

and furrow along dorsal margin, all elements of hinge showing tendency to crenulation, although terminal teeth may be smooth; radial canals numerous, straight; muscle scars 3 or 4, closely spaced. *Mio.*, E.Indies.—FIG. 276.1. **T. sumatraensis*, Sumatra; 1a,b, carapace R. dors., 1c,d, LV int., RV hinge; all $\times 40$ (227). [HOWE.]

Timiriasevia MANDELSTAM, 1947 [**T. epidermiformis*]. Carapace roughly kidney-shaped, LV larger than RV, in some species anterior and posterior ends almost equally rounded, but anterior always more broadly rounded than posterior, dorsal margin almost straight to convex, ventral margin weakly convex in anterior third; surface with fine pits, small ribs, or irregular spines (placed usually in a row parallel to and at a short distance from anterior and posterior margins, or dorso-centrally). Zone of concrescence with only a few radial pore canals; inner margin and line of concrescence coincident; no eye spot; RV hinge provided with smooth median furrow and elongated terminal tooth plates; muscle scars in row of 4 adductors with 2 mandibular scars in front. Strong sexual dimorphism, inferred female carapaces being strongly swollen in posterior third. Very like *Metacypris* (syn. *Gomphocythere*) in general features but with different hinge. [Freshwater.] *M.Jur.-L.Cret.*, Eu.-Asia(USSR).—FIG. 276.2. **T. epidermiformis*, M.Jur., SW.Asia; 2a,b, RV lat., RV muscle field, $\times 43$, $\times 56$ (237); 2c,d, RV and LV hinge, $\times 43$ (50).—FIG. 275.6. *T. polymorpha* MANDELSTAM, L.Cret., SW.Asia; 6a-c, ♀ carapace L, R, dors., $\times ?$ (50).—FIG. 274.3. *T. acuta* MANDELSTAM, L.Cret., SW.Asia; 3a-c, ? ♂ carapace L, R, dors., $\times ?$ (50). [REYMENT.]

Triassinella SCHNEIDER, 1956 [**T. chramovi*]. Small, equivalved, valves slightly inflated, oblong; dorsal margin straight, in some forms gently rounded; anterior and posterior margins rounded, ventral margin straight to slightly convex; surface ornamented with fine pits, central part of valves with shallow transverse depression, posteroventral part provided with short spine. Hinge simple. [Marine.] *L.Trias.*, USSR.—FIG. 276.3. **T. chramovi*, Emba Region; RV lat., $\times 64$ (50). [REYMENT-BOLD.]

Tscherdynzeviana KASHEVAROVA, 1958 [**T. busulukensis*]. Elongate oval, with rather truncate posterior end and regularly rounded anterior margin; RV overlapping LV along straight dorsal margin but with reverse overlap along ventral margin, which is gently concave in middle; surface pitted. Zone of concrescence well developed anteriorly but narrow. *U.Perm.* (Tatar.), USSR.—FIG. 274.6. **T. busulukensis*; 6a-c, carapace R, dors., vent., $\times 43$ (192). [BOLD-REYMENT.]

Velarocythere BROWN, 1957 [**V. scuffeltonensis*]. Medium in size, elongate ovate, with obliquely rounded, rimmed, toothed anterior margin, pos-

terior extremity slightly narrower, rounded in LV and subangulate near middle in RV; dorsal outline slightly arched, with distinct eye spot; ventral outline irregular because of overhang of valves, ventral margin inturned in front of middle; surface rather coarsely reticulate and pitted near middle. Hingement holamphidont, with median elements finely crenulate; marginal areas rather broad at ends, with numerous long paired radial pore canals; muscle scars in vertical row of 3 with a large antennal scar in front. *U.Cret.*, N. Am.—FIG. 274.10. **V. scuffeltonensis*, USA (N.Car.), 10a-c, carapace R, L, dors., $\times 50$ (117). [HOWE.]

Vicinia KUZNETSOVA in MANDELSTAM *et al.*, 1957 [**V. subtilis*]. Reminiscent of *Paracytheridea* but LV hinge consisting of anterior socket with 4 crenulations, central denticulate bar with 3 larger teeth at its anterior end [only 2 visible in author's figure] and posterior elongate socket with 5 crenulations. *L.Cret.(Barrem.)*, SE.Eu.(Caucasus)-SW. Asia (Caspian-Azerbaijan).—FIG. 275.8. **V. subtilis*; 8a-c, LV lat., int., dors., $\times 72$ (238a). [BOLD.]

Suborder METACOPINA Sylvester-Bradley, n. suborder

[Diagnosis and discussion by P. C. SYLVESTER-BRADLEY, University of Leicester]

Hinge distinct, simple to tripartite; muscle scar consisting of secondary scars assembled in a compact group; inner lamella narrow, poorly developed or unknown. ?*L.Ord.*, *M.Ord.-L.Cret.*

The Metacopina are podocopids in which the muscle-scar pattern is a circular aggregate of many scars. The duplicature is variable in width. In the Healdiacea it is narrow, and often described as absent. Transverse sections (Fig. 277.A) show, however, a calcified inner lamella developed in some genera; this is joined to the outer lamella along a plane of concrescence oblique to the shell surface. This differs only in degree from the situation, common in the Podocopina, in which the plane of concrescence is parallel to the shell surface (Fig. 277.B), and in which, therefore, a duplicature is clearly recognizable. Other Podocopina show a plane of commissure which is intermediate in direction (Fig. 277.C). The duplicature in the Quasillitacea has not yet been investigated by modern methods; superficial examination suggests that it is intermediate in nature between the conditions described above for the Healdiacea and the Podocopina, respectively. The hinge in

the Metacopina is more or less differentiated. Some Healdiacea (?Cavellinidae) have an undifferentiated hinge; others (Healdiidae) have a hinge differentiated into three striated elements. Quasillitacea have a differentiated hinge in which the terminal elements may be denticulate.

The suborder certainly includes the ancestors of the Platycopina (which are related, via *Cavellina*, to the Cavellinidae, and may also be related, via *Hungarella* [*Ogmoconcha*], to the Healdiidae). It may also include ancestors of some of the Podocopina (e.g., some of the Cytheracea may be descended from some of the Quasillitacea); in that case, however, the Podocopina must be polyphyletic, as some of the Cytheracea (e.g., Bythocytheridae) seem to have developed independently from the Palaeocopida. The Healdiacea also show signs of relationship (in the development of ornament) with Paleozoic Bairdiacea.

Superfamily HEALDIACEA Harlton, 1933

[*nom. transl.* MANDELSTAM, 1960 (ex Healdiidae HARLTON, 1933)] [Diagnosis and discussion by R. H. SHAVER, Indiana University and Indiana Geological Survey]

Convex-backed, short-hinged ostracodes with hinge and contact margins ridged and grooved in platycopine fashion, LV-over-RV overlap and overreach, adductor muscle scars consisting of numerous aggregate spots. *Dev.-L.Cret.*

Healdiacea have hinges that generally are better differentiated from the contact margin than are those of Cytherellacea, from which the Healdiacea also differ in direction of overlap; Healdiacea have shorter hinges than Quasillitacea, and they lack the separated calcified inner lamellae of Bairdiacea; Healdiacea are externally smooth or ornamented but lack the coarse sculpturing of Thlipsuracea.

Genera classified in families of the Healdiacea are predominantly middle to late Paleozoic in distribution, occurring especially in Devonian and Carboniferous formations (Fig. 278). Only two, or possibly three, genera range above the Permian.

Family HEALDIIDAE Harlton, 1933

[Materials for this family prepared by R. H. SHAVER, Indiana University and Indiana Geological Survey, with some additions by W. A. VAN DEN BOLD, Louisiana State University]

Carapaces convex-backed, with suboblong

to subtriangular outlines and nearly straight venters in lateral view, commonly with posterior, and less commonly with anterior sculpturing in ridges and spines; valves hinged posterodorsally; LV larger than RV, overlap and overreach (where present) LV over RV. Without separated calcified inner lamellae but with hinges and contact margins simply ridged and grooved or shouldered in platycopine fashion; adductor muscle scar circular, consisting of numerous spots generally arranged in concentric rings or rows. Most genera probably exhibit moderate sexual dimorphism. *Dev.-L.Cret.*

Healdiidae have distinctive marginal areas which serve to separate them from other families. A duplicature is either lacking or is completely fused with the outer lamella so that a vestibule and other associated structures are lacking around the entire margin.

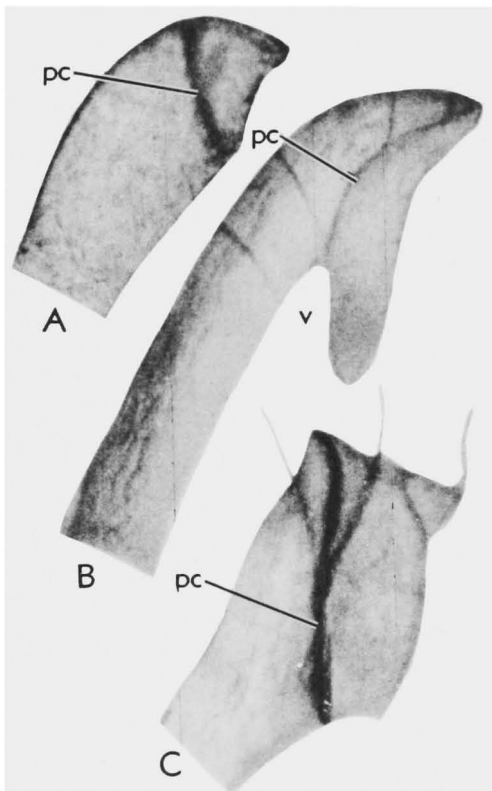


FIG. 277. Transverse sections through the anterior border of the left valves of (A) *Ogmoconcha contractula* TRIEBEL (Healdiacea, Metacopina) $\times 240$; (B) *Pelocypris zilchi* TRIEBEL (Cypridacea, Podocopina) $\times 350$; (C) *Cyprideis torosa* (JONES) (Cytheracea, Podocopina) $\times 370$. [Explanation: pc, plane of concrescence; v, vestibule] (Triebel).

The LV is larger than RV and with a heavy selvage and prominent inner selvage groove around the entire margin, overlaps it except

commonly posterodorsally and anteriorly, where the flange groove and flange of the RV variably have conspicuous development

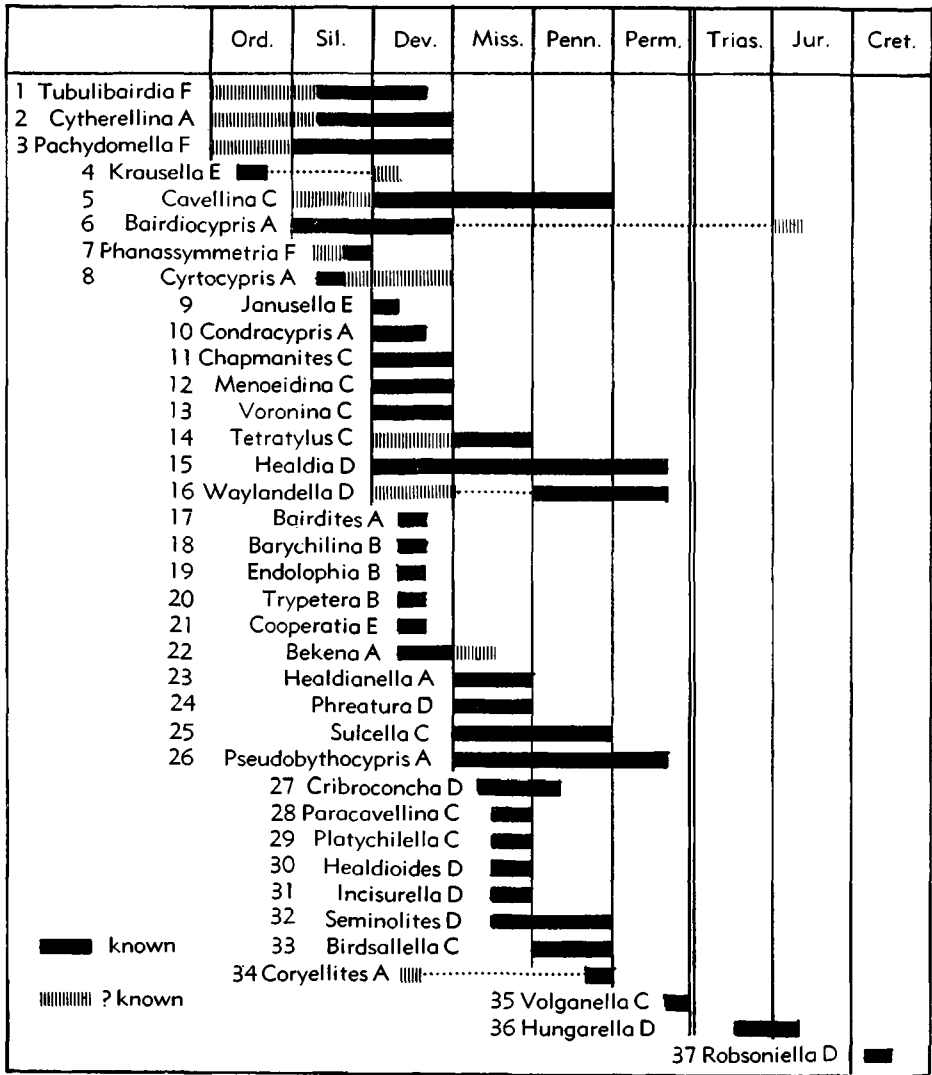


FIG. 278. Stratigraphic distribution of healdiacean ostracodes (Moore, n). Classification of genera in families is indicated by letter symbols (A—Bairdiocyprididae, B—Barychiliniidae, C—Cavellinidae, D—Healdiidae, E—Krausellidae, F—Pachydomellidae). An alphabetical list of genera with index numbers furnishes cross reference to the serially arranged numbers on the diagram.

Generic Names with Index Numbers

Bairdiocypris—6
 Bairdites—17
 Barychilina—18
 Bekena—22
 Birdsallella—33
 Cavellina—5
 Chapmanites—11
 Condacypris—10
 Cooperatia—21
 Coryellites—34

Cribroconcha—27
 Cyrtocypris—8
 Cytherellina—2
 Endolophus—19
 Healdia—15
 Healdianella—23
 Healdioides—30
 Hungarella—36
 Incisurella—31

Janusella—9
 Krausella—4
 Menoeidina—12
 Pachydomella—3
 Paracavellina—28
 Phanassymetria—7
 Phreatura—24
 Platychilella—29
 Pseudobythocypris—26

Robsoniella—37
 Seminolites—32
 Sulcella—25
 Tetratylus—14
 Trypetera—20
 Tubulibairdia—1
 Volganella—35
 Voronina—13
 Waylandella—16

so that overlap may be mutual; the LV commonly overreaches the RV even in areas of mutual overlap. Closure of the valves is accomplished by the selvage of the RV articulating in the selvage groove of the LV and additionally by outer grooving of the RV at the hinge for reception of the selvage of the LV. The hinge and adjacent contact margins are commonly further modified by transverse microteeth-like crenulations in the selvage groove and selvage of the LV and RV, respectively.

