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Upper Carboniferous Ostracodes from Wadi Araba, Eastern Desert, Egypt

Ostracoden aus dem Oberkarbon des Wadi Araba, in der östlichen ägyptischen Wüste

With 2 figures and 1 plate

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Abstract

Six species representing six genera of ostracodes from the Upper Carboniferous marine exposure of Wadi Araba, Eastern Desert of Egypt, are illustrated and described, of which *Kirkbya waltheri* is new. The assemblage shows affinitiy to Pennsylvanian ostracodes of North America.

Zusammenfassung

Sechs Gattungen und Arten von Ostracoden werden aus dem Oberkarbon des Wadi Araba, in der östlichen ägyptischen Wüste, beschrieben und abgebildet. Davon ist die Art *Kirkbya waltheri* neu. Diese Ostracodenfauna zeigt Beziehungen zu jener des nordamerikanischen Pennsylvanian (Oberkarbon).

Introduction

In the previous studies on the marine Carboniferous exposures of the Gulf of Suez region, authors have been concerned primarily with megafossils. So far as can be determined, the only mention of Paleozoic ostracodes from Egypt, is included in Omara & Kenawy, 1966 "Upper Carboniferous microfossils from Wadi Araba", where two genera of ostracodes with two species are photographed and described.

The present study is focused on the Carboniferous ostracodes from the marine beds of Wadi Araba, from where six species belonging to six genera are described and illustrated, one is believed to be new. The ostracodes have been derived from the shale beds (V-15 and V-13), separated by a crinoidal limestone stratum, near the classical section of Rod el Hamal (Omara & Kenawy, 1966, text-fig. 2). Sample V-15 yielded a fairly rich fauna of ostracodes as regards both genera and individuals. Sample V-13, on the other hand, is poorer in ostracode genera and individuals, which are mostly badly preserved.

Figured types are deposited in the collections of the "Bundesanstalt für Bodenforschung", Hannover, Germany.

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Affinity and Environment of the Ostracodes

The Wadi Araba section has been dated as equivalent to the Lower Stephanian or to the Upper Missourian — Lower Virgilian in terms of North American

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nomenclature. This age assignment was mainly based on the vertical distribution of arenaceous Foraminifera and conodonts. The ostracodes do not contribute substantially to the age determination, although their generic assemblage and specific affinities to Pennsylvanian ostracodes of North America, corroborate the Upper Missourian — Lower Virgilian age assigned to the Wadi Araba marine section (Omara & Kenawy, 1966).

