

WICHERELLA AND GRAMANNELLA, TWO NEW GENERA OF LOWER JURASSIC OSTRACODA FROM ENGLAND

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ABSTRACT. Two new genera of Lower Jurassic Ostracoda, *Wicherella* and *Gramannella*, are described and illustrated from the Upper Pliensbachian of England, and their recorded occurrence in north-west Europe discussed.

DURING an investigation of the lateral and vertical distribution of the Ostracoda from the Middle Lias (Lower Jurassic) along the outcrop from Dorset to Yorkshire, 2 new genera were recognized. Both these genera occur also in the upper part of the Lower Lias. *Wicherella* is known from a single species, *W. semiora* sp. nov., while *Gramannella* includes the 2 species described from the German Lias by Gramann (1962) as *Procytheridea? apostulescui* and *P.? tatei*. *Procytheridea* has been thought to contain some 59 species, of which 42 have been described from the Lias. Bate (1963) and Anderson (1964) have discussed the genus in general terms and concluded that in all probability *Procytheridea* does not occur in the Lower Jurassic in Europe. Certainly the type species of *Procytheridea*, *P. exempla* Peterson 1954, differs markedly from the Liassic species here included in *Wicherella* and *Gramannella*.

The ostracods described in this paper were collected from the Middle Lias sections on the Dorset coast at Golden Cap (SY405918) and between Ridge Cliff (SY425915) and Thorncombe Beacon (SY438914) near Bridport (see Howarth 1957), from Robins Wood Hill, Gloucester (SO836419), described by Ager (1955), and from Kirton-in-Lindsey, north Lincolnshire (SE935005) (see Howarth and Rawson 1965). There are relatively few exposures in the Midlands and the fauna is therefore poorly known; at present the author is examining borehole samples from the collections of the Institute of Geological Sciences in an attempt to provide material to complement that from surface exposures.

Neither *Wicherella* nor *Gramannella* have been found in the Middle Lias of the Yorkshire coast. The fauna here is sparse and is of particular interest because it is composed solely of the metacopid genera *Ogmoconcha* and *Pseudohealdia*. At the moment no explanation for this poor fauna can be advanced.

SYSTEMATIC PALAEOONTOLOGY

The type and figured specimens are deposited in the collections of the Department of Geology, University of Hull. Morphological terms are as used in the 'Treatise on Invertebrate Paleontology', Part Q (1961), with hinge nomenclature after Sylvester-Bradley (1956).

Family PROGONOCYTHERIDAE Sylvester-Bradley 1948

Genus WICHERELLA gen. nov.

Type species. Wicherella semiora gen. et sp. nov.

Derivato nominis. The genus is named after the late Dr. C. A. Wicher, the distinguished German micropalaeontologist.

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Diagnosis. Shape sub-rectangular; left valve larger than right. Adductor muscle scars a subvertical row of 4 rounded scars, with 2 rounded antennal scars and a round mandibular scar. Hinge antimerodont. Inner margin and line of concrescence coincide; marginal pore canals simple, weakly curved, 8 anteriorly and 4 posteriorly in the type species.

Zone		<i>Wicherella semiora semiora</i>		<i>W. semiora kirtonensis</i>	<i>Gramannella apostolescui</i>	
		Dorset coast	Gloucester	Kirton-in-Lindsey	Dorset coast	Gloucester
Subzone						
spinatum	hawskerense					
	apyrenum					
margaritatus	gibbosus					
	subnodosus					
	stokesi	■	?	■	■	?
davoei	figulinum	?	?	■	?	?
	capricornus					
	maculatum					

Zonal scheme from Dean, Donovan & Howarth (1961)

TEXT-FIG. 1. Distribution of *Wicherella* and *Gramannella* in England.

Primary ornament consists of 3 ribs which cross valve diagonally from antero-ventral to postero-dorsal margin; the most dorsal rib may be very weakly developed; some variation in ornament occurs, particularly in strength of reticulate secondary ornament. Sexual dimorphism well developed, with females shorter and relatively higher than males.