Several authors have noted considerable specific variation among some healdiid genera, and others have erected species of a genus on minute differences. Commonly, the variants are of two forms, one with greater height and, in dorsal view, with more symmetrically convex outlines; the other is relatively lower, and, in dorsal view, the greatest thickness is near the posterior end, producing a lateral outline with acuminate anterior and blunt posterior extremities. The two forms are interpreted as male and female, respectively, although either choice presents evidence contradictory to the normal aspect of sexual dimorphism in other ostracodes.

The classification of healdiid genera has been determined by re-evaluation of the relative importance of taxonomic characters, the most essential of which are thought to be marginal structures, muscle scar, direction of overlap, and shape. While generally diagnostic, shape is not considered all-important, for reliance on shape often has resulted in indiscriminate grouping of dissimilar genera. Direction of overlap is emphasized as a valuable taxonomic character even above the generic level in this group, previous objections and exceptions to this being without force when orientation is correct and when other evidence is considered.

Features serving to differentiate genera of the Healdiidae from Cytherellidae and Cavellinidae are LV-over-RV overlap and overreach, associated generally with somewhat more complex articulation and sculpture. Healdiidae are distinguished from Bairdiidae by muscle-scar patterns and simpler metacopine margins which lack separated calcified inner lamellae. Healdiidae differ from Bairdiocyprididae in their characteristic healdiid shape as opposed to

bythocypridid shape and in the presence of ridges and spines on the carapace.

Healdia ROUNDY, 1926 [**H. simplex*]. Carapace generally subtriangular in lateral view, with angularly arched dorsum, venter nearly straight, anterior border mostly broadly rounded and posterior end commonly truncate; greatest thickness posterior, producing cuneate appearance in dorsal view; surface of each valve generally smooth and posteriorly sculptured with either a sickle-shaped to straight, vertical ridge or shoulder, or 1 or 2 backward-pointing spines, or both; LV larger than RV, with overlap and overreach of LV over RV but overlap commonly reduced or lacking in hinge area located posterodorsally. Hinge and contact margins consisting of groove or depressed shoulder in LV into which fits edge of RV, which also is grooved or beveled marginally; dorsal elements of articulation of each valve commonly crenulated transversely in numerous, minute toothlets and grooves extending through and beyond hinge area; adductor muscle scar circular, with numerous aggregate spots arranged in concentric rings or rows (121, 29, 82). *Dev.-Perm.*, cosmop.—FIG. 279, *1a-h*. *H. cara* BRADFIELD, Penn., USA (Ill.). *1a,b*, ?♂ carapace R, dors.; *1c,d*, ?♀ carapace R, dors. (= *H. aspinosa* COOPER), ×100 (Shaver, n); *1e,f*, RV int., LV int., showing marginal areas (Shaver, n); *1g,h*, long. and transv. secs.; all ×100 (Shaver, n).—FIG. 279, *1i*. *H. sp.*, Penn., USA (Tex.); muscle scar from RV int., ×200 (82).

Cribroconcha COOPER, 1941 [**C. costata*]. Resembles *Healdia* but variably with coarsely pitted surface anterior to ridge; imperfectly known. *M. Miss.-L. Penn.*, N.Am. (Ill.-Ark.).—FIG. 280, *1*. **C. costata*, Ill.; *1a,b*, carapace R, dors., ×80 (Shaver, n).

Healdioides CORYELL & ROZANSKI, 1942 [**H. diversus*]. Like *Seminolites*, with anterior ridge but without pits; commonly with spines. *U. Miss.*, N. Am.—FIG. 280, *3*. **H. diversus*, USA (Ill.); *3a,b*, carapace R, dors., ×100 (130).

Hungarella MÉHES, 1911 [**Bairdia? problematica* DADAY, 1911] [= *Ogmoconcha* TRIEBEL, 1941]. Resembling *Healdia* but carapace subovate with rounded extremities, relatively higher and shorter in lateral view; lacks cuneate appearance in dorsal view and without posterior ridges or spines; LV overlaps and overreaches RV and is conspicuously larger. Muscle scar with fewer spots; hinge and contact margins mostly similar but with more prominent transverse crenulation of hinge (82). *U. Trias.-L. Jur.*, Eu.—FIG. 281, *1a-d*. *H. sp.*, Ger.: *1a-c*, RV lat., dors., LV int., ×85 (Shaver, n); *1d*, transv. sec. through hinge, ×240 (376).—FIG. 281, *1e*. *H. contractula* (type species of *Ogmoconcha*), Ger.; long. sec. through ant. margin, ×180 (376). (SHAVER prepared the above diagnosis and figures for *Ogmoconcha* on the assumption that this name is not a synonym of *Hungarella*. He has

not seen the specimens representing the type species of *Hungarella*, but the type figures and description suggest to him the presence of radial pore canals and a duplicature. He therefore has no basis for agreement on the suggested synonymy or on assignment of *Hungarella* to Healdiidae, as have other *Treatise* authors. He appreciates, however, the late editorial necessity that has left this taxon unsatisfactorily described.]

Incisurella COOPER, 1941 [**I. prima*]. Resembles *Healdia* but sculpture consists of vertically sub-ovate area impressed into shell near posterior border of each valve; imperfectly known. *U.Miss.*, N.Am.(Ill.-Okla.).—FIG. 282, I. **I. prima*, USA (Ill.); 1a,b, carapace R, dors., $\times 90$ (Shaver, n).

Phreatura JONES & KIRKBY, 1886 [**P. concinna*]. Resembles *Incisurella* but with smaller impressed area near anterior border of each valve; imperfectly known. *L.Carb.*, Eu.(Eng.).

Robsoniella KUSNETSOVA in MANDELSTAM *et al.*, 1956 [**R. obovata*]. Carapace elongate-ovate reniform, LV projecting, anterior end narrower than posterior and bent downward, dorsal margin arched; surface smooth or bearing weak striae in central region. Duplicature broad, with relatively few radial pore canals, which are straight and thin; muscle scars 4 to 5, not arranged in cypridid manner; LV hinge with terminal elongate crenulate teeth and median narrow bar, denticulate on dorsal side. [Differs from *Ogmoconcha* in

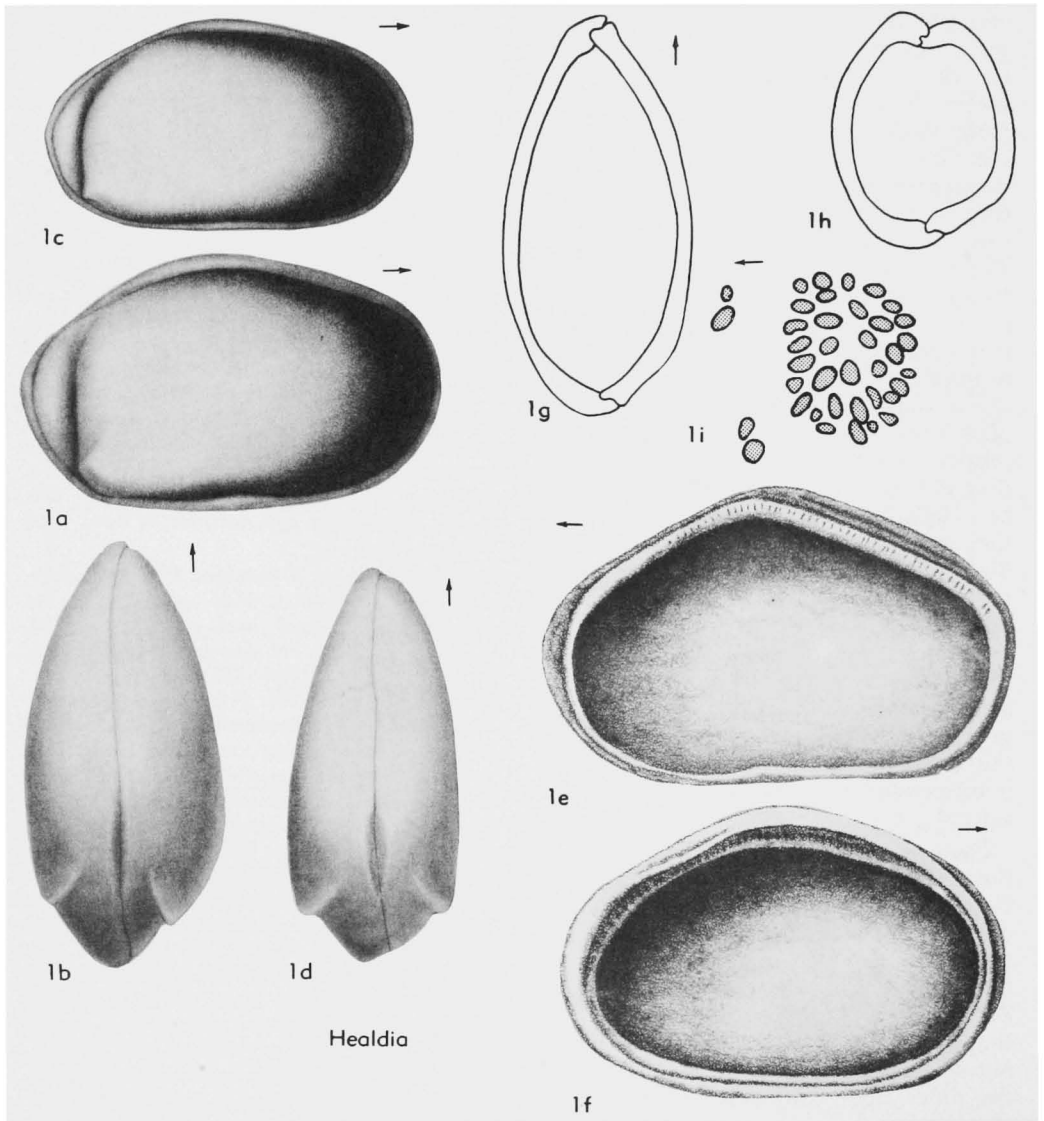


FIG. 279. Healdiidae (p. Q361).

stronger differentiation of hinge features.] *L.Cret.* (*Apt.-Alb.*), SE.Eu. (Caucasus).—FIG. 283,1. **R. obovata*; 1a,b, RV lat., int., $\times 70$; 1c,d, LV int., dors., $\times 70$; 1e,f, LV and RV hinge, $\times 195$ (50). [BOLD.] [SHAVER disagrees strongly with inclusion of *Robsoniella* in the Healdiidae. He believes especially that the duplicature and associated morphology and muscle scars of that genus, and to a lesser extent the shape and hinge structures, would render the family diagnosis meaningless if this assignment should be considered as a valid one. The genus is assigned here on the basis of the original author's judgment; a more important consideration to SHAVER, except for late editorial neces-

sity, is that *Treatise* authors are urged to improve, if they can, upon taxonomic concepts.]

Seminolites CORYELL, 1928 [**S. truncatus*]. Like *Healdia* but mostly with sickle-shaped ridge nearly paralleling anterior border and shallow depression commonly paralleling both ridges on concave side; known species without spines; mostly coarse-pitted like *Cribroconcha* (21, 121). *U.Miss.-Penn.*, N.Am.—FIG. 280,2. **S. truncatus*, Penn., USA (Ill.); 2a,b, ? δ carapace R, dors.; 2c, ? δ carapace dors. (= *S. elongatus* CORYELL), $\times 90$ (Shaver, n).

Waylandella CORYELL & BILLINGS, 1932 [**W. spinosa*] [= *Harltonella* BRADFIELD, 1935]. Differs

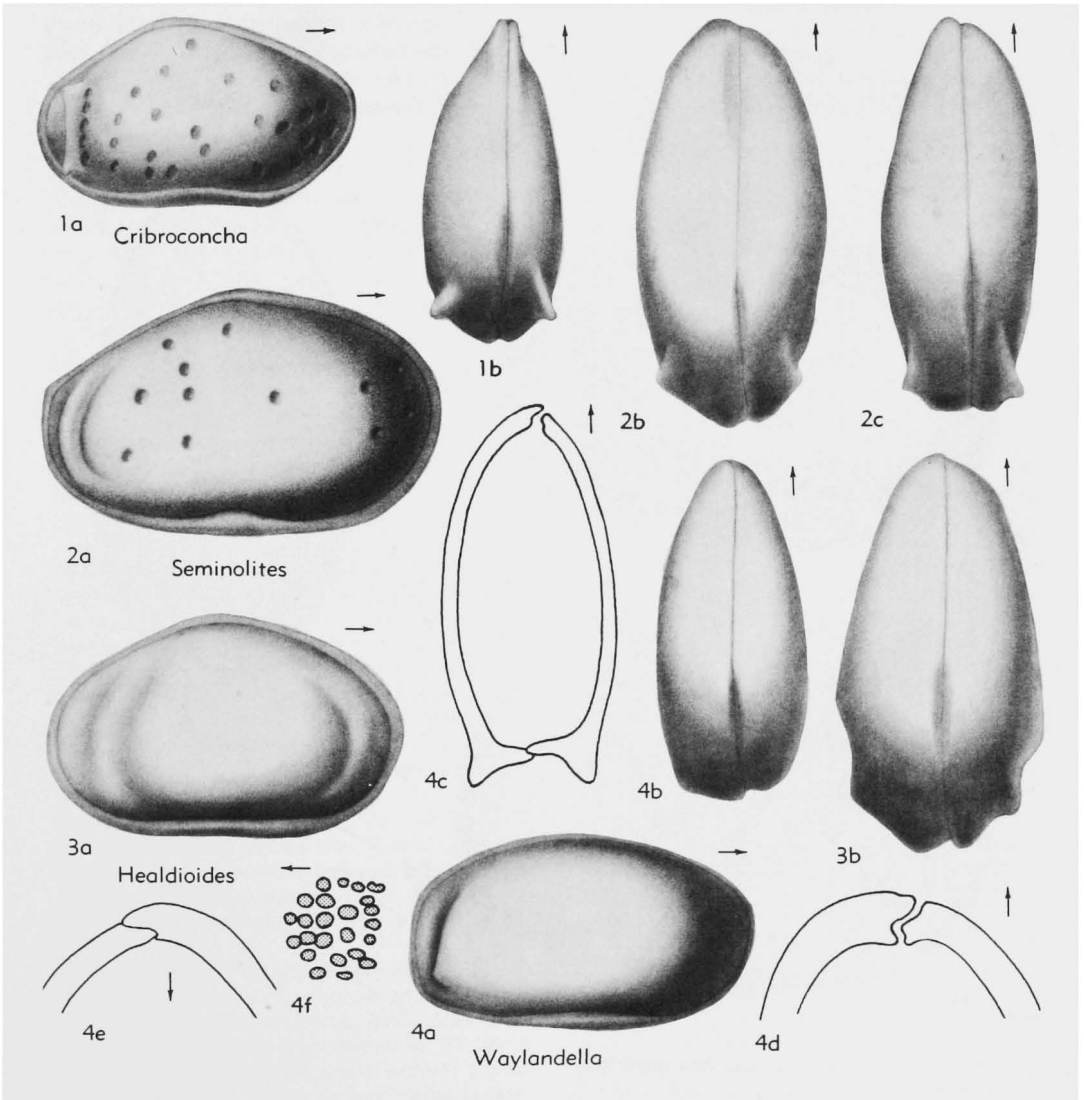


FIG. 280. Healdiidae (p. Q361-Q364).

from *Healdia* in generally more elongate outline in lateral view, dorsal angulation mostly lacking; posterior terminated as in *Healdia* to somewhat pointed ventrally; sculpture generally weaker but variably consisting of 1 or 2 spines, or ridge or both, on each valve posteriorly (21, 123). ?*Dev.*, Penn.-Perm., N.Am.-Eu.—FIG. 280, *4a, b*. *W. ardmorensis* (BRADFIELD), Penn., USA (Ill.); *4a, b*, carapace R, dors., $\times 60$ (Shaver, n).—FIG. 280, *4c-f*. *W. obesa* COOPER, Penn., USA (Ill.); *4c*, long. sec., $\times 60$ (Shaver, n); *4d, e*, transv. secs., through hinge and venter, $\times 100$ (Shaver, n); *4f*, muscle scar from LV ext., $\times 100$ (Shaver, n).