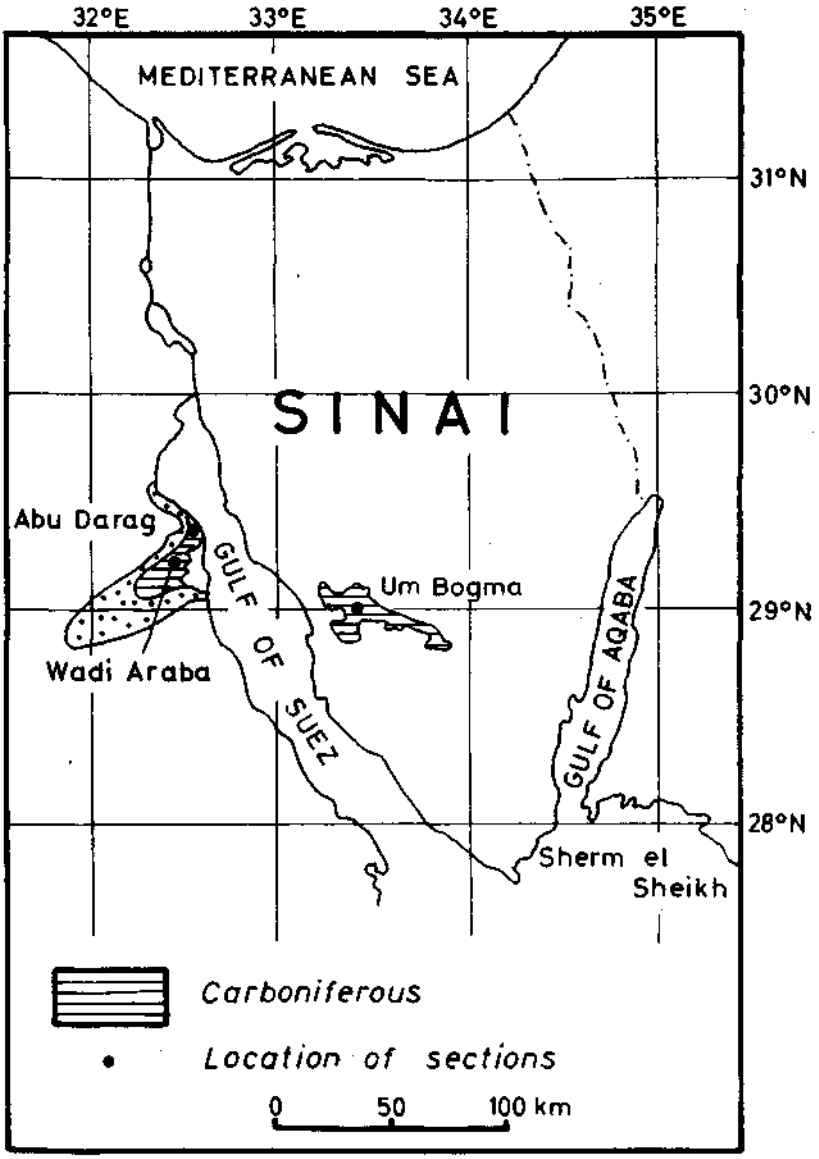

Fig. 1.
Text-Fig. 1. Carboniferous exposures in the Gulf of Suez region.

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The ostracodes of Wadi Araba differ from these of Southwestern Sinai, on the opposite side of the Gulf of Suez, which definitely bear a Lower Carboniferous (Mississippian) aspect. Twenty kilometers north of Wadi Araba at Abu Darag, exposures with marine Carboniferous of Westphalian age had been described recently (OMARA & VANGEROW, 1965). No comparison between the ostracodes of Wadi Araba and those of Abu Darag can be made, as the latter are in the form of indeterminable steinkerns.

The biocoenosis of the two shale beds from which the Wadi Araba ostracodes have been derived, is suggestive of a near shore marine environment of normal salinity (OMARA & KENAWY, 1966), which is identical to the depositional environment in other localities from which the same genera of ostracodes have been recorded.

Systematic Descriptions

Order: Paleocopida HENNINGSMOEN 1953.
Suborder: Beyrichicopina SCOTT 1961.
Superfamily: Drepanellacea ULRICH & BASSLER 1923.
Family: Kirkbyellidae SOHN 1961.
Genus: *Kirkbyella* CORYELL (BOOTH, 1933).
Subgenus: *Berdanella* SOHN 1961.

Kirkbyella *(Berdanella)* sp.
Pl.: I Fig.: 5

A right valve only with the diagnostic characters of the genus has been encountered. By the presence of a ventral lobe, it is to be placed into the subgenus *Berdanella*. With the exception of a well-developed postero-ventral spine, the valve seems to be smooth.

Occurrence: Single valve in sample V-15. This is the highest stratigraphical level noticed for a representative of this subgenus, which has been known from "Silurian to Upper Mississippian" according to SOHN 1961.

Dimensions: L: 0.74 mm; h: 0.38 mm; w: 0.19 mm (right valve, TK-Nr.: 5437).

Superfamily: Kirkbyacea ULRICH & BASSLER 1906.
Family: Kirkbyidae ULRICH & BASSLER 1906.
Genus: *Kirkbya* JONES 1859.

Kirkbya waltheri n. sp.
P.: I Fig.: 1, 2, 3 a—d, 4 a—b.

Kirkbya n. sp. OMARA & KENAWY, pl. 11, figs. 4—7.

Derivation of name: The name is in honour of the late Professor JOHANNES WALTHER, who disclosed the earliest micropaleontological data of the Wadi Araba Carboniferous beds three quarters of a century ago (WALTHER, 1890).

Holotype: Carapace TK-Nr. 5438.

Paratypes: TK-Nr. 5439—5442.

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Horizon: Stephanian, sample V-15 from shale bed above a crinoidal — limestone stratum.