Remarks. Only 1 species is at present definitely assigned to this genus. 3, possibly 4, other species of the genus are thought to be present in the Paris Basin, judging from photographs of ostracods from the Berneval 101 well (Oertli 1963, pls. 13 (2) and 14 (1)), although hingement, muscle-scars and marginal structures of these specimens are at present unknown. The ostracods from the Paris Basin are of Pliensbachian age, as is the species described below. The ostracod recorded by Klingler (1962) from the Lias delta of North Germany as 'Ostracod Nr. 106' may well belong to *Wicherella*, possibly

to the type species. The genus is therefore known to exist in the Pliensbachian deposits of England and probably also in those of the Paris Basin and North Germany.

Wicherella is distinguished from the Lower Lias *Klinglerella* by general shape, form of inflation, ornament and lack of marginal rims; and similarly from the Upper Lias *Kinkelina*, which is particularly notable for its alate extensions and anterior and posterior marginal rims. The Domerian *Nanacythere* differs in shape, especially in that it is more elongate, but the most striking difference is in hinge structure.

Wicherella semiora sp. nov.

Derivato nominis. An allusion to the smooth rim around the anterior and ventral margins of this species. Latin—'semi', part; 'ora', rim.

Remarks. This species is a good index for the mid-part of the Pliensbachian. 2 geographically separated subspecies are recognized.

Wicherella semiora semiora subsp. nov.

Plate 39, figs. 1, 3–6, 11, 13; text-fig. 2A

1963 *Procytheridea* n. sp., Oertli, pl. 13 (2).

?1962 *Ostracod* Nr. 106, Klingler, p. 101, pl. 13, fig. 35 and table 7.

Material. 311 valves, 40 carapaces, and 53 instars.

Distribution. Dorset: Eype Clay, Down Cliff Sands (*stokesi* subzone, *margaritatus* zone). Robins Wood Hill, Gloucester: ?*davoei*/*margaritatus* zone.

Holotype. HU. 54.J.27, Down Cliff Sands, Ridge Cliff, Dorset. *Paratypes.* HU. 55.J.1–4 inclusive, same horizon and locality; HU. 55.J.5 and 6, topmost Eype Clay, same locality.

Dimensions (in mm).

	<i>Length</i>	<i>Height</i>	<i>Width</i>
Holotype, left valve, male, HU. 54.J.27	0.70	0.37	0.18
Paratype, left valve, female, HU. 55.J.1	0.57	0.34	0.17
Paratype, right valve, female, HU. 55.J.2	0.57	0.32	0.14
Paratype, left valve, male, HU. 55.J.3	0.70	0.38	0.19
Paratype, right valve, male, HU. 55.J.4	0.69	0.35	0.18
Carapace, female, HU. 55.J.5	0.59	0.35	0.29
Carapace, male, HU. 55.J.6	0.72	0.39	0.36

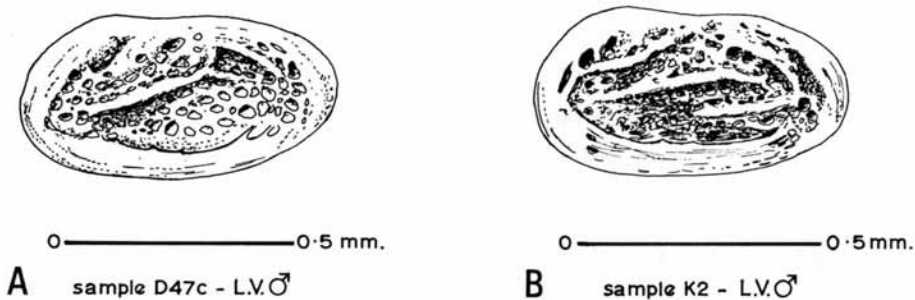
Diagnosis. A subspecies of *Wicherella semiora* with the primary ornament only slightly more developed than the secondary.

Description. Shape sub-rectangular. Dorsal margin straight or weakly concave antero-medially in larger (left) valve or weakly convex in right; from anterior cardinal angle, anterior margin broadly and symmetrically rounded, although right valves may exhibit straightening of dorsal section of anterior margin; ventral margin convex but with weak antero-median flexure of margin which corresponds to a selvage groove; posterior rounded, with most distal point at approximately mid-height.