Family BAIRDIOPYRIDIDAE
Shaver, n.fam.

[Materials for this family prepared by R. H. SHAVER, Indiana University and Indiana Geological Survey]

Convex-backed ostracodes of bythocypridid shapes, mostly without ornamenta-

tion and sculpturing; LV larger, with overlap and overreach of LV over RV; lacking separated calcified inner lamellae but with short hinges and contact margins simply ridged and grooved in platycopine fashion; adductor muscle scars circular and consisting of numerous closely grouped spots; sexual dimorphism slight or unknown in most genera. ?*Ord.*, Sil.-Perm., ?*Jur.*

Bairdiocyprididae are intermediate morphologically between Healdiidae and Bairdiidae but are easily distinguished from other families. They resemble Healdiidae in having similar muscle scars and configuration of the contact margins; true duplicatures either are lacking or are mostly fused with the outer lamellae, so that vestibules are lacking; the contact margins and hinges of

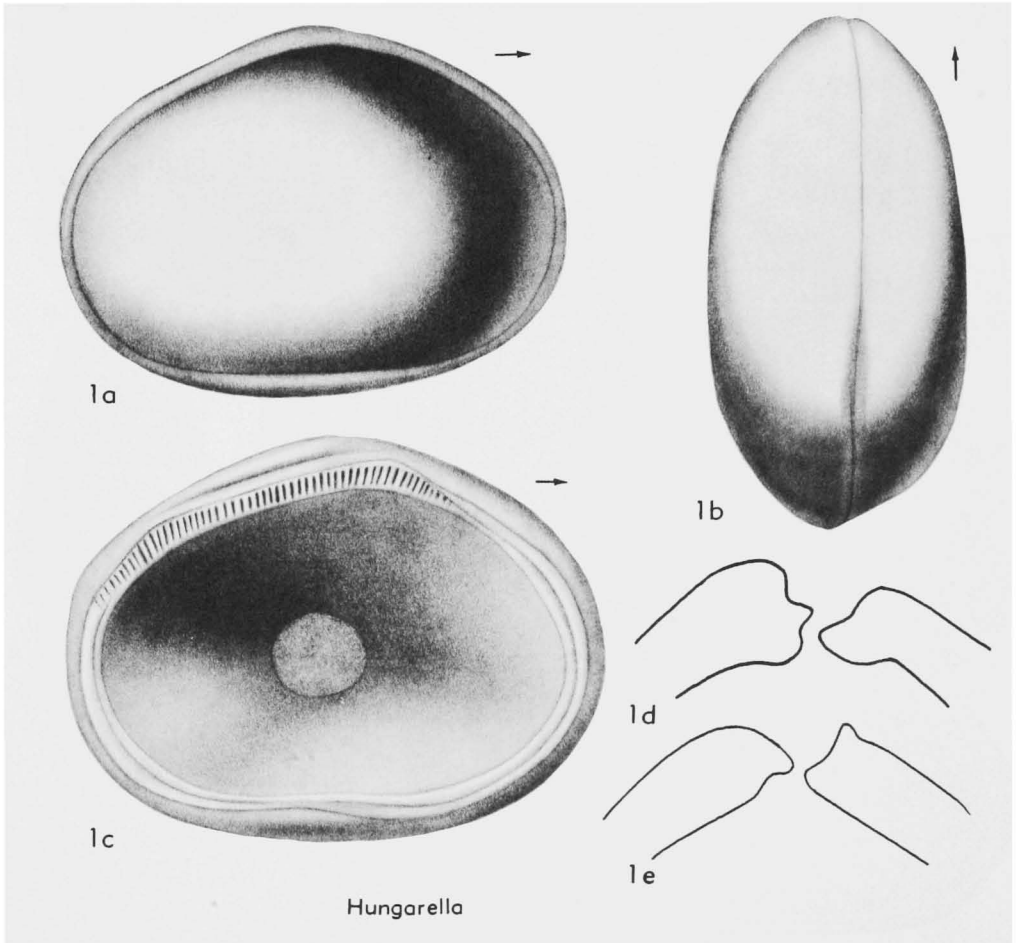


FIG. 281. Healdiidae (p. Q361).

LV are considered to consist of selvage, and proximally from it, selvage groove and list, whereas the contact margins of RV consist principally of the selvage. Bairdiocyprididae differ from Healdiidae by mostly lacking the distinctive dorsal angularity and posterior sculpturing in ridges and spines of that family.

The family mostly resembles Bairdiidae in shape and lack of sculpture but has adductor muscle scars and marginal structures that are foreign to true bairdiids. Bairdiocyprididae are differentiated from Cytherellidae and Cavellinidae by LV over RV overlap and overreach; they are much less tumid than *Pachydomella* and *Phanassymetria*; they have simpler hinges and contact margins than *Ponderodictya*, *Quasillites*, *Menoeidina*, and related genera, in which reversal of overlap occurs dorsally.

Possibly, *Bythocypris* does not exist in Paleozoic strata. Re-examinations of several of the many-score Paleozoic species referred to it have resulted in assignments to other genera. Part of these genera and remaining supposed Paleozoic species of *Bythocypris* are better assigned to the Bairdiocyprididae; nevertheless, the critical morphology of some genera included here is unknown.

Bairdiocypris KEGEL, 1932 [**Bythocypris* (*Bairdiocypris*) *gerolsteimensis* KEGEL, 1932]. Carapace large, heavy-shelled, mostly subtriangular in lateral view, with considerable dorsal convexity and nearly straight ventral border; lacking the great tumidity of *Pachydomella*; LV conspicuously overreaching RV; contact marginal structures as described for family; adductor muscle scar with 70 or more spots; commonly with posteroventral furrow on RV. Surface smooth or punctate. *Sil.-Dev.*, ?*Jur.*, cosmop.—FIG. 284,2*a,b*. **B. gerolsteimensis* (KEGEL), M.Dev., Ger.; 2*a,b*, carapace (holotype) R, dors., $\times 20$ (224).—FIG. 284,2*c,d*. *B. uexheimensis* (KEGEL), M.Dev., Ger.; 2*c*, transv. vent. edge, $\times 40$; 2*d*, adductor muscle scar, $\times 60$ (224).

Bairdites CORYELL & MALKIN, 1936 [**B. deltasulcata*]. Externally, nearly like *Bairdiocypris* but differs in having posterior crescentic ridge in each valve with depression in front. *M.Dev.*, N.Am.—FIG. 284,1. **B. deltasulcata*; 1*a,b*, RV lat., dors., $\times 25$ (Shaver, n).

Bekena GIBSON, 1955 [**B. diaphrovalvis*]. Nearly like *Bairdiocypris*, but type species without ventral furrow and having crescentic, compressed areas near anterior and posterior borders of RV (both features being of doubtful generic value); contact marginal structures apparently conforming to fam-

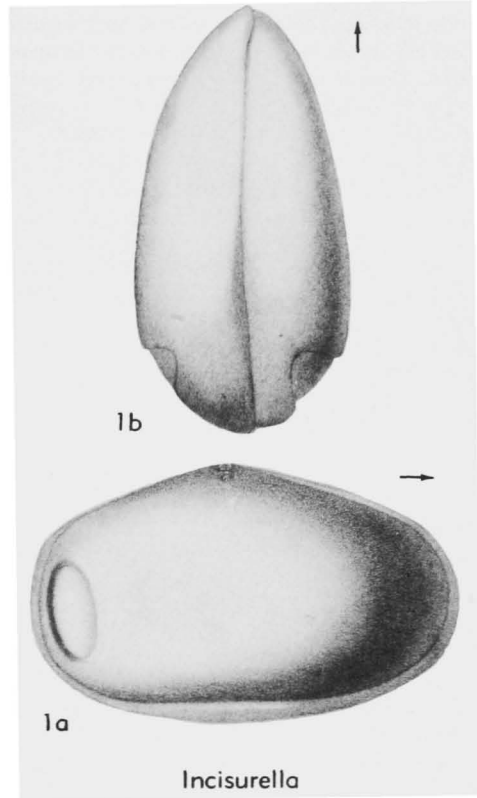


FIG. 282. Healdiidae (p. Q362).

ily diagnosis; adductor muscle scar unknown. *M. Dev.-U.Dev.*, ?*L.Miss.*, N.Am.-Eu.(Ger.).—FIG. 285,3. **B. diaphrovalvis*, U.Dev., USA(Iowa); 3*a,b*, carapace R, dors., $\times 38$ (155).

Condacypris ROTH, 1929 [**C. binoda*]. Large bairdiocypridid with 2 crescentic ridges located antero- and postero-centrally on surface of each valve; adductor muscle scars and marginal structures of type species (from USA) unknown; European specimens doubtfully referred to genus having greater overreach than type species but typical bairdiocypridid muscle scars and marginal structures. *L.Dev.-M.Dev.*, N.Am.-?Eu.—FIG. 284,3*a,b*. **C. binoda*, L.Dev., USA (Okla.); 3*a,b*, carapace R, dors., $\times 40$ (297).—FIGS. 284,3*c*, 285,4. *C. ?circumvallata* (KUMMEROW), M.Dev., Ger.; 284,3*c*, transv. sec., LV at right, $\times 35$; 285,4*a,b*, carapace R, dors., $\times 25$; 285,4*c*, adductor muscle scar, $\times 70$ (226).

Coryellites KELLETT, 1936 [*pro Coryellina* KELLETT, 1935 (non BRADFIELD, 1935)] [**Coryellina firma* KELLETT, 1935]. Externally almost like *Pseudo-bythocypris* but has blunt node with depression in front near posteroventral angle of LV; contact marginal structures and muscle scars unknown. ?*M.Dev.*, Eu.(Pol.), *U.Penn.*, N.Am.(Kans.).

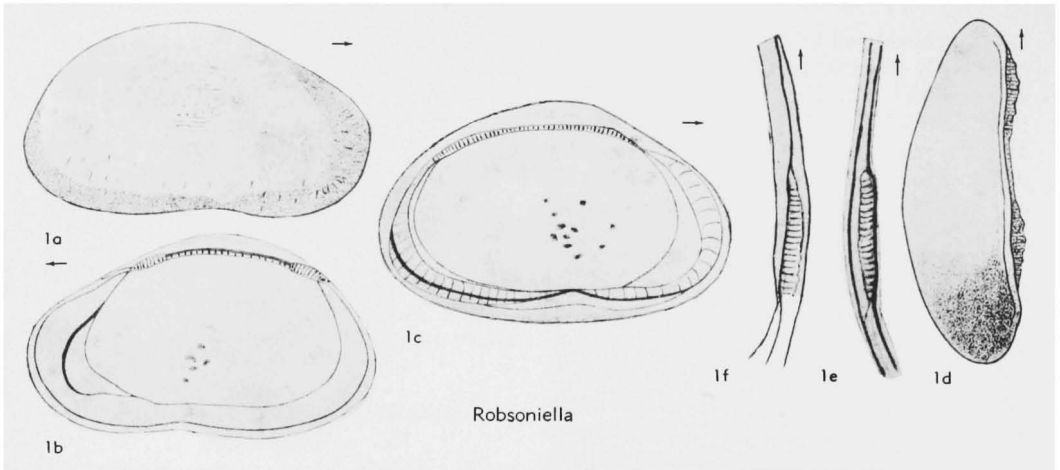


FIG. 283. Healdiidae (p. Q362-Q363).

?*Cyrtocypris* CORYELL & WILLIAMSON, 1936 [**C. subovata*] [= *Cyrtocypris* CORYELL & WILLIAMSON, 1936 (*nom. van.*)]. Nearly like *Cytherellina* in external appearance and doubtfully distinguished from that genus by truncation of posterior border in lateral view; adductor muscle scars and contact marginal structures unknown; like some middle Paleozoic species assigned to *Cavellina*. *M.Sil.*, ?*Dev.*, N.Am.-?Eu.—FIG. 285,2*a,b*. **C. subovata*, *M.Sil.*, USA (Ind.); 2*a,b*, carapace (holotype) R, dors., $\times 23$ (131).—FIG. 285,2*c,d*. *C.?* *chvorostanensis* POLENOVA, *Dev.*, Russia; 2*c,d*, carapace R, dors., $\times 50$ (278).

Cytherellina JONES & HOLL, 1869 [**Beyrichia siliqua* JONES, 1855] [= *Orthocypris* KUMMEROW, 1953]. Carapace without external sculpture, smooth, elongate bythocyprid in side view, with point of greatest height in posterior half, terminal borders rounded, ventral border nearly straight; adductor muscle scars and contact marginal structures unknown, but many Paleozoic species assigned to *Bythocypris* are similar to *Cytherellina*. [Type specimens figured by JONES and JONES & HOLL consist partly of internal molds with clinging shell material that show 2 elongate, nearly vertical, shallow depressions without external expression, one located centrally and the other anteriorly.] ?*Ord.*, *M.Sil.-Dev.*, cosmop.—FIG. 285,1. **C. siliqua* (JONES), *M.Sil.*, Eng.; 1*a-c*, carapace R, vent., post.; 1*d*, LV int. with clinging shell, lat.; all $\times 20$ (188).

Healdianella POSNER, 1951 [**H. darwinulinoidea*]. Nearly like *Healdia* in shape and small size but lacking ridges, shoulders, and spines; contact-marginal structures and adductor muscle scars as described for family. [The Devonian species from Russia referred to the genus apparently should be assigned to *Cytherellina* and other genera; some of POSNER's original species appear to differ from *Cytherellina* only in their smaller size.] *L.Carb.*,

E.Eu.—FIG. 285,5. **H. darwinulinoidea*; 5*a,b*, carapace R, vent., $\times 72$ (281).—FIG. 284,4. *H. darwinulinoidea*?; adductor muscle scar, $\times 70$ (281).

?*Longiscula* NECKAJA, 1958 [**L. arcuaris*]. Non-sulcate, outline depressed subtriangular, dorsal margin gently arcuate, ventral somewhat concave in central part, carapace broadest in dorsal part, LV overlapping RV along free margin, most distinct in central part of ventral margin (overlap may be indistinct or not developed along anterior and posterior ends), RV overlapping LV along dorsal margin, particularly in central part; no adventral structures or internal cavellinoid lamellae present. Dimorphism not observed. Surface smooth, tubercles developed in posterior part. *M.Ord.-M.Sil.*, NW.Eu. (Eng.-Baltoscandia).—FIG. 143,3. **L. arcuaris*, *M.Ord.*, NW.USSR (Pskow area); 3*a,b*, carapace (holotype) R lat., dors. (post. end up), $\times 28$ (264). [HESSLAND.]