Locality: Eastern Desert, Wadi Araba, near Rod el Hamal.

Material: About 100 carapaces, some of them larval, some specimens are damaged or slightly deformed.

Diagnosis: Outline almost rectangular in side view, greatest length somewhat below dorsal border-line; "shoulder" clearly developed with a dorso-ventral ridge. "Inner" ridges very sharp, prominent at ends of carapace, arising from broad end-surfaces, formed by "outer" ridges.

Description: Anterior end well rounded, anterio-dorsal angle pronounced, larger than 90°; the straight dorsal border is depressed in the middle; dorsal outline slightly lowering at the shoulder, posterio-dorsal angle equally well developed, rectangular. Posterior border rounded, resembling a quarter of a circle, ventral border straight, parallel to dorsal one; terminal borders and ventral borders accompanied in each valve by a very prominent and sharp "inner" ridge, which meets the dorsal border-line at the dorsal angles.

The "shoulder" is clearly visible even in lateral view, for it bears a sharp, dorso-ventral ridge; the sides are ornamented by a network of meshes, whose sizes and proportions are somewhat varying. The "pit", characteristic for the Kirkbyacea, is not much larger than the largest meshes and only slightly deeper, but is mostly elliptical; in adult specimens, it is surrounded by about 7 meshes. In front of this pit, but only fairly visible in larval individuals, there is a faint ridge, curved in the form of the letter "u".

In dorsal view the carapace is comparatively narrow and not very concave; greatest width at the posterior part of the carapace, at the "shoulder". At both ends broad „terminal surfaces" are formed by the "inner" ridges, the "outer" ridges are rather prominent and sharp.

In ventral view an overlap of the left valve on the right one can be recognized; a thin, unsculptured lobe of the left valve covers the ventral margin of the right valve; the other part of the marginal surface is also covered by a network, consisting of two or three rows of meshes in each valve.

Remarks:

On account of inadequate illustrations and meagre descriptions in literature, it is somewhat difficult to compare our material with the numerous species already described.

The known species fall in two groups. The first, containing the generotype, is formed by species with low valves and with dorsal angles of less than 90 degrees. Among this group, only *Kirkbya punctata* KELLETT 1933, from the Upper Pennsylvanian of Kansas, can be compared with our new species, due to a relatively high carapace. But the American species differs from it by the absence of the shoulder — ridge. A dorsal view of *Kirkbya punctata* has not been given.

The second group is formed by species of more rectangular outline. But most of them have no dorso-ventral ridges. The vaguely illustrated *Kirkbya rigida* JONES & KIRKBY 1885 from the Lower Carboniferous of England shows such ridges, but as to be seen in the figures, a "shoulder" is missing. *Kirkbya kellettae* HARLTON 1929 from the Upper Pennsylvanian of Texas is most similiar to the Egyptian species by its broad end — surfaces, but there is also no dorsal-ventral ridge, as in the new species.

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In conclusion, *Kirkbya waltheri* n. sp. has many affinities to species from the Pennsylvanian of the United States.

Occurrence: Only in sample V-15.

Dimensions: Holotype (TK-Nr. 5438) L: 0.79 mm; h: 0.41 mm; w: 0.32 mm.

Paratypoids: (TK-Nr. 5439) L: 0.78 mm; h: 0.41 mm; w: 0.34 mm.
(TK-Nr. 5440) L: 0.83 mm (other dimensions not to be given, deformed),
(TK-Nr. 5441) L: 0.58 mm; h: 0.28 mm; w: 0.25 mm (larval).
(TK-Nr. 5442) L: 0.81 mm; h: 0.38 mm; w: 0.33 mm.

? Superfamily: Youngiellacea KELLETT 1933.
Family: Youngiellidae KELLETT 1933.
Genus: *Moorites* CORYELL & BILLINGS 1932.

Moorites cf. *elongatus* (CORYELL & SAMPLE 1932).
Pl.: I Fig.: 6 a—c

? 1932 *Moorea elongata* — CORYELL & SAMPLE, p. 258, Tab. 24, Fig. 19.
1935 *Youngiella* ? *elongata* CORYELL & SAMPLE — BRADFIELD, p. 72, Tab. 4, Fig. 14.