Valves inflated, but no really prominent ventral inflation, although sufficient to obscure median and posterior portions of ventral margin in lateral view. Shape differences exist between larger left and smaller right valves, mainly expressed in terms of left valve being more ovate, overlap being fairly weak. Greatest length at mid-height,

greatest height at anterior cardinal angle, and greatest width at about one-third of length from posterior end. Valves ornamented with complex pattern of primary and secondary ribs, pattern remaining constant in both left and right valves of males and females (text-fig. 2).

Area bordering anterior, ventral and posterior margins raised and unornamented, rest of valve being slightly lower and ornamented. 2 ribs run in postero-dorsal direction across valve; 1 lies in mid-dorsal area with sulcus anteriorly, second is fairly narrow rib which follows slightly sinuous course from antero-ventral angle of smooth marginal strip and bifurcates in postero-median area to give 2 relatively weak ribs. Apart from groove round inner edge of smooth marginal strip, primary ornament little stronger



TEXT-FIG. 2. A, *Wicherella semiora semiora*. B, *Wicherella semiora kirtonensis*.

than secondary. Ventral surfaces have up to 7 longitudinal grooves on each valve. Ornamentation weaker and disappears round posterior margin, which is smooth and essentially continuation of smooth marginal strip.

Hinge antimerodont, in left valve an anterior loculate groove with 7 small sockets, median denticulate bar, and posterior loculate groove with 7 or 8 small sockets. Narrow ledge runs beneath median bar, connecting anterior and posterior hinge elements, and sometimes developed sufficiently to give impression of groove connecting terminal elements.

Muscle-scar pattern composed of sub-vertical row of 4 rounded adductor scars, central 2 being markedly elongate oval, and anteriorly 2 rounded antennal scars and round mandibular scar. Marginal zone moderately wide anteriorly, but less so along ventral and posterior margins. Inner margin coincides with line of concrescence. Marginal pore canals simple, isolated and weakly curved, 8 anteriorly (6 in ventral half of shell) and 4 posteriorly. Eye structures absent.

Sexual dimorphism prominent, with females shorter and relatively higher than more elongate males. Both males and females somewhat swollen posteriorly, but males generally to lesser extent.

The 4 oldest instars plus the adult form have been recognized. Ornament of instars much weaker than that of adults and appears reticulate except for 1 diagonal rib which becomes apparent when material is stained. Groove on inside of smooth marginal strip not present in younger moults, but smooth margin developed. Since instars are immature

they are naturally less inflated posteriorly, and posterior part of carapace in lateral view shows more angular outline than in adult, particularly in left valves.

Remarks. Ostracods apparently belonging to this sub-species are figured by Oertli (1963, pl. 13 (2)) from the western Paris Basin (borehole Berneval 101). Viaud (unpublished thesis, 1963) incorporated in his work some material from the same borehole. Viaud used Oertli's notation 'Indet. gen. sp. 37a' for this taxon and, within the Paris Basin, recorded it only from Normandy. He also described what may be a second subspecies (possibly that described below) from the same area and denoted it as 'Indet. gen. sp. 37'.

W. semiora semiora appears to be restricted to the western part of the Paris Basin and to southern England. The material from Gloucester (6 carapaces and 35 valves, male and female) differs from the Dorset material only in that ornamentation is weaker and the difference in strength between primary and secondary ornament less apparent. The fauna obtained from the Domerian at Robins Wood Hill, Gloucester, was sparse and yielded only a small number of specimens belonging to 6 species. There is a strong connection with the Dorset fauna in that the same subspecies of *W. semiora* is present in both areas. It is impossible to assess the influence which the Mendip structure exerted on faunal movement, but it would seem likely that it was not of major importance and was certainly variable. Howarth (1958, p. xxxvii), discussing faunal provinces in *spinatum* zone ammonites and incorporating evidence from Kent (1949, p. 98), concluded that a few miles to the east of the Mendips there was free north-south access, and as far as it goes the evidence here supports that view.

Wicherella semiora kirtonensis subsp. nov.

Plate 39, figs. 2, 7-10, 12; text-fig. 2B

Derivato nominis. From the locality at which it was first discovered.