Pseudobythocypris SHAVER, 1958 [**Bythocypris pediformis* KNIGHT, 1928]. Carapace small, smooth, thin-shelled; most species differing from other bythocypridids in showing laterally a short posteroventral slope or upsweep that meets postero-dorsal border in sharp angle; marginal structures, undifferentiated hinge, and adductor muscle scars as described for family; dimorphism slight. [Differs from *Waylandella* in lacking posterior ridges, shoulders, and spines, and from *Cytherellina* in its smaller size and posteroventral slope of most species.] *Miss.-Perm.*, N.Am.-Eu.—FIG. 286,1. **P. pediformis* (KNIGHT), Penn., USA (Ill.); 1*a,b*, ? δ carapace R, dors.; 1*c,d*, RV int., LV int.; all $\times 42$ (Shaver, n).

?*Reversocypris* PŘIBYL, 1955 [**R. regularis*]. Outline resembling *Bythocypris* in lateral view, with greatest height in posterior portion; stated to have reversal of overlap along venter, but duplicature-like structure along ventral contact margin of RV

and contact margins, as well as hingement and adductor muscle scar, are not well understood. [The orientation adopted by PŘIBYL is reversed here, so that the genus resembles *Bairdiocypris* with overreach, if not overlap, mostly LV over RV.] *L.Dev.*, Czech.—FIG. 287,1a-d. **R. regularis*; 1a-d, carapace (holotype) ?L, ?R, dors., vent., $\times 28$ (61).—FIG. 287,1e-g. *R. klučkoviensis* PŘIBYL; 1e,f, ?RV lat., vent., $\times 28$; 1g, ?RV lat., int., $\times 40$ (61).

?*Silenis* NECKAJA, 1958 [*S. subtriangulatus*]. Outline subtriangular, short straight hinge, ventral margin generally concave in central part, non-sulcate, LV overlapping RV along entire free margin and if developed, RV overlap along dorsal margin, no adventral or interior structures. Dimorphism not observed. Surface smooth. *L.Sil.-M.Sil.*, NW.Eu.—FIG. 143,2. **S. subtriangulatus*, Wenlock., Est.; carapace (holotype) R lat., $\times 18$ (264). [HESSLAND.]

?Family BARYCHILINIDAE Ulrich, 1894

[Materials for this family prepared by R. V. KESLING, University of Michigan, with addition by H. W. SCOTT, University of Illinois]

RV much larger than LV, overlapping it

around free border and with corners conspicuously projecting beyond those of LV. Hinge line short, straight, depressed, with groove in RV for accommodation of edge of LV, interior of both valves with elongate vertical ridge marking position of external sulcus. *M.Dev.*, ?*L.Miss.*

Barychilina ULRICH, 1891 [**B. punctostriata*]. Each valve with distinct S_2 . Surface with pattern of ridges in many species, outermost ridges nearly concentric in outline but central ones sloping posterodorsal-anteroventrally; some species with punctae in furrows between ridges. *M.Dev.*, N.Am.—FIG. 288,2a. **B. punctostriata*, M.Dev. (Onondaga), USA (Ind., Falls of Ohio); LV lat., $\times 20$ (385).—FIG. 288,2b,c. *B. embrithes* KESLING & KILGORE, M.Dev., USA (Mich.); 2b,c, carapace L, dors., $\times 30$ (209).

Endolophia KESLING, 1954 [**E. chariessa*]. Like *Barychilina* but lacking sulci; internal ridges without external sulcate counterparts. *M.Dev.*, N.Am.—FIG. 288,3. **E. chariessa*, USA (Ohio); 3a,b, carapace L, dors., $\times 30$; 3c,d, LV int., RV int., $\times 30$ (203).

Trypetera KESLING, 1954 [**T. barathrota*]. Valves

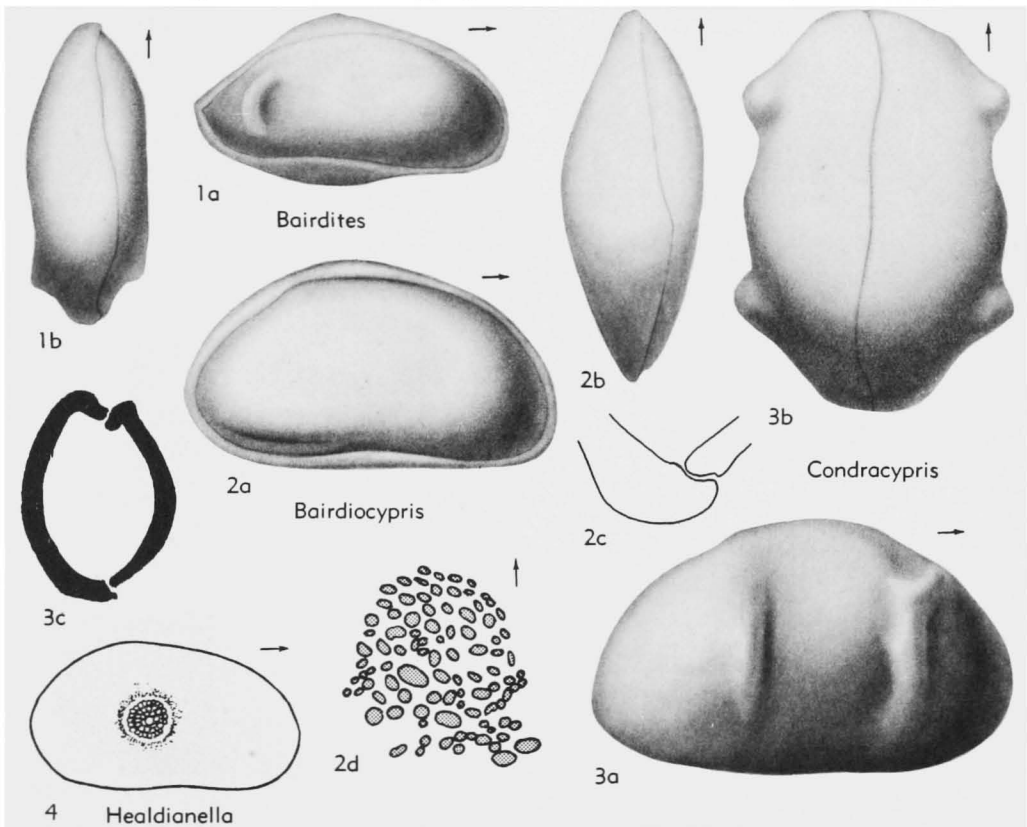


FIG. 284. Bairdiocyprididae (p. Q365-Q366).

with large pit in place of *S*₂; surface ornamented with smaller pits. *M.Dev.*, N.Am.—FIG. 288, 1. **T. barathrota*, USA (Ohio); 1*a,b*, carapace L, dors., ×30 (203).

?*Venula* COOPER, 1941 [**Primitiopsis? striatus* CRONEIS & FUNKHOUSER, 1938]. Small, valves unequal, RV overlapping LV; dorsal margin straight, ventral margin subparallel to dorsal; greatest width near posterior end, wedge-shaped in dorsal view; surface covered with thin ribs connected at various points; *S*₂ faintly developed; probable dimorphism indicated by swelling of posterior portion. *L.Miss.*, USA (Ill.). [SCOTT.]

?Family CAVELLINIDAE Egorov, 1950

[*nom. transl.* POLENOVA, 1960 (*ex Cavellininae* EGOROV, 1950)] [=?Volganellidae MANDELSTAM in MANDELSTAM *et al.*, 1956; ?Volganellacea (MANDELSTAM) KASHEVAROVA, 1959] [Materials for this family prepared by R. H. BENSON, University of Kansas, with contributions from W. A. VAN DEN BOLD, Louisiana State University, R. H. SHAVER, Indiana University and Indiana Geological Survey, and R. A. REYMENT, University of Stockholm]

Carapace subovate to subelliptical in lateral view, subelliptical in dorsal view with noticeable posterior swelling in female. Dorsal border convex, commonly with slight anterodorsal slope; ventral border almost straight, varying to slightly convex or con-

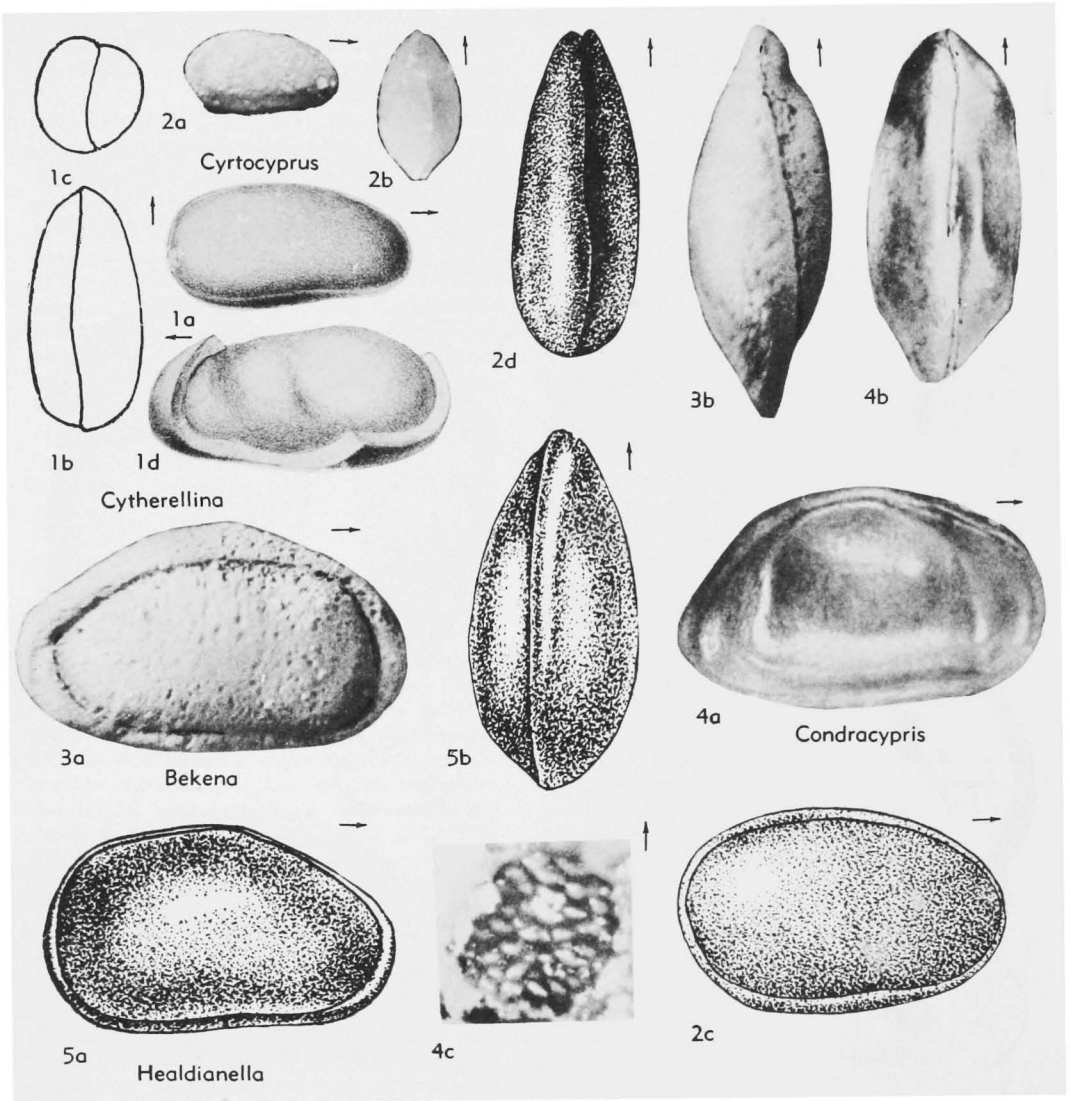


FIG. 285. Bairdiocyprididae (p. Q365-Q366).

cave; ends round or subround. Valves unequal, right larger, overreaching left completely around margin, emphasized most along dorsum and venter, less conspicuously on ends. Surface smooth, genera distinguished by slight muscle scar pit or development of posterior rim and possibly anterior rim. Left valve with duplicature fused or lacking, right valve with continuous groove dipping dorso-anteriorly and very well developed along venter; inner lip forms depression suggesting analogy with left valve of ostracodes with tripartite hinge, duplicature very narrow as in the Cytherellidae; no vestibule. Hinge lacking or at least without differentiation of marginal structure along dorsum. Aggregate circular muscle scar slightly anterodorsal to mid-carapace located on a low ridge extending downward and normal to dorsal margin, commonly more strongly developed in the female. ?*Sil.*, *Dev.-Penn.*, ?*L.Perm.*-?*U.Perm.*

In this family the duplicature and details of overreach are intermediate in character between those typical of the Healdiidae and Cytherellidae. The muscle scar and tendency toward arching of the dorsum are typical of the Healdiidae, the development of a posterior rim being possibly a relict structure derived from healdiid ancestors. The Cavellinae resemble Cytherellidae in size and in nature of the valve contacts but differ in muscle-scar structure.

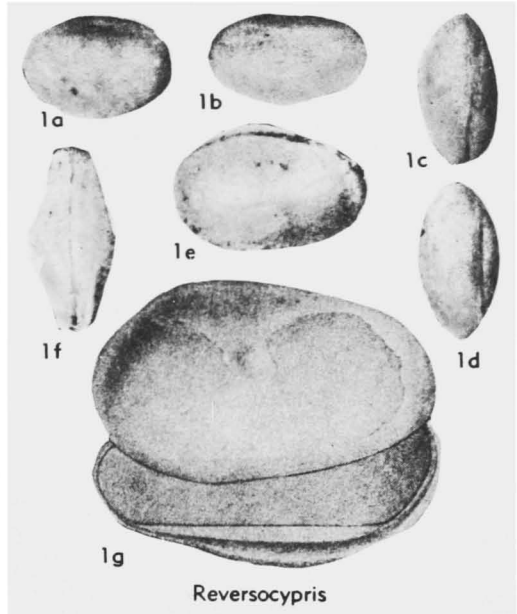


FIG. 287. Bairdiocyprididae (p. Q366-Q367).

linidae resemble Cytherellidae in size and in nature of the valve contacts but differ in muscle-scar structure.

Cavellina CORYELL, 1928 [**C. puchella*] [=?*Cavellinella* BRADFIELD, 1935; *Avenus* HAMILTON, 1942 (erroneous original spelling), *Avenus* HAMILTON, 1942]. Carapace oblong to ovate in lateral view, dorsum moderately arched, venter slightly concave to convex, ends rounded, with posteroventer and anterodorsal extremities slightly to moderately truncated. Subovate in dorsal view, posterior end thicker than anterior, especially pronounced in female. Surface smooth; contact margin of right (larger) valve grooved along inner edge so as to receive edge of smaller left valve which may be more subangular than right valve marginally. Sexual dimorphism expressed by shorter, higher, and thicker carapace of females especially in posterior part, where inner body cavity is more fully developed than in male. Some species show tendency to develop shallow muscle-scar pit (as in *Sulcella*) and posterior rim or ridge (as in *Birdsallella*, *Paracavellina*). ?*Sil.*, *Dev.-Penn.*, ?*Perm.*, N.Am.-Eu.-Austral.—FIG. 289, 4. **C. puchella*, Penn., USA (Okla.-Tex.); 4a-e, carapace L, dors., vent., post., ant., $\times 30$ (21); 4g, muscle scar, $\times 350$; 4f, RV int., $\times 60$ (82).