Description:

Smooth, long carapaces. Frontal margin very obliquely rounded, antero-dorsal angle little larger than 90°; posterior margin circular, passing into straight or faintly concave ventral border-line. Carapace rather narrow in dorsal view; greatest thickness at posterior end, on the thick sulciform marginal ridge. This scroll-like ridge emerges most strongly in the region, where the posterior end passes into the ventral margin.

Remarks:

There seem to be close relations between our *Moorites* and "*Youngiella? elongata* CORYELL & SAMPLE", described and figured by BRADFIELD 1935. As to be seen in the literature available to us, the name "elongatus" or "elongata" has been given to several species, which should be included in the genus *Moorites* at the present state of taxonomy. It would be desireable that a revision of all the species concerned should be made on basis of type material. "*Moorea elongata* CORYELL & SAMPLE" is listed by EDHOLS & CREATH from the Desmoinesian (Middle Pennsylvanian). *Moorites identus* COOPER 1946 from the Middle Pennsylvanian and Upper Pennsylvanian of Illinois, shows a similar marginal ridge, but is shorter and higher than the carapaces encountered.

Occurrence: Only in sample V-15 from Rod el Hamal.

Material: 11 carapaces, 6 adult, 5 larval.

Dimensions: TK-Nr. 5443, L: 0.5 mm; h: 0.25 mm; w: 0.15 mm.

Order: Podocopida MÜLLER 1894.
Suborder: Podocopina SARS 1866.
Superfamily: Bairdiacea SRAS 1888.
Family: Bairdiidae SARS 1888.
Genus: *Bairdia* MCCOY 1844.

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Bairdia sp.
Text-Fig.: 2.1 a—b.

Description: Carapaces with the external characters of *Bairdia* are rather frequent in the samples from Rod el Hamal. They are however, badly preserved. As most of them seem to be compressed dorso-ventrally, it was not tried to assign our material to one of the many species known from the Paleozoic, since the outline is the main and often single diagnostic feature for most of them.

On a "steinkern" (TK-Nr. 5446), muscle-sars are observed. The pattern appears to consist largely of seven, circularly arranged scars with the eighth in the centre. Two other scars are seen in front of the circular group.

Occurrence: Rather frequent in samples V-15 and V-13.

Dimensions: TK-Nr. 5445, L: 0.67 mm; h: 0.35 mm; w: 0.27 mm

Suborder: Metacopina SYLVESTER-BRADLEY 1961.
Superfamily: Healdiacea HARLTON 1933.
Family: Healdiacea HARLTON 1933.
Genus: *Healdia* ROUNDY 1929.

Healdia cf. *caneyensis* HARLTON 1927.
Pl.: I Fig.: 7 a—c, 8 a—d

1927 *Healdia caneyensis* HARLTON — HARLTON, p. 208, Pl. 33, Figs. 2 a—c.
1933 *Healdia caneyensis* HARLTON-HARLTON, p. 26, Pl. 7, Fig. 10.
1936 *Healdia caneyensis* HARLTON-BRADFIELD, p. 105, Pl. 8, Fig. 4.

Description:

Carapace ovoid to oblong in lateral view, angular at the highest point of the dorsal line, which is situated at $^2/_3$ of length. Frontal margin narrowly rounded; posterior margin broadly rounded. "Shoulder" edges well-developed, concave; a short spine emrges at each end of these edges. In dorsal — view, the carapace is wedge — shaped from the front end to the "shoulder", but still slightly concave. Posterior part angular, blunt; left valve larger than right one.

Remarks:

The representatives of this genus in the samples from Wadi Araba are very similar if not identical with *Healdia caneyensis* HARLTON. In general, they belong to a group of species, in which the ovoid to angular outline is combined with concave "shoulder" edges and four spines. This group is characteristic of the Pennsylvanian of North-America.

Healdia boggyensis HARLTON 1927 from Desmoinesian and Missourian seems to differ by a slightly higher carapace.

OMARA & KENAWY 1966 described the same species as *Healdia* cf. *asper* COOPER 1946. *Healdia asper* differs only by a more symmetrical outline in lateral view.

Occurrence: Fairly will preserved and rather frequent in sample V-15; frequent, but very corroded in sample V-13.

