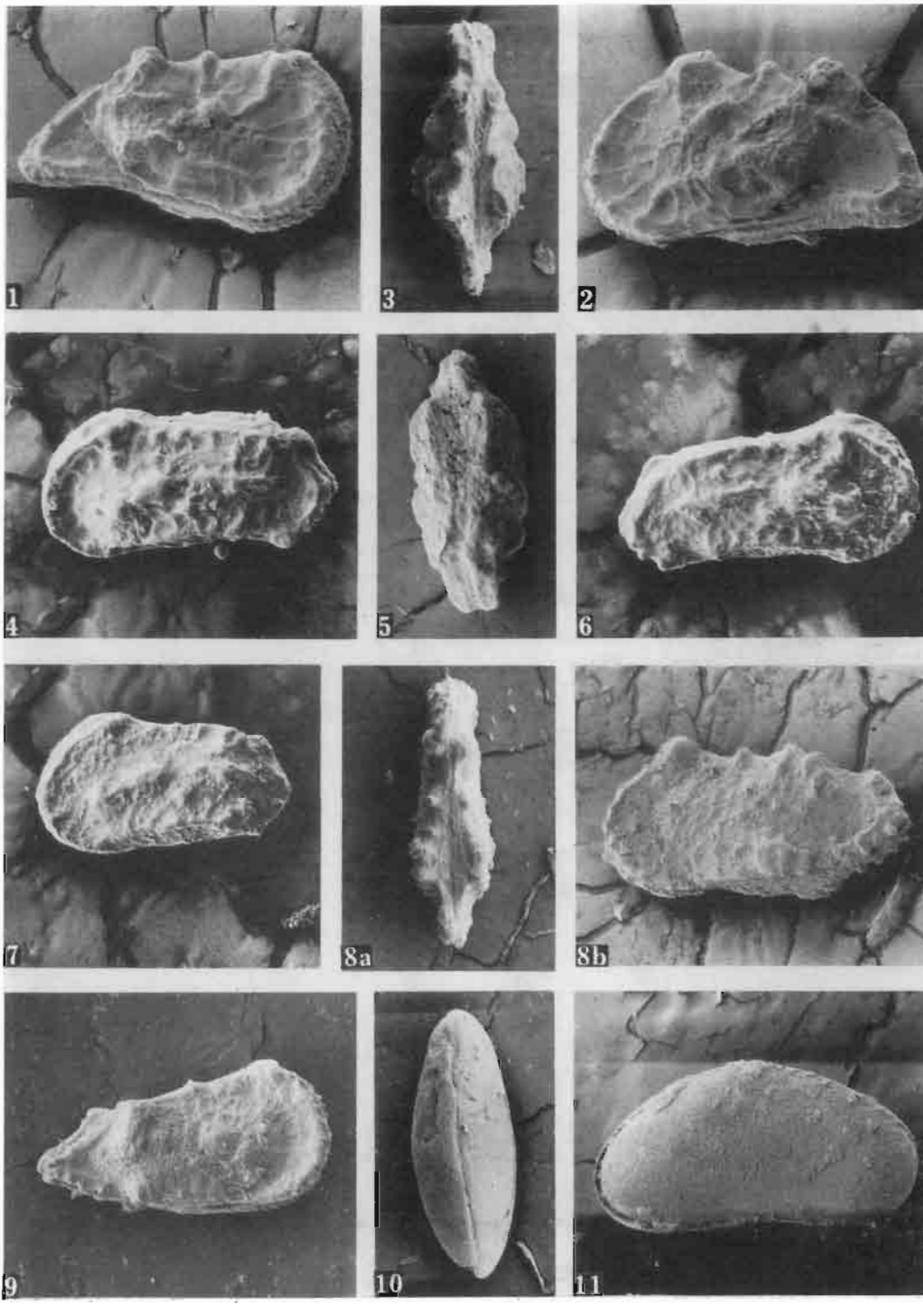
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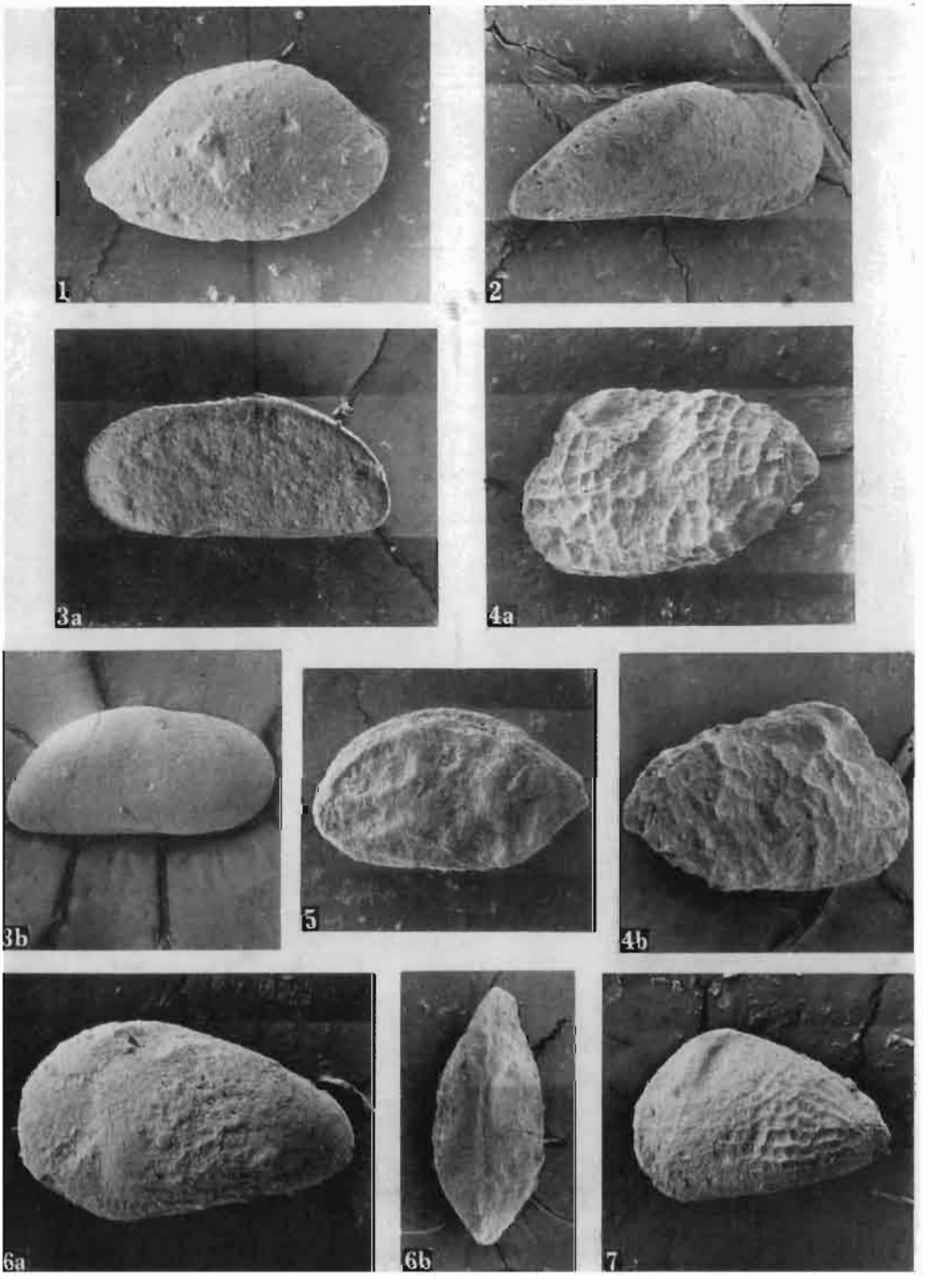
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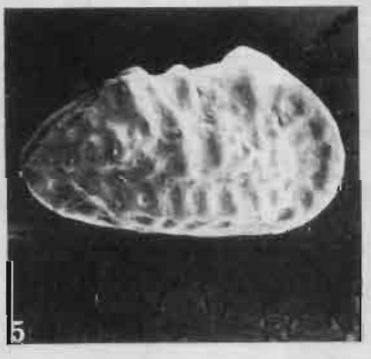
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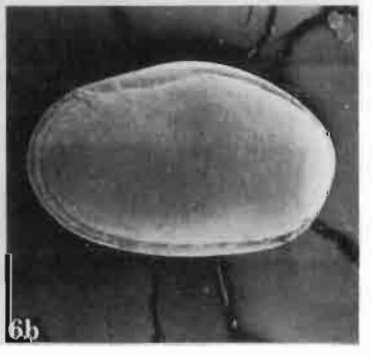
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