Birdsallella CORYELL & BOOTH, 1933 [**B. simplex*]. Carapace small, cavellinoid with only slight right-over-left overreach; posterior swelling develops into an accentuated crest or beveled ridge giving carapace a wedge-shaped outline in dorsal view. Differs from *Sulcella* only in lack of muscle-scar

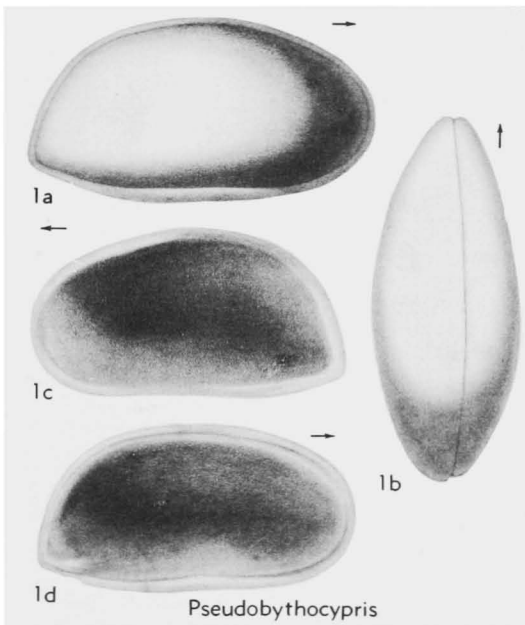


FIG. 286. Bairdiocyprididae (p. Q366).

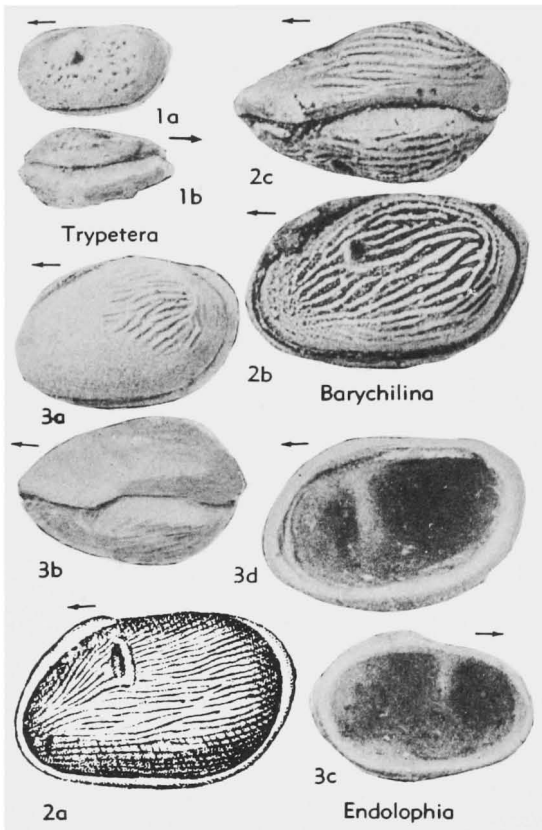


FIG. 288. Barychiliniidae (p. Q367-Q368).

pit and shape of posterior ridge. *Penn.*, N.Am.—FIG. 289,2. **B. simplex*, U.Penn., USA(Tex.); 2a,b, carapace L, dors., $\times 50$ (124).

Chapmanites KRÖMMELBEIN, 1954 [**C. crassus*]. Carapace moderately large, less elongate than in *Cavellina*. Pronounced marginal right-over-left overreach, culminating in a high comblike dorsal flange which tends to be directed toward posterior end in some species. Surface smooth. *Dev.*, Austral.—FIG. 289,1. **C. crassus*, M.Dev., SE.Austral.; 1a-c, carapace R, L, dors., $\times 60$ (225).

?**Menocidina** STEWART, 1936 [**M. subreniformis*]. Carapace small, elongate-ovate to beanlike in lateral view; very similar to *Birdsallella* but smaller, with reversed overreach. Probably transitional between representatives of Healdiidae and Cavellinidae. Surface smooth but with posterior beveled crescentic ridge. *Dev.*, N.Am.—FIG. 290,2. **M. subreniformis*, M.Dev., USA(Ohio); 2a,b, carapace R, dors., $\times 65$ (345).

Paracavellina COOPER, 1941 [**P. elliptica*]. Carapace like *Cavellina* in general shape, outline, and valve relationships; differs from other cavellinids in that both posterior and anterior ends bear a spineless ridge close to and parallel with margins so as to

form a furrow just inside the ridge. Surface usually smooth but may be minutely pitted. *U.Miss.*, N. Am.—FIG. 290,3. **P. elliptica*, U.Miss., USA (Ill.); 3a,b, carapace L, dors., $\times 50$ (20).

Platychilella COOPER, 1942 [pro *Platychilus* COOPER, 1941 (non JAKOLEV, 1874)] [**Platychilus ovooides* COOPER, 1941]. Like *Cavellina* but much smaller and has a narrow overlap terminally, and with shallow sulcate area centrodorsally; these features of doubtful generic significance. *U.Miss.*, Ill.—FIG. 289,3. *P. sp. ovooides*; 3a,b, carapace L, dors., $\times 40$ (20).

Sulcella CORYELL & SAMPLE, 1932 (May) [**S. sulcata*] [= ?*Sansabelloides* HARRIS & LALICKER, 1932 (June)]. Carapace like *Cavellina* in shape and contact of valves but somewhat smaller; postero-dorsal cardinal angle slightly sharper than antero-dorsal in some forms; posterior margin bordered by distinct ridge. Surface smooth, except for shallow sulcus which extends from dorsal margin to a pronounced submedian pit. *Miss.-Penn.*, N.Am.—FIG. 290,1. **S. sulcata*, Penn., USA(Tex.); 1a-d, ♂ carapace L, dors., vent., ant.; 1e-i, ♀ carapace L, dors., vent., post., ant.; all $\times 50$ (21).

Tetratylus COOPER, 1941 [**T. elliptica*]. Carapace like *Cavellina* in general shape. It differs from other cavellinids in that overreach (right-over-left) is less emphasized; anterior and posterior ridges which run parallel to margins like *Paracavellina* terminate dorsally and ventrally in round, knoblike spines of variable length. A shallow muscle-scar pit indicates a close relationship to *Sulcella*. Surface smooth to finely punctate. *Dev.*, *Miss.*, N.Am.-Eu.—FIG. 291,1. **T. elliptica*, U. Miss., USA(Ill.); 1a-c, ♂ carapace L, dors., post.; 1d-f, ♀ carapace L, dors., post.; all $\times 85$ (20).

?**Volganella** SHARAPOVA & MANDELSTAM, 1956 [**Volganella magna* SPIZHARSKY, 1956]. Usually large, irregularly oval, with broadly rounded anterior, posteriorly convergent dorsal and ventral margins and narrowly rounded posterior margin, dorsal margin almost straight or faintly convex, ventral margin straight to faintly concave; surface smooth, moderately convex, greatest convexity posteroventral from center; RV slightly overlapping LV. Zone of concrescence narrow, line of concrescence coinciding with inner margin; vestibule and eye spots lacking; RV hinge with thin, knifelike bar that fits below dorsal margin of LV. [Fresh-water.] *U.Perm.*, USSR(Sukhon Basin).—FIG. 291,2. **V. magna* SPIZHARSKY; LV lat., $\times 40$ (50).—FIG. 292,1. *V. spizharskyi*; RV lat., $\times 35$ (50). [REYMENT-BOLD.]

?**Voronina** POLENOVA, 1952 [**V. voronensis*]. Possibly equivalent to *Cavellina*, for reversal of POLENOVA's orientation provides close resemblance to *C. mesodevonica* POKORNÝ. *Dev.*, Russia.—FIG. 292,2. **V. voronensis*; 2a,b, ♀ carapace (holotype) L, vent.; 2c,d, ♂ carapace L, vent.; all $\times 45$ (277). [SHAVER.]

?Family **KRAUSELLIDAE** Berdan,
n. fam.

[Materials for this family prepared by JEAN BERDAN, United States Geological Survey]

Asymmetrical, smooth ostracodes, LV distinctly different from RV, overlapping it ventrally and in some forms overreaching

it dorsally; posterior end of either valve produced as spine. Hinge line straight, shorter than greatest length, hinge simple; muscle scar unknown; duplicature absent. *M.Ord.-M.Dev.*

Krausella ULRICH, 1894 [**K. inaequalis*] [= *Rayella* TEICHERT, 1939 (pro *Basslerites* TEICHERT,

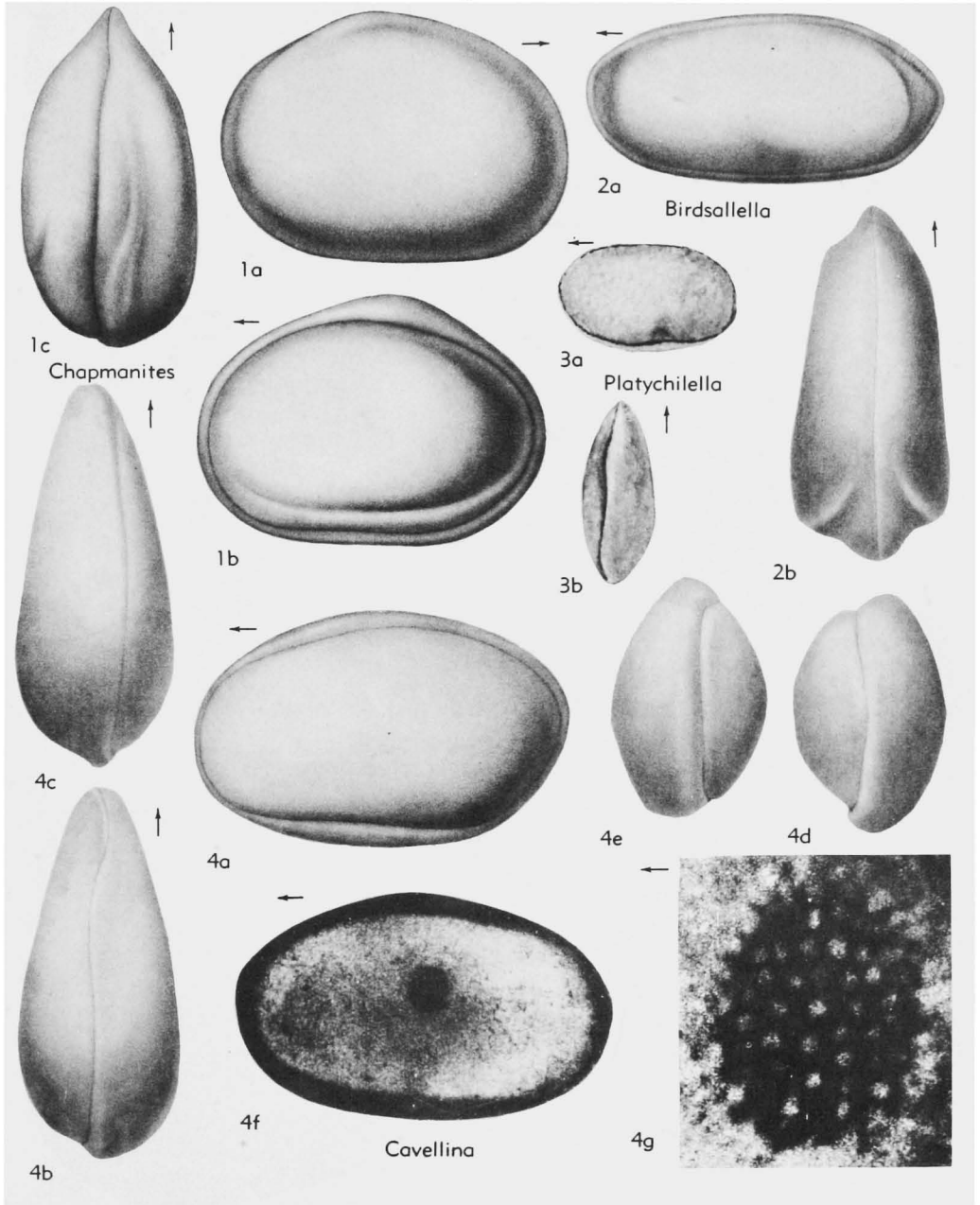


FIG. 289. Cavellinidae (p. Q369-Q370).

1937, non Howe, 1937)]. LV suboval in outline, overlapping RV ventrally, RV being produced posteriorly in short, blunt spine. Hinge line may coincide with dorsal margin, may be entrenched below dorsal margin of both valves, or LV may

overreach RV along hinge line. *M.Ord.*, ?*L.Dev.*, N.Am.-Eu.—Figs. 293,1, 294,1a,b. **K. inaequalis*, *M.Ord.*, USA (Ill.); 293,1a, carapace (holotype) R, ×15; 293,1b, carapace (topotype) vent., ×15; 294,1a, carapace dors., ×20; 294,1b, cross-