Dimensions: TK-Nr. 5447, L: 0.62 mm; h: 0.40 mm; w: 0.82 mm.
TK-Nr. 5448, L: 0.60 mm; h: 0.38 mm; w: 0.28 mm.

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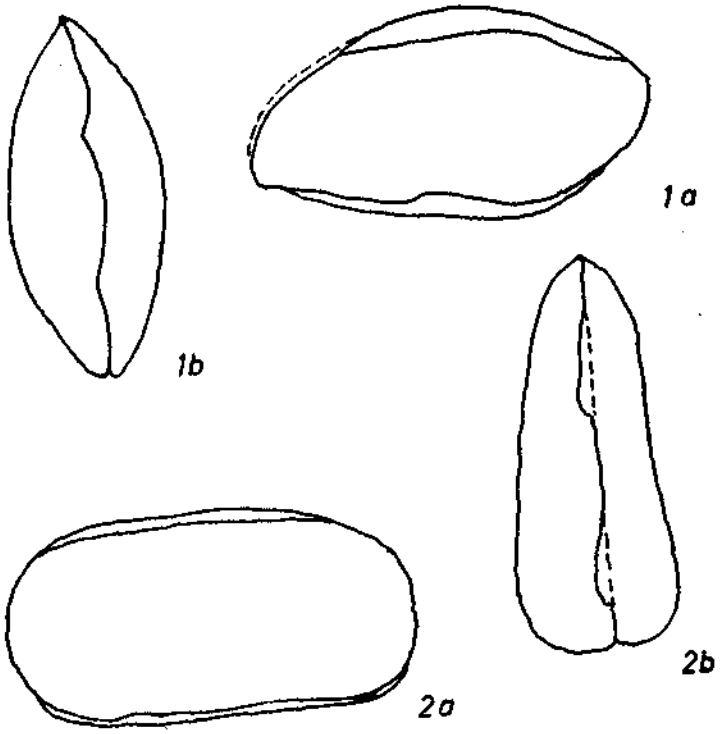
?Family: Cavellinidae EGOROV 1950.
Genus: *Cavellina* CORYELL 1928.

Cavellina sp .
Text-Fig.: 2, 2 a—b.

The material encountered consists of weathered carapaces. The almost rectangular outline of the carapaces would however indicate the genus *Cytherella*. Unfortunately muscle-scars are not visible. But, as all individuals are inflated, they are preferably allocated to *Cavellina*.

Occurrence: Rather frequent in sample V-15, only one carapace in V-13.

Dimensions: TK-Nr. 5450, L: 0.68 mm; h: 0.36 mm; w: 0.24 mm.



Text-Fig. 2.

Text-Fig. 2. *Bairdia* sp., carapace Tk-Nr. 5445.
1 a: lateral view,
1 b: dorsal view.
Cavellina sp., carapace Tk-Nr. 5450.
2 a: lateral view,
2 b: dorsal view.

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Plate I

Fig. 1. *Kirkbya waltheri* n. sp., TK-Nr. 5440, Rod el Hamal, sample V-15, left side of deformed carapace, showing „kirkbyoid" pit (higher magnification than other figures).

Fig. 2. *Kirkbya waltheri* n. sp., TK-Nr. 5441, Rod el Hamal, sample V-15. Dorsal view of larval individual.

Fig. 3. *Kirkbya waltheri* n. sp., TK-Nr. 5438, Rod el Hamal, sample V-15 (Holotype).
3 a: left side,
3 b: right side,
3 c: dorsal view,
3 d: ventral view.

Fig. 4. *Kirkbya waltheri* n. sp., TK-Nr. 5439, Rod el Hamal, sample V-15.
4 a: left side,
4 b: ventral view.

Fig. 5. *Kirkbyella* (Berdanella) sp., TK-Nr. 5437, Rod el Hamal, sample V-15.

Fig. 6. *Moorites* cf. *elongatus* (Coryell & Sample), TK-Nr. 5443, Rod el Hamal, sample V-15.
6 a: left side,
6 b: right side,
6 c: ventral view.

Fig. 7. *Healdia* cf. *caneyensis* Harlton, TK-Nr. 5447, Rod el Hamal, sample V-15.
7 a: ventral view,
7 b: left side,
7 c: right side.