Distribution. *margaritatus* zone, Kirton-in-Lindsey.

Material. 7 carapaces and 97 valves.

Dimensions (in mm).

	<i>Length</i>	<i>Height</i>	<i>Width</i>
Holotype, left valve, female, HU. 55.J.7	0.59	0.36	0.16
Paratype, right valve, female, HU. 55.J.8	0.58	0.34	0.14
Paratype, left valve, male, HU. 55.J.9	0.66	0.35	0.17
Paratype, right valve, male, HU. 55.J.10	0.66	0.35	0.16
Paratype, carapace, female, HU. 55.J.11	0.56	0.35	0.27
Paratype, carapace, male, HU. 55.J.12	0.70	0.39	0.31

Diagnosis. Primary ornament relatively stronger than in *W. semiora semiora*; secondary ornament weak or virtually absent.

Description. Very similar to previous subspecies in shape and relative dimensions, pattern of muscle-scars, hingement, number and detailed disposition of marginal pore canals, marginal structures, and sexual dimorphism. Pattern of ornament also essentially same, but difference, here regarded as of subspecific rank, lies in relative strength of ornamentation (see text-fig. 2). Primary ornament very distinct, much more so than in

W. semiora semiora, because of marked reduction in strength of secondary ornament, which forms reticulate pattern between main ribs.

Remarks. This consistent ornamental difference between 2 groups of ostracods which appear to be conspecific but geographically separate, justifies the creation of subspecies to distinguish them. It seems that at some stage the Kirton-in-Lindsey population became isolated from the Dorset and Gloucester population, and no specimens of the species were found in the Domerian sediments at Lincoln (Bracebridge pit, SK971671) or at Napton-on-the-Hill, Warwickshire (SP456613). In addition it should be noted that very few ostracods were obtained from Napton-on-the-Hill and this faunal poverty may in fact be a localized phenomenon reflecting ecological controls accompanying the geographical isolation.

Family Uncertain

Genus GRAMANNELLA gen. nov.

Type species. *Procytheridea? apostolescui* Gramann 1962.

Derivato nominis. Named after Dr. Franz Gramann, who first described the 2 species assigned to it.

Diagnosis. Shape sub-rectangular, anterior margin broadly but asymmetrically rounded, posterior short and acuminate. Left valve larger than right. Ornament reticulate, often strongly so. Hinge antimerodont. Marginal pore canals simple, curved, 8–10 anteriorly, 2 or 3 posteriorly. Adductor muscle scars arranged in sub-vertical row of 4 rounded scars with round antennal scar anteriorly. Sexual dimorphism evident, with inferred males more elongate than females.

Remarks. 2 species are considered to belong to *Gramannella: Procytheridea? apostolescui* Gramann 1962, and *P.? tatei* Gramann 1962.

EXPLANATION OF PLATE 39

Specimens 2, 8, 11, 14–23 are coated with carbon, all others with aluminium. Photographs taken with a Cambridge Instruments Scanning Electron Microscope.

Figs. 1, 3–6, 11, 13. *Wicherella semiora semiora* subsp. nov. All from *stokesi* subzone, Ridge Cliff, Dorset; 1, 3, 4, 6, 11 from Down Cliff Sands, 5, 13 from Eype Clay. 1, Holotype, left valve, male, HU. 54.J.27, × 66. 3, Paratype, right valve, male, HU. 55.J.4, × 66. 4, Paratype, left valve, female, HU. 55.J.1, × 66. 5, Left valve, female, muscle-scar pattern; × 400. 6, Paratype, right valve, female, HU. 55.J.2, × 66. 11, Left valve, female, internal view, × 66. 13, Paratype, carapace, female, HU. 55.J.5, dorsal view, × 63.

Figs. 2, 7–10, 12. *Wicherella semiora kirtonensis* subsp. nov. All from *margaritatus* zone, Kirton-in-Lindsey, Lincs. 2, Right valve, male, internal view, × 66. 7, Paratype, left valve, male, HU. 55.J.9, × 66. 8, Right valve, female, internal view, × 66. 9, Paratype, right valve, male, HU. 55.J.10, × 66. 10, Holotype, left valve, female, HU. 55.J.7, × 66. 12, Paratype, right valve, female, HU. 55.J.8, × 66.