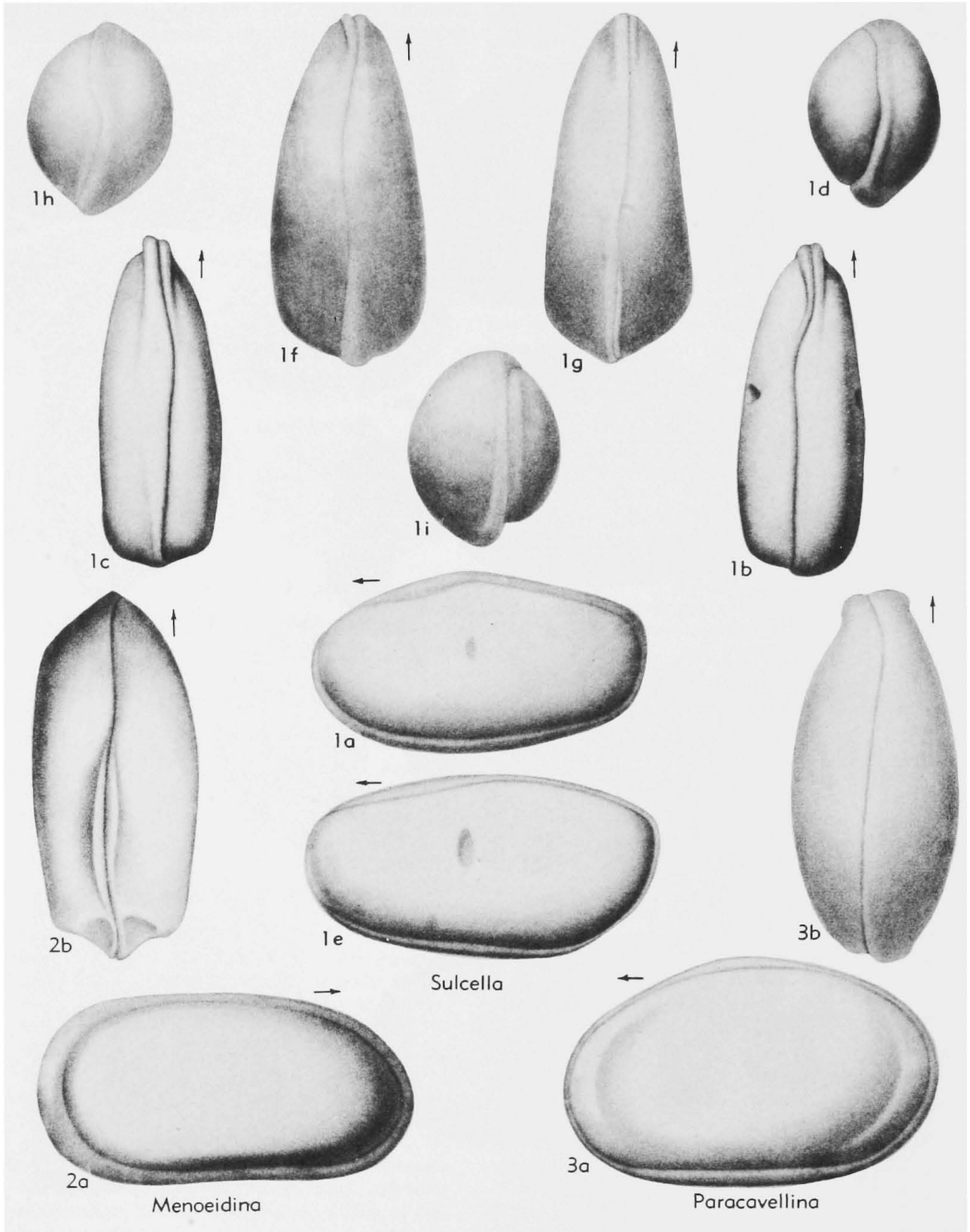


FIG. 290. Cavellinidae (p. Q370).

section showing overlap, $\times 33$ (Berdan, n).—FIG. 294, 2a-c. *K. sp.*, M.Ord. (Edinburg F.), USA (Va.); 2a-c, carapace R, L, vent., $\times 20$ (J. C. Kraft, n).

?*Cooperatia* TOLMACHOFF, 1937 [pro *Cooperia* TOLMACHOFF, 1926 (non RANSOM, 1907)] [**Cooperia granum* TOLMACHOFF, 1926]. Suboval in lateral outline, LV acuminate at rear, rounded acuminate in front; LV overlapping RV all round, forming both anterior and posterior ends of carapace, dorsal margin curved. *M.Dev.*, Arct. N.Am.—FIG. 293, 3. **C. granum* (TOLMACHOFF); 3a,b, carapace L, dors.; 3c, carapace R; all $\times 28$ (370). *Janusella* ROTH, 1929 [**J. bicaratina*]. LV subtriangular, with spine at apex of dorsum, RV like that of *Krausella*. *L.Dev.*, N.Am.—FIG. 293, 2. **J. bicaratina*, USA (Okla.); 2a,b, carapace (topotype) R, dors., $\times 30$ (Berdan, n).

Family PACHYDOMELLIDAE Berdan & Sohn, n. fam.

[Materials for this family prepared by JEAN BERDAN and I. G. SOHN, United States Geological Survey]

Inequivalved, subovate, asymmetrical, medium-sized, with thick shells; tubules normal to shell surface, wider on interior surface, invisible on exterior of well-pre-

served specimens; hinge simple, hinge line straight, shorter than greatest length of carapace. Surface smooth, punctate or rugulose. ?*Ord.*, *Sil.-Dev.*

Pachydomella ULRICH, 1891 [**P. tumida*] [= ?*Senescella* STEWART & HENDRIX, 1945]. Round cross-section, prominent shoulder on larger valve separated from dorsum by deep groove parallel to hinge line. Surface rugulose or smooth. ?*L.Dev.*, *M.Dev.*, C.N.Am.—FIG. 295, 1. **P. tumida*; *M.Dev.*, USA (Ky.); 1a-d, carapace (holotype) R, dors., vent., post.; 1e, LV (topotype) int. showing tubules; all $\times 30$ (Sohn, n).

Tubulibairdia SWARTZ, 1936 [**T. tubulifera*]. Round cross-section, lacking shoulders or well-defined grooves. Surface smooth or finely punctate. ?*Ord.*, *M.Sil.-M.Dev.*, E.N.Am.-C.Eu.—FIG. 295, 2a,b. **T. tubulifera*, *L.Dev.*, Pa.; 2a,b, LV (holotype) artificial cast, lat., dors., $\times 30$.—FIG. 295, 2c,d. *T. punctulata* (ULRICH), *M.Dev.*, USA (Ky.); 2c,d, LV (topotype) post., LV radiograph showing internal tubules (Sohn, n).

Phanassymetria ROTH, 1929 [**P. triserata*] [= *Phanassymetria* NEAVE, 1940 (errore); *Phanassymetria* VAN DEN BOLD, 1946 (errore)]. Angu-

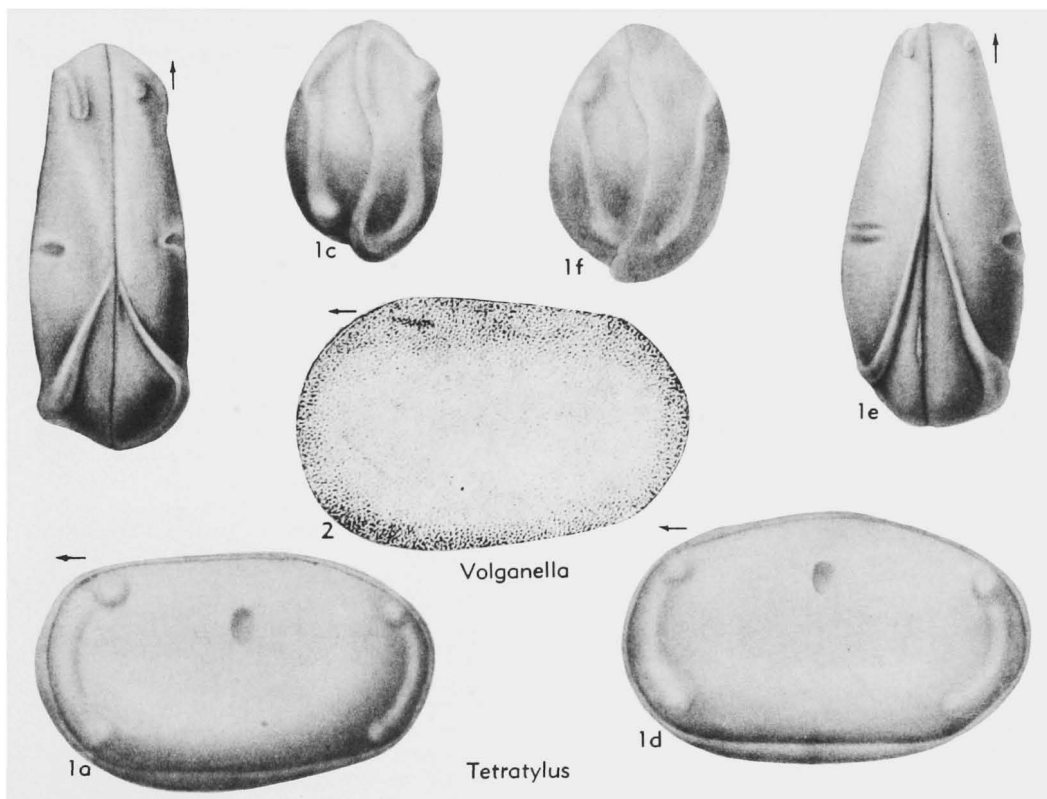


FIG. 291. Cavellinidae (p. Q370).

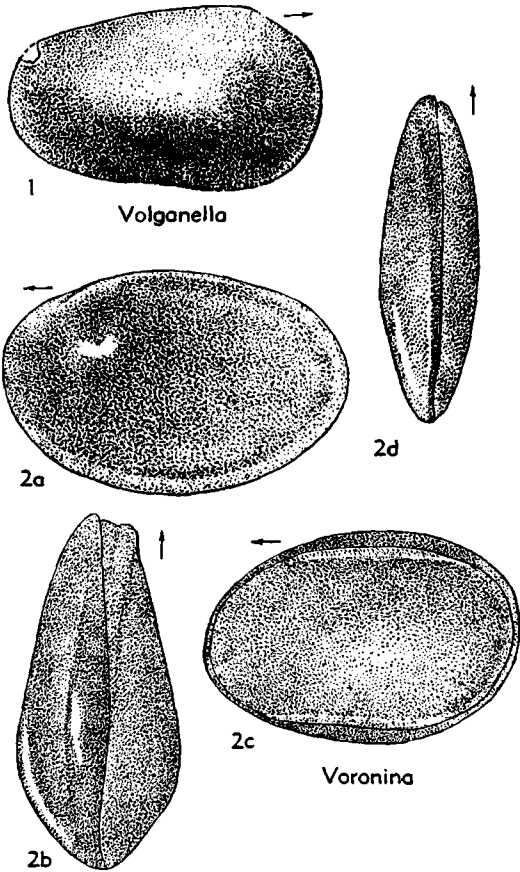


FIG. 292. Cavellinidae (p. Q370).

lar cross section, groove parallel to hinge line may be present on LV. Surface smooth. ?*M.Sil.*, *L.Dev.*, C.N.Am.—FIG. 295,3a-c. **P. triserrata*, *L.Dev.*, USA(Okla.); 3a-c, carapace (holotype) L, dors., ant., $\times 30$ (Sohn, n).—FIG. 295,3d. *P. sp.*, *L.Dev.*, USA(Okla.); LV int., showing tubules, $\times 30$ (335).

Superfamily QUASILLITACEA Coryell & Malkin, 1936

[*nom. transd.* SYLVESTER-BRADLEY, 1956 (ex Quasillitidae CORYELL & MALKIN, 1936)] [Diagnosis and discussion by H. W. SCOTT, University of Illinois]

Ostracodes with a primitive tripartite hinge; mostly straight-backed, some arched; muscle-scar circular, composed of many small secondary scars; inner calcareous lamella absent or poorly developed; surface ornamented. *Dev.-Miss.*, ?*Penn.*

The Quasillitacea are included in the Metacopina because of the presence of an

inner calcareous lamella in some forms, general outline and ornamentation of the carapace, and the tripartite hinge. However, a duplicature has not been demonstrated to exist in all forms and the details of hinge structure are inadequately known in many closely related groups. The muscle-scar pattern is suggestive of that found in Healdiididae, and, in fact, is very unlike anything known in the Podocopina. Hingement, ornamentation, and outline are somewhat similar to such features in the Cytheracea. In the final allocation of the quasillitids, it becomes a question of relative values. Is hingement more important than muscle-scar pattern; or is the muscle-scar pattern of less value than a poorly developed duplicature and general outline?

The stratigraphic distribution of quasillitacean genera of ostracodes is shown graphically in Figure 296.

Family QUASILLITIDAE Coryell & Malkin, 1936 (November)

[=Graphiodactylidae KELLETT, 1936 (December)] [Materials for this family prepared by I. G. SOHN, United States Geological Survey, and L. E. STOVER, Tulsa, Oklahoma]

Straight-hinged, subquadrate ostracodes with well-developed to vestigial marginal flange on end margins. Hinge (merodont) with terminal crenulated teeth and sockets. Surface ornamented by ridges and grooves, usually with posterior spines. Muscle scar round, aggregate consisting of circular spots; inner lamella narrow (KELLETT, 1936), usually not preserved. *Dev.-Miss.*, ?*Penn.*

Quasillites CORYELL & MALKIN, 1936 [**G. obliquus*] [=?*Burlella* CORYELL & BOOTH, 1933; *Spinovina* CORYELL & MALKIN, 1936; ?*Lucasella* STEWART, 1936; *Allostracites* PŘIBYL, 1953 (pro *Paracythere* BASSLER, 1932, non MÜLLER, 1894)]. Surface ornamented with grooves and ridges, posterior spine and ridge in front of posterior margin. *Dev.-Miss.* (*L.Carb.*), ?*Penn.*, N.Am.-Eu.—FIG. 297,1. **Q. obliquus*, *Dev.*, Can.(Ont.); 1a-d, carapace (holotype) R, L, dors., vent., $\times 30$ (Sohn, n).—FIG. 298,2. *Q. sp.* cf. *Q. obliquus*, *Dev.*, Can.(Ont.); RV int. (converted to fluoride, anterodorsal portion broken), $\times 60$ (Sohn, n).

Costatia POLENOVA, 1952 [**C. posneri*]. Differs from *Jenningsina* in vertical trend of ornamental ribs, groove joining dental sockets, and crenulated opposing ridge. Muscle spot not surrounded by rim. *M.Dev.*, Eu.(USSR).—FIG. 299,1a-d. **C. posneri*, 1a,b, carapace (holotype) L, dors.; 1c,d, LV int., RV int.; $\times 60$ (277).—FIG. 299, 1e,f. *C. cavernosa* POLENOVA; 1e,f, carapace (holotype) R, dors., $\times 60$ (277).

?*Eriella* STEWART & HENDRIX, 1945 [**E. robusta*]. Differs from *Jenningsina* in concentric ornamentation, absence of rim around muscle-scar pit, and presence of posteroventral spine. Hinge unknown. *Dev.*, N.Am.—FIG. 300,3. **E. robusta*, USA (Ohio); 3a-d, carapace (holotype) R, L, dors., vent., $\times 70$ (Sohn, n.).

?*Euglyphella* WARTHIN, 1934 [**Strepula sigmoidalis* JONES, 1890]. Small, with high or low bifurcating ridges; accommodation groove above dental sockets. *Dev.*, N.Am.—FIG. 298,1. **E. sigmoidalis*, *Dev.*, N.Y.; 1a, LV (holotype) lat., $\times 60$; 1b, LV lat., $\times 60$ (Sohn, n.).

Graphiadactyllis ROTH, 1929 [**Kirkbya lindahli arkansana* GIRTY, 1910] [= *Graphiodactylus* ROTH, 1929; *Bassleria* HARLTON, 1929]. Like *Quasillites* but differs in presence of well-developed marginal flanges and lack of posterior ridge and spine. *Miss.*, N.Am.—FIG. 300,1. **G. arkansana*, USA (Ark.); 1a, carapace (lectotype) R, $\times 40$; 1b, dors., $\times 30$; 1c,d, RV int., LV int., $\times 40$ (Sohn, n.).