Fig. 8. *Healdia* cf. *caneyensis* Harlton, TK-Nr. 5448, Rod el Hamal, sample V-15.
8 a: view from posterior end,
8 b: left side,
8 c: right side,
8 d: dorsal view.

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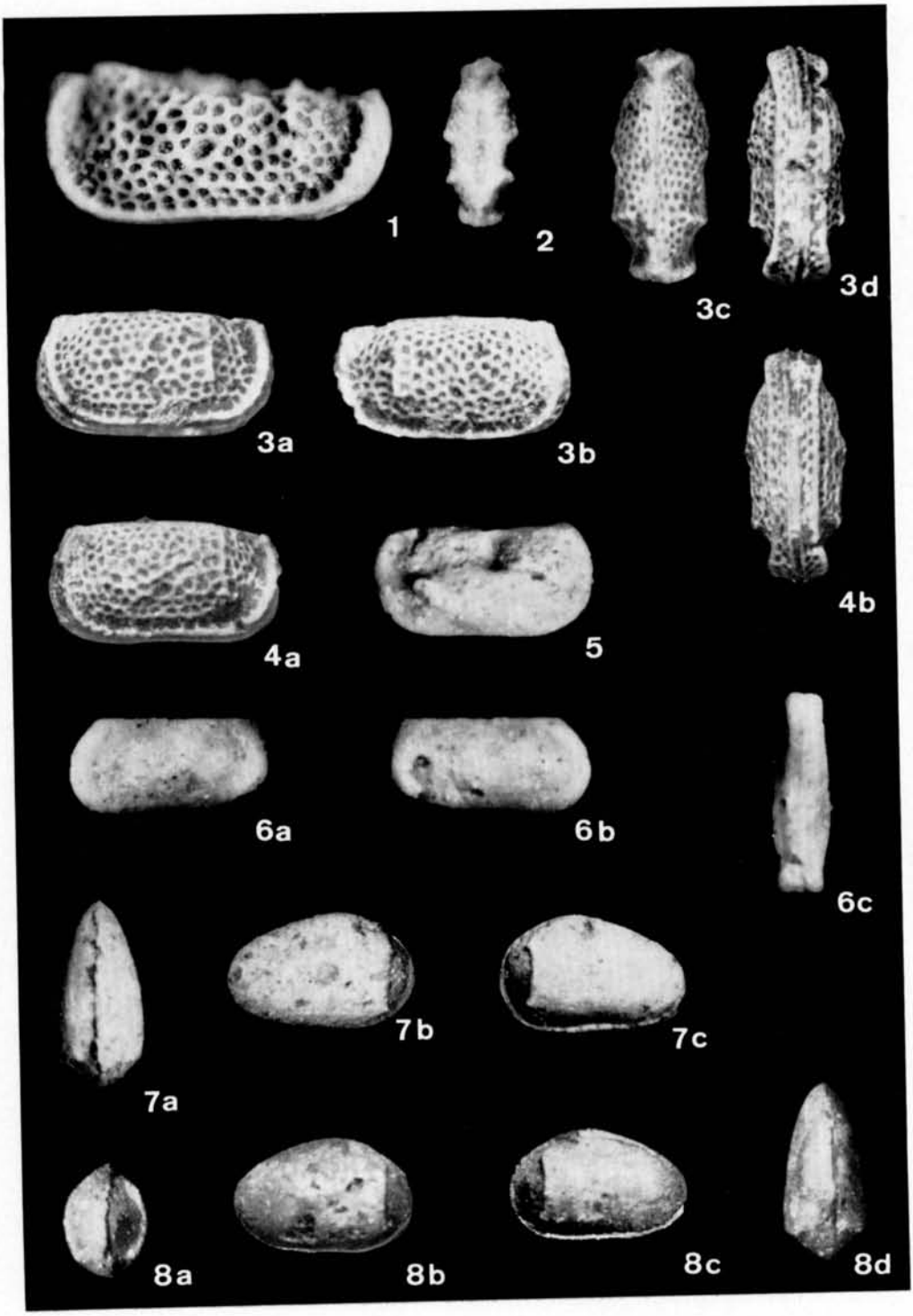

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