Figs. 14–23. *Gramannella apostolescui* (Gramann 1962). 14, 15, 17, 21 from *stokesi* subzone, Ridge Cliff, Dorset; rest from *subnodosus* subzone, Thorncombe Beacon, Dorset. 14, Left valve, male, HU. 56.J.16 (a), × 71. 15, Right valve, male, HU. 56.J.17 (a), × 71. 16, Left valve, female, HU. 56.J.18, × 66. 17, Right valve, male, HU. 56.J.17, × 71. 18, 19, 23, Left valve, female, HU. 56.J.19; 18, dorsal view, × 73; 19, enlargement of median element of hinge; 23, internal view, × 72. 20, Carapace, female, HU. 56.J.25, dorsal view, × 66. 21, Carapace, male, HU. 56.J.24, dorsal view, × 66. 22, Right valve, female, internal view, × 66.

The genus occurs in the Pliensbachian of north-western Europe, but present evidence suggests that *G. tatei* is restricted to Germany, whereas the type species, *G. apostolescui*, occurs commonly in southern England, France, Germany, and north-east Spain.

Gramannella is one of a number of Jurassic genera with somewhat similar muscle-scars and hingement which are distinguished by combinations of morphological features. Similarities exist between *Gramannella* and certain species of *Aphelocythere* (e.g. *A. ramosa* Fischer 1961) and the genus may prove to be ancestral to *Aphelocythere*, but such a lineage has yet to be demonstrated, and the differences in muscle-scars and overall morphology are adequate for distinction. The affinities of the genus are unknown, but it is readily recognizable and a good indicator of Pliensbachian deposits, occurring in the *ibex*, *davoei* and *margaritatus* zones.

Gramannella apostolescui (Gramann 1962)

Plate 39, figs. 14–23

- 1961 ?*Procytheridea* D, Cousin and Apostolescu, p. 429, fig. 2.
 1961 Indet. gen. sp. 36, Oertli and Grosdidier, p. 460, table 6.
 1961 ?*Procytheridea* sp. D, Apostolescu; Séronié-Vivien, Magné and Malmoustier, pp. 770, 781, table 2, pl. 4, figs. 1a–d.
 1962 *Procytheridea*? *apostolescui*; Gramann, pp. 192–194, pl. 3, figs. 4–6.
 1963 Indet. gen. sp. 36, Oertli, pl. 16 (1).

Type specimens (Gramann (1962, p. 193)). Holotype, Tk. H. 3749; Paratypes, Tk. H. 3746–3748; material from Bohrung Burlo 1, 47·70–48·20 m.

Material. 40 carapaces, 418 valves.

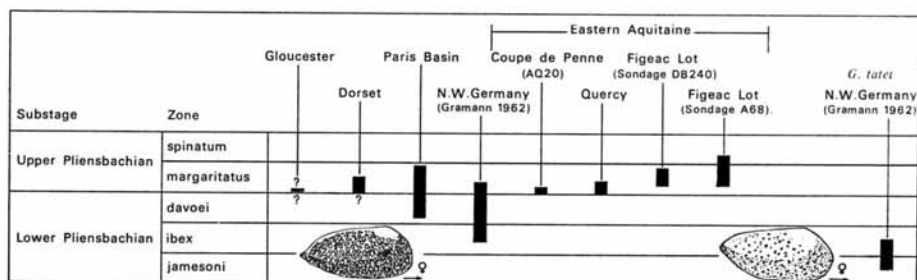
Distribution. Dorset: Eype Clay, Down Cliff Sands and Margaritatus Clay (*stokesi* and basal *subnodosus* subzones, *margaritatus* zone). Robins Wood Hill, Gloucester: ?*margaritatus* zone.