Jenningsina CORYELL & MALKIN, 1936 [**Graphiodactylus catenulatus* VAN PELT, 1933]. Differs from *Quasillites* in muscle-scar pit surrounded by rim,

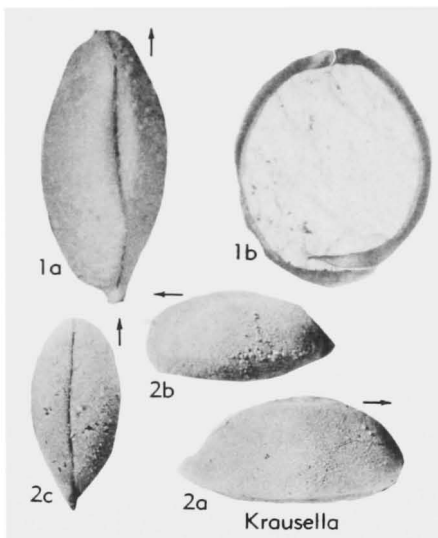


FIG. 294. Krausellidae (p. Q371-Q373).

steep posterior shoulder, and absence of spines. *Dev.*, N.Am.—FIG. 300,2. **J. catenulata*; 2a-d, carapace L, R, dors., vent.; 2e, LV int., $\times 80$ (Stover, n.).

?*Scalptina* STOVER, 1956 [*S. incuda*]. Differs from *Jenningsina* in having reticulations, a smooth central spot and lacking an anteroventral flange. *M. Dev.*, N.Am.

Family BUFINIDAE Sohn & Stover, n. fam.

[Materials for this family prepared by I. G. SOHN, United States Geological Survey, and L. E. STOVER, Tulsa, Oklahoma, and with contribution from R. H. SHAVER, Indiana University and Indiana Geological Survey]

Straight-hinged, subovate, smooth, striate or reticulate, with terminal ridges subconcentric to end margins, and usually beaded end margins. Hinge and muscle scar like *Graphiadactyllis*. Each curved ridge may be reduced to one or more spines, or one ridge may be missing. *Dev.*, ?Penn.

Bufina CORYELL & MALKIN, 1936 [**B. elata* CORYELL & MALKIN (= *?Moorea bicornuta* ULRICH, 1891)] [= *Parabufina* SMITH, 1956]. Well-developed terminal ridges, beaded end margins; posterior ridge may be reduced to 2 thick spines. *Dev.*, E.N.Am.—FIG. 301,1a. **B. elata*, *Dev.*, Can.; carapace (holotype) R, $\times 40$ (Sohn, n.).—FIG. 301,1b-e. *B. ?bicornuta* (ULRICH), *Dev.*, USA (N.Y.); 1b-d, carapaces (1b, holotype) R, L, dors.; 1e, LV int.; all $\times 40$ (Sohn, n., 348).

?*Aurigerites* ROUNDY, 1926 [**A. texanus*]. Posterior ridge horseshoe-shaped, ? no anterior ridge or spines. Based on corroded carapaces so that hinge-ment and muscle scar unknown. *Penn.*, SW.USA.—FIG. 301,2. **A. texanus*, USA (Tex.); 2a,b,

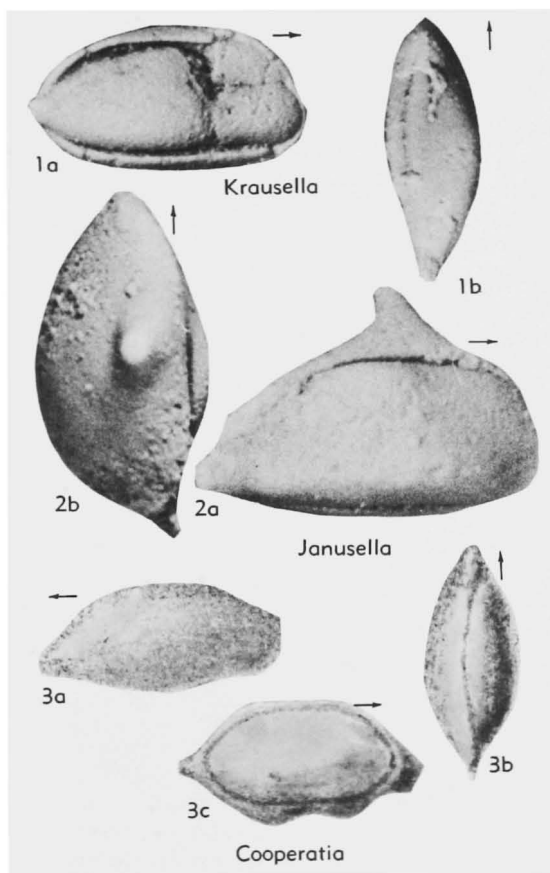


FIG. 293. Krausellidae (p. Q371-Q373).

carapace (lectotype, herein designated) R, dors., ×40 (Sohn, n).

?**Bythocyproidea** STEWART & HENDRIX, 1945 [**B. sanduskyensis*]. Anterior margin narrower than posterior; posterior ridge on RV only, no anterior ridge or spines. Hinge and muscle scar unknown. *M.Dev.*, E.USA.—FIG. 302.1. **B. sanduskyensis*, USA(Ohio); 1a,b, carapace (lectotype, herein designated) R, dors., ×36 (Shaver, n.).—FIG. 301.3. *B. eriensis* STEWART & HENDRIX, USA (Ohio); 3a,b, carapace (lectotype, herein designated) R, dors., ×40 (Sohn, n).

Punctumosea STOVER, 1956 [**Thrallella cristata* SWARTZ & ORIEL, 1948]. Differs from *Bythocyproidea* only in having posterior ridges on both valves. *M.Dev.*, N.Am.—FIG. 302.2. **P. cristata*; 2a,b, carapace R, dors.; 2c, RV int.; all ×25 (348).

Family ROPOLONELLIDAE

Coryell & Malkin, 1936

[Materials for this family prepared by I. G. SOHN, United States Geological Survey]

Straight-hinged, subtriangular, minute, with terminal ridges that may be spinose or single spines. Ridge-and-groove hinge known in one genus; muscle scar and surface ornament unknown. *Dev.*

Ropolonellus VAN PELT, 1933 [**B. papillatus*]. Rows of spinelets near end margins. Hinge line 0.7 or more of greatest length. *Dev.*, E.USA.—303.3. **R. papillatus*, N.Y.; 3a,b, carapace R, dors., ×60; 3c,d, carapace (another specimen) R, dors., ×40 (Sohn, n).

Rudderina CORYELL & MALKIN, 1936 [**R. extensa*]. Single anterior and posterior backwardly-directed

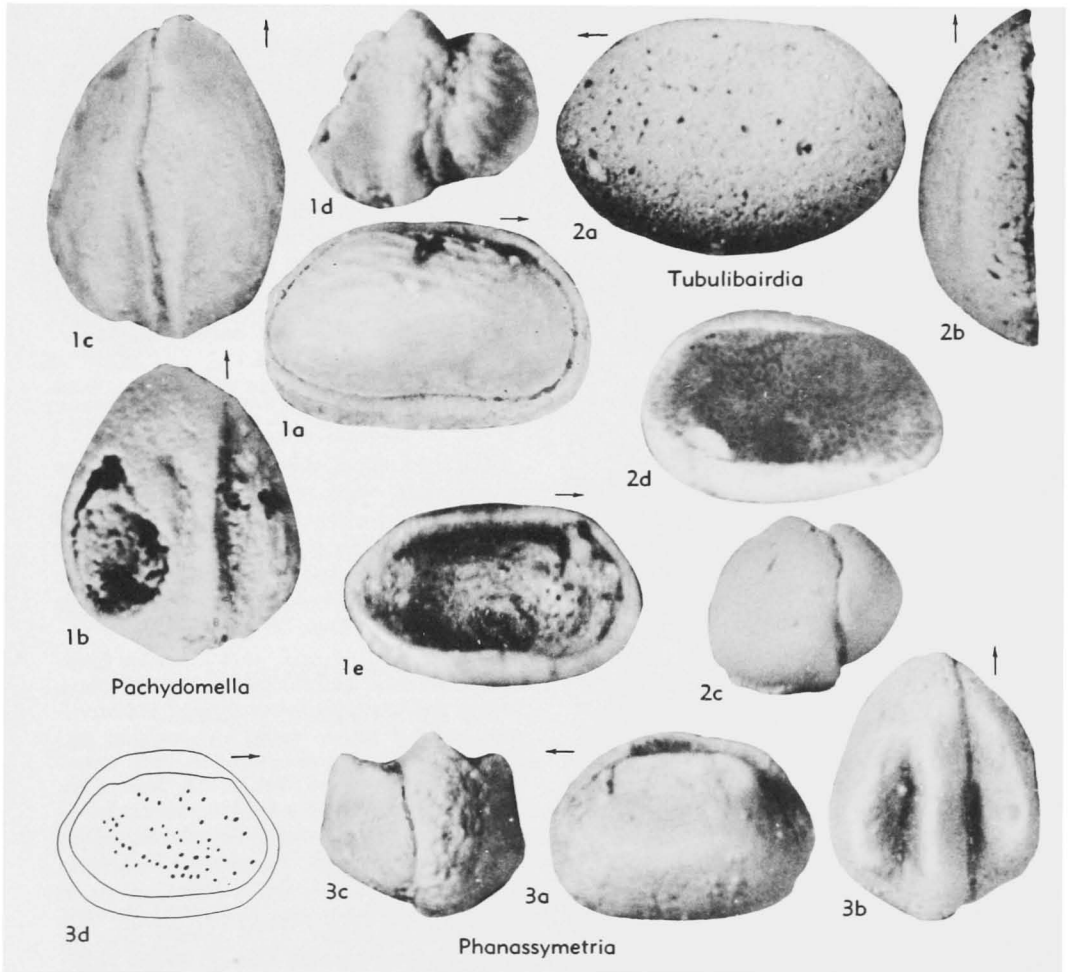


FIG. 295. Pachydromellidae (p. Q373-Q374).

spines extending from valve surface above contact of valves, located in ventral 0.3 of valve height. *M.Dev.*, N.Am.—FIG. 303,1. **R. extensa*, Can.; 1a-d, LV lat., int., dors., vent., ×40 (Sohn, n).

Varicobairdia POKORNÝ, 1950 [**Bairdia* (*Varicobairdia*) *kettneri*]. Terminal ridges with tubercles or spines. Hinge line 0.7 or less of greatest length. *Dev.*, C.Eu.—FIG. 303,2. **V. kettneri*, Czech.; 2a-c, carapace (topotype) R, L, dors., ×40 (Sohn, n).

Family UNCERTAIN

Unicornites POKORNÝ, 1950 [**U. homeomorphus*]. Carapace elongate, subquadrate in lateral view, fusiform in dorsal view, with posteroventral spine on RV, with variable LV over RV overlap, except none or reversed overlap along hinge. [These features suggest Quasillitidae, but the surface is smooth and the hinge, contact margins, and adductor muscle scar are unknown. *M.Dev.*, Eu.—FIG. 298,3. **U. homeomorphus*, Czech.; 3a,b, carapace R, vent., ×25 (275). [SHAVER.]

?Superfamily THLIPSURACEA
Ulrich, 1894

[*nom. transl.* KESLING, herein (*ex* Thlipsuridae ULRICH, 1894)] [Diagnosis by R. V. KESLING, University of Michigan]

Carapace subovate to elongate-subelliptical in lateral view; dorsal border slightly convex, ventral border nearly straight, ends subround; valves unequal, LV overreaching RV and with slight left-over-right overlap; posterior end compressed, rest of lateral surface convex except for pits, furrows, or depressed areas. Insofar as known, hinge consisting of groove in one valve and corresponding ridge in the other (some genera have groove in LV, others in RV); some species with elongate anterior and posterior sockets below ridge; function of sockets unknown, since opposite valve has no elements fitting into them. Details of muscle scars unknown. ?*Ord.*, *Sil.*-*Dev.*

The stratigraphic occurrences of thlipsuracean genera are indicated diagrammatically in Figure 296.

Family THLIPSURIDAE Ulrich, 1894

[Materials for this family prepared by R. V. KESLING, University of Michigan]

Carapace subovate to elongate-subelliptical in lateral view, subelliptical to subquadrate in dorsal view; dorsal border convex; ventral border nearly straight or, in some species, slightly concave; ends round or subround; valves unequal, in known species, LV overreaching RV on all margins, over-

lap slight; lateral surfaces convex except for pits, furrows, or depressed areas and posterior end of carapace, which is characteristically compressed. Hingement, development of ?duplicate, and muscle scars unknown in most genera, hence taxonomic position of the family remains in doubt. ?*Ord.*, *Sil.*-*Dev.*

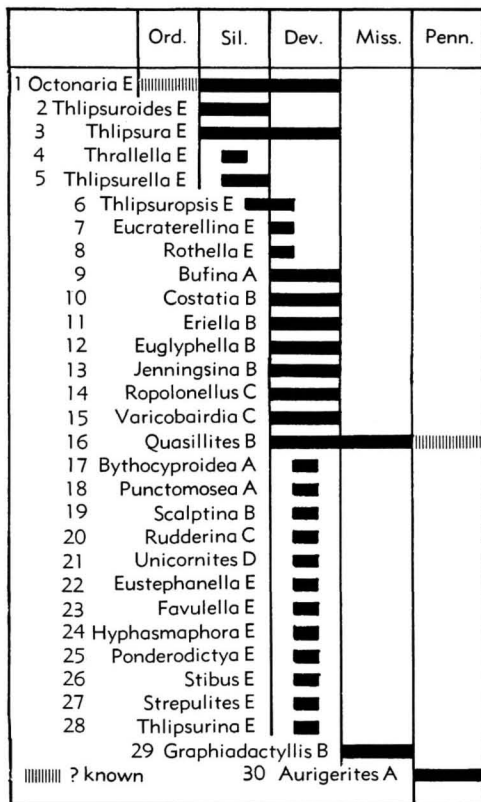


FIG. 296. Stratigraphic distribution of quasillitacean and thlipsuracean ostracode genera (Moore, n). Classification in families is indicated by letter symbols (A—Bufinidae, B—Quasillitidae, C—Ropolonellidae, D—Quasillitacea, family uncertain, E—Thlipsuridae). An alphabetical list of genera furnishes cross reference to the serially arranged numbers given on the diagram.

Generic Names with Index Numbers

- | | |
|---------------------|------------------|
| Aurigerites—30 | Quasillites—16 |
| Bufina—9 | Ropolonellus—14 |
| Bythocyproides—17 | Rothella—8 |
| Costatia—10 | Rudderina—20 |
| Eriella—11 | Scalptina—19 |
| Eucraterellina—7 | Stibus—26 |
| Euglyphella—12 | Strepulites—27 |
| Eustephanella—22 | Thlipsura—3 |
| Favulella—23 | Thlipsurella—5 |
| Graphiadactyllis—29 | Thlipsurina—28 |
| Hyphasmaphora—24 | Thlipsuroides—2 |
| Jenningsina—13 | Thlipsuroopsis—6 |
| Octonaria—1 | Thrallella—4 |
| Ponderodictya—25 | Unicornites—21 |
| Punctomosea—18 | Varicobairdia—15 |

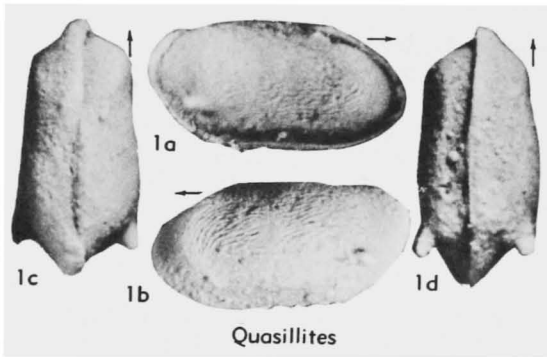


FIG. 297. Quasillitidae (p. Q374).