<i>Dimensions</i> (in mm).	<i>Length</i>	<i>Height</i>	<i>Width</i>
Left valve, male, HU. 56.J.16	0·61	0·30	0·16
Left valve, male, HU. 56.J.16 (a)	0·67	0·31	0·16
Right valve, male, HU. 56.J.17	0·67	0·31	0·17
Right valve, male, HU. 56.J.17 (a)	0·67	0·31	0·16
Left valve, female, HU. 56.J.18	0·58	0·31	0·14
Left valve, female, HU. 56.J.19	0·58	0·29	0·13
Penultimate instar, left valve, HU. 56.J.20	0·57	0·27	0·11
Antepenultimate instar, left valve, HU. 56.J.21	0·48	0·24	0·09
Antepenultimate instar –1, left valve, HU. 56.J.22	0·43	0·22	0·08
Antepenultimate instar –2, left valve, HU. 56.J.23	0·35	0·18	0·07
Carapace, male, HU. 56.J.24	0·69	0·31	0·28
Carapace, female, HU. 56.J.25	0·58	0·30	0·24

Description. Shape sub-rectangular. Dorsal margin straight or very slightly concave up to highest point at anterior cardinal angle; anterior round, normally with some asymmetry so that most distal part is in ventral half; ventral margin gently convex in lateral view but margin usually medianly or antero-medianly concave with distinct flange groove; posterior distally extended into an acuminate process, exact position of which may vary a little between mid-height and just ventral of mid-height; posterior may be somewhat ventrally inclined, especially in instars. Greatest length at mid-height, greatest

height usually at anterior cardinal angle, and greatest width posteriorly. Left valve larger than right.

Valve surface ornamented with strong reticulate pattern; cells often deeply excavated, 6-sided or rounded, intercellular walls relatively thin; ornament absent on distal part of posterior, on ventral surface where valve is flattened beside margin, and along edge of dorsal margin. Notable smooth area close to anterior cardinal angle, sometimes slightly raised, but does not appear to have been a definite eye spot. Adductor muscle scar pattern a sub-vertical row of 4 rather flattened scars with rounded antennal scar anteriorly.



TEXT-FIG. 3. Distribution of *Gramannella apostolescui* (Gramann 1962) and *Gramannella tatei* (Gramann 1962). Information from sources quoted in synonymy and from Viaud (1963).

Hinge antimerodont, in left valve an anterior loculate groove with 7 small sockets, finely denticulate median ridge which frequently appears smooth, and posterior terminal groove with 6 or 7 sockets. Complementary structures present in right valve. Marginal zone of moderate width, widest anteriorly, inner margin and line of conscrescence coincident. Marginal pore canals simple, curved 8–10 anteriorly and 2 or 3 posteriorly.

Sexual dimorphism evident, males relatively longer than females; females relatively short but not prominently inflated posteriorly. Adults and 4 juvenile moult stages recognized.

Remarks. *G. apostolescui* is distinguished from *G. tatei*, the only other species known to belong to the genus, by differences in ornamentation. In the former the surface is covered by a fairly strong, evenly developed, reticulation composed of similarly sized cells, whereas *G. tatei* possesses a far more irregular reticulate pattern, often with elongate cells, intercellular walls of different strength, and smaller cells within larger. Gramann's illustrations of *G. tatei* (1962, Pl. 3, fig. 3) show 1 female right valve with much reduced reticulation.

G. apostolescui is a useful index for the middle of the Pliensbachian (see text-fig. 3).

The range of the species in Dorset is not fully known; certainly it did not survive to the end of the *subnodosus* subzone but its range down into the Lower Lias is unknown. A sample traverse through the Green Ammonite Beds (*davoei* zone) in order to prove the range yielded no ostracods at all. At Robins Wood Hill, Gloucester, the species is known from only 1 specimen. To the ranges shown on text-fig. 3 other, more general, records must be added: Domérien (Cousin and Apostolescu 1961), Pliensbachien

(Séronié-Vivien *et al.* 1961), and base Domérien in the borehole Berneval 101 (Paris Basin) quoted in Oertli (1963).

The geographic distribution of this species is of interest since it has been found in the Basins of Paris and Aquitaine, southern England, north-west Germany and north-east Spain (Ariño, mid-Domerian). Viaud (unpublished thesis, 1963) specifically noted that this species, described under Oertli's notation 'Indet. gen. sp. 36', is absent in south-west Germany and the Swiss Jura.

When first described (Gramann 1962, p. 193) the name of the species was incorrectly spelt as '*apostulescui*' instead of '*apostolescui*', though named after the French micro-palaeontologist Vespasian Apostolescu. This would appear to constitute an 'inadvertent error' (Stoll 1961, I.C.Z.N. Article 32a (ii)) and is here corrected.

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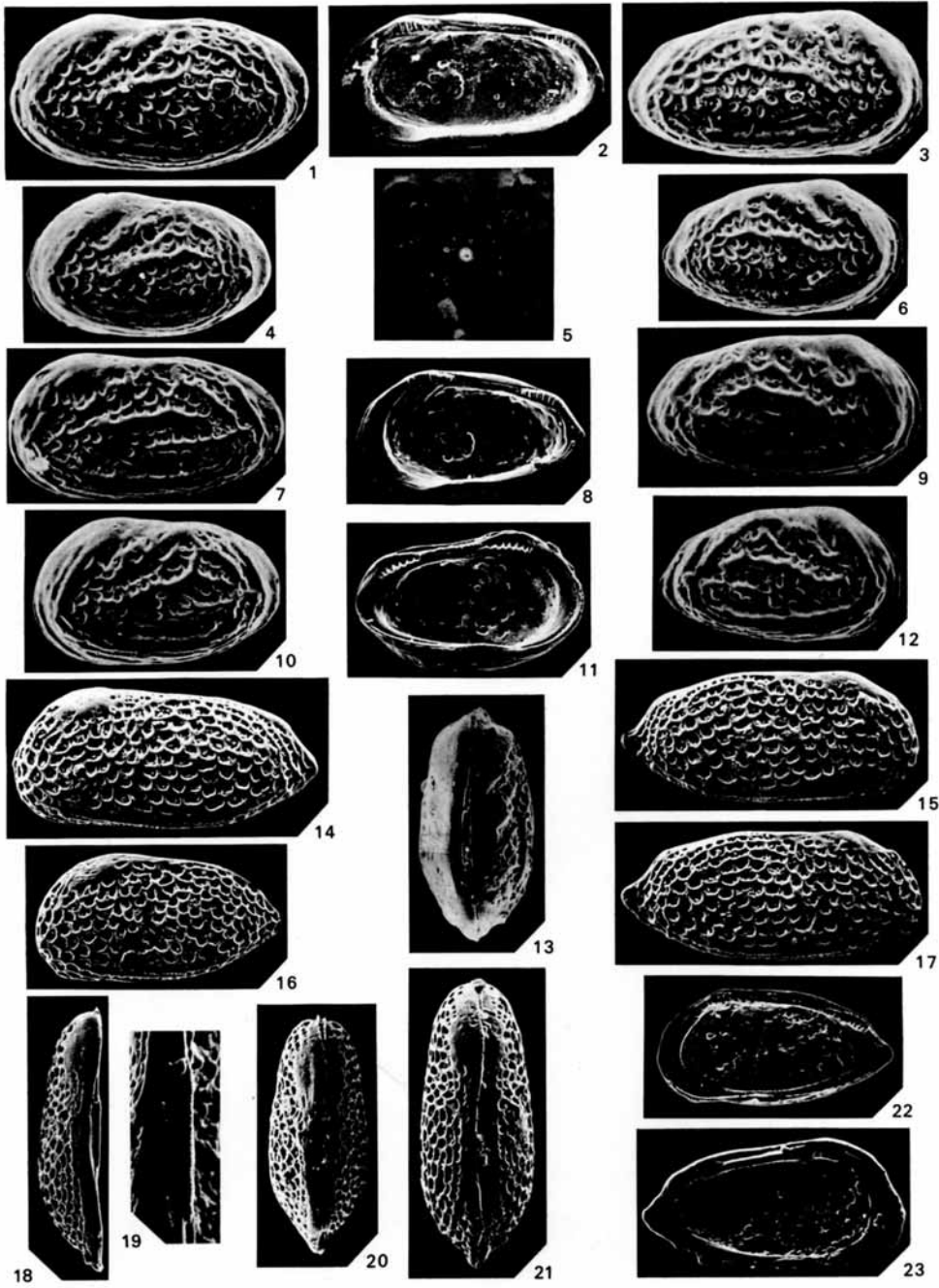
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