Thlipsura JONES & HOLL, 1869 [**T. corpulenta*] [= *Craterellina* ULRICH & BASSLER, 1913]. Lateral surfaces strongly convex except for flat depressed area at posterior; contact of flat area with convex part of valve very abrupt; in some species, one or more furrows form re-entrants extending forward into convex part of valve. *Sil.-Dev.*, Eu.-N.Am.—FIG. 304,2d. **T. corpulenta*, *Sil.*, Eng.; carapace R, $\times 50$ (85).—FIG. 304,2a,b. *T. confluens* SWARTZ, *L.Dev.*, Pa.; 2a,b, carapace R, dors., $\times 60$ (297).—FIG. 304,2c. *T. robusta* (ULRICH & BASSLER), *L.Dev.*, Pa.; carapace R, $\times 35$ (74).

Eucraterellina WILSON, 1935 [**E. randolphi*] Like *Thlipsura*, except posterior depression completely surrounded by distinct rim at level of rest of valve to form crater, which in some species has nodes within that rise to general level of valve but in other species has prolongations of lateral surface into it, so that crater becomes deep C-shaped furrow. *L.Dev.*, N.Am.—FIG. 305,1a. **E. randolphi*, Helderberg, Tenn.; carapace L, $\times 50$ (403).—FIG. 305,1b. *E. oblonga* (ULRICH & BASSLER), USA (Pa.); carapace L, $\times 50$ (74).—FIG. 305,1c. *E. crateriformis* SWARTZ, USA (Pa.); carapace R, $\times 50$ (74).

Eustephanella SWARTZ & SWAIN, 1942 [**Eustephanus catastephanes* SWARTZ & SWAIN, 1941] [= *Eustephanus* SWARTZ & SWAIN, 1941 (non REICHENBACH, 1849)]. Surface of each valve broadly convex, with pits tending to lie in curving furrows that more or less parallel dorsal border, much as in *Octonaria*; posterior slope concave; crest at summit of this slope bearing 2 posteriorly directed short spines. [Differs from *Octonaria* in lacking a marginal flange, and from *Stibus* in being more elongate and having pits more evenly distributed and in grooves.] *M.Dev.*, N.Am.—FIG. 304,3. **E. catastephanes* (SWARTZ & SWAIN), Onond., USA (Pa.); LV lat., $\times 40$ (76).

Favulella SWARTZ & SWAIN, 1941 [**Bythocypris favulosa* JONES, 1889]. Submarginal ridge in each valve, indistinct dorsally in some species, setting off marginal flange, which is low and indistinct ventrally in both valves and dorsally also in RV;

posterior part of submarginal ridge extended into 2 well-developed posteriorly-directed spines; area enclosed by ridge honeycombed with coarse, close-set puncta of various shapes and sizes, except on subcentral smooth spot. Hinge of LV with main longitudinal groove, long anterior accessory groove somewhat oblique to main groove, and possibly short posterior accessory groove; these grooves receive slightly modified dorsal edge of RV; LV apparently overlapping RV except at ends. [This genus appears closely related to *Ponderodictya*.] *M.Dev.*, N.Am.—FIG. 306,6. **F. favulosa*, Onond., USA (Pa.); 6a, juv. LV ext., $\times 35$; 6b, RV ext., $\times 35$ (76).

Hyphasmaphora VAN PELT, 1933 [**H. textiliger*]. Each valve divided into sloping smooth marginal area and central reticulate area; conspicuous circular pit in center of each valve. Posterior part of marginal area sloping sharply away from reticulate area to posterior border; LV hinge with long groove; narrow flange along border of each end of valve. *M.Dev.*, N.Am.—FIG. 304,4. **H. textiliger*, Hamilton, USA (Mich.); LV lat., $\times 70$ (400).

Octonaria JONES, 1887 [**O. octoformis*]. Lateral surface of each valve divisible into large, nearly flat central area and convex marginal area extending out to free edge and hinge line; central part of flat area marked by pits or pitlike depressions, in some species large and few, in others small and numerous; edge of flat area forms rim around pitted area; LV in some species has fewer pits than RV, and in one species has none. ?*Ord.*, *Sil.-Dev.*, Eu.-N.Am.—FIG. 304,1d. **O. octoformis*, *Sil.*, Eng.; RV lat., $\times 40$ (185).—FIG. 304,1a-c. *O. laevilatata* KESLING & KILGORE, *M.Dev.* (Hamilton), USA (Mich.); 1a-c, carapace L, R, dors., $\times 50$ (209).—FIG. 307,1. *O. bifurcata* STOVER, *M.Dev.* (Hamilton), USA (N.Y.); 1a,b, carapace R, L, $\times 30$ (348).

Ponderodictya CORYELL & MALKIN, 1936 [**Cytherella*(?) *bispinulatus* STEWART, 1927 (= *Leperditia punctulifera* HALL, 1860)] [= *Hamiltonella* STEWART, 1936]. Dorsal margin sinuous; surface closely punctate; carapace swollen posteriorly; some specimens ornamented with one or more spines on posterior and rarely on anterior; crescentic swollen ridge on anterior; intraspecific variation very great; LV overlapping selvage of RV along venter. Hinge hemimerodont; muscle scar an oval aggregate clump, marked on outer surface by lack of puncta. [Included in *Thlipsuridae* with doubt; may be related to *Quasillitidae* (Metacopina) or even *Healdiidae* (Metacopina).] *M.Dev.*, N.Am.—FIG. 306,3. **P. punctulifera*, *M.Dev.* (Hamilton), USA (Mich.), Ont.-N.Y.; 3a,b, RV lat., vent.; 3c, hinge (RV int.), all $\times 35$; 3d, muscle scar (RV int.), $\times 100$ (82).

Rothella WILSON, 1935 [**Dizygopleura recta* ROTH, 1929]. Carapace subrectangular in lateral and

dorsal views; dorsal border nearly straight or slightly convex; greatest length through middle of valve, greatest height posterior; surface with anterior and posterior craters, which are vertically elongate in some species, round in others; some species with rims around craters, others with ridge or lip at one side of crater, and some with no raised structures. *L.Dev.*, N.Am.—FIG. 305,2. **R. recta*, Helderberg., USA (Tenn.); 2*a,b*, carapace R, post., $\times 40$ (297).

Stibus SWARTZ & SWAIN, 1941 [**S. kothornostibus*]. Surface of each valve convex, with steep, concave posterior slope; crest at top of slope bearing 2 small, posteriorly directed spines, as in *Eustephanela*; one or more furrows, in some species only a row of pits, near to and approximately parallel with anterior and anterodorsal borders; in some species posterior part of each valve with numerous small pits but in others this part is smooth. *M.Dev.*, N.Am.—FIG. 306,2. **S. kothornostibus*, Onond., USA (Pa.-W.Va.); LV lat., $\times 60$ (76).

Streplulites CORYELL & MALKIN, 1936 [**S. mooki*] [= *Octonariella* BASSLER, 1941]. Like *Octonaria* but with more strongly developed narrow ridges, somewhat parallel to borders; many species with short, low ridges connected to main ridges and surrounding pitlike areas. *Dev.*, N.Am.—FIG. 305,4*a*. **S. mooki*, M.Dev. (Hamilton); Can. (Ont.); carapace R, $\times 50$ (22).—FIG. 305,4*b*. *S. quadricostata* (VAN PELT), M.Dev. (Hamilton), USA (Mich.); LV lat., $\times 60$ (391).—FIG. 305,4*c*. *S. crescentiformis* (VAN PELT), M.Dev. (Hamilton), USA (Mich.); carapace R, $\times 70$ (391).—FIG. 307,2. *S. divectus* STOVER, M.Dev. (Hamilton), USA (N.Y.); 2*a,b*, carapace L, R, $\times 25$ (348).

Thlipsurella SWARTZ, 1932 [**T. ellipsolepta*]. Like *Thlipsura* except for depressed areas; distinct ridge rising from posterior border; 2 sublongitudinal furrows in rear part of each valve, separated from posterior border by ridge; short subvertical furrow near middle of valve or shallow pit in anterior half, or both. *M.Sil.-U.Sil.*, Eu.; *L.Dev.*, N.Am.—FIG. 305,3. **T. ellipsolepta*, *L.Dev.*, N.Am.; 3*a,b*, LV lat., dors., $\times 60$ (74).

Thlipsurina BASSLER, 1941 [non KUMMEROW, 1953] [**T. elongata*]. Like *Thlipsura*, but with broad, shallow, transverse depression near middle of each valve; narrow concave area forming posterior slope, bounded anteriorly by distinct ridge, immediately in front of which is elongate, nearly vertical sulcus widest at bottom, extending from dorsal border almost to ventral. *M.Dev.*, N.Am.—FIG. 306,5. **T. elongata*, Onond., USA (Tenn.); 5*a,b*, LV lat., RV lat., $\times 40$ (4).

Thlipsuroides MORRIS & HILL, 1951 [**T. thlipsuroides*]. Overlap confined to narrow area; each valve with 2 long, subparallel, nearly longitudinal grooves (in type species with pits along bottom); in dorsal view, posterior slope of each valve nearly flat, set at angle of about 45° to hinge.

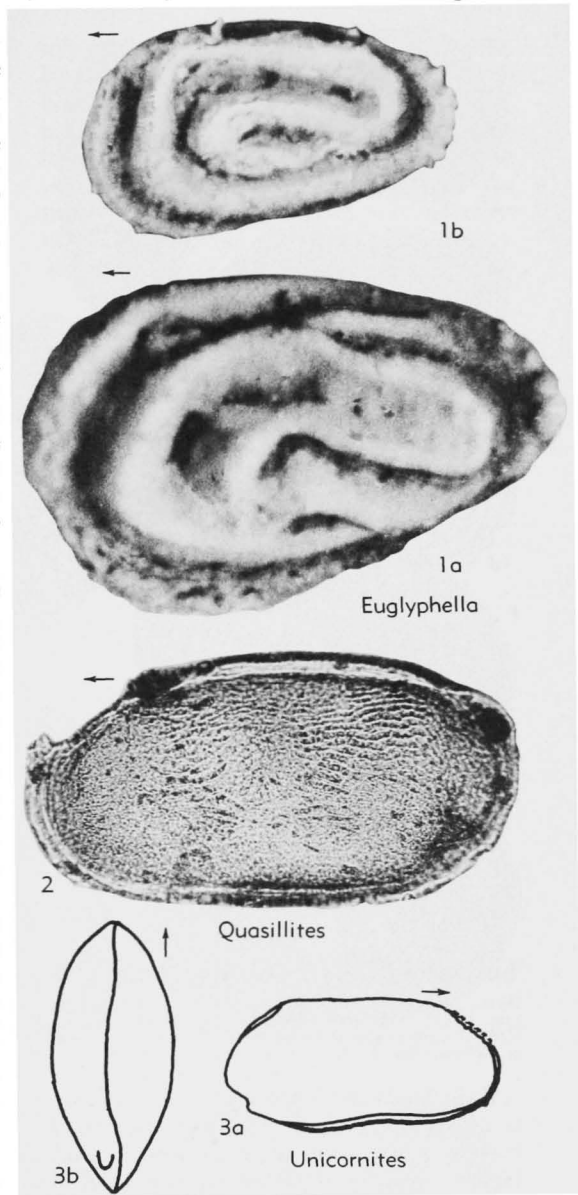


FIG. 298. Quasillitidae, Family Uncertain (p. Q374-Q377).

Sil., N.Am.—FIG. 306,1. **T. thlipsuroides*, *M.Sil.*, USA (Tenn.); 1*a,b*, carapace R, dors., $\times 25$ (253).

Thlipsuropsis SWARTZ & WHITMORE, 1956 [**T. diploglyptulis*]. Markedly inequivalved, LV overlapping RV; LV with posterior depressed area confluent with anteriorly projecting furrows, RV lacking depressed area; narrow furrow parallel to anterodorsal border. *U.Sil.-L.Dev.*, N.Am.—FIG.

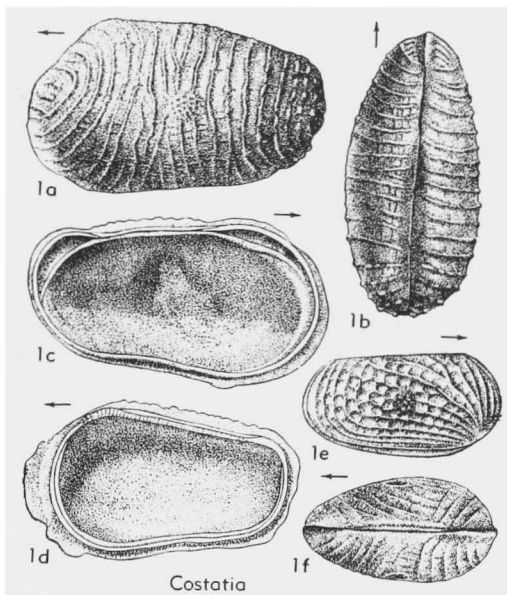


FIG. 299. Quasillitidae (p. Q374).

307,3. **T. diploglyptulis*, U.Sil., USA (N.Y.); 3a,b, carapace L, R, $\times 45$ (78).

Thrallella STEWART & HENDRIX, 1945 [**T. phaseolina*]. Small; crescentic ridge in posterior part of each valve, subparallel to posterior border; shallow pits in area immediately in front of crescentic ridge, rear row of pits regularly spaced along concave edge of ridge. *M.Dev.*, N.Am.—FIG. 306, f. **T. phaseolina*, Hamilton., USA (Ohio); RV lat., $\times 70$ (347).

Suborder PLATYCOPINA Sars, 1866

[*nom. correct.* SYLVESTER-BRADLEY, herein (*pro* Platycopa Sars, 1866)] [Type genus: *Cytherella* JONES, 1859; SD Sars, 1866] [Diagnosis and discussion by H. W. Scott, University of Illinois, and P. C. SYLVESTER-BRADLEY, University of Leicester]

Podocopida in which muscle-scar pattern is a biserial aggregate of small scars. Dorsal margin convex, ends round; valves unequal, larger (typically RV) overlapping smaller; uninterrupted contact furrow in larger RV receiving selvage edge of smaller valve; duplicature narrow or wanting; dimorphism by posterior swelling. *Jur.-Rec.*

Sars based definition of this assemblage mainly on characters of the appendages, as indicated by his description, which follows:

Lower antennae [antennae proper] biramous, equal, similar to the feet of Copepoda, the basal part biarticulate and geniculate, with numerous setae attached to both margins. Upper antennae [antennules] very large and strong, multiarticulate, geniculate at the base, with short spines. Mandibles

small and feeble, with a large palp. There are only three pairs of thoracic limbs, all maxilliform. Mandibular palp and first maxillae [maxillulae] are provided with a pair of combs with large bristles attached to the inner surfaces. First and second maxillae [maxillulae and third post-oral limbs] provided with large branchial plates; the third maxillae [fourth post-oral limb] rudimentary in the female, in the sea they are evolute and prehensile. The postabdominal rami [furcal rami] are small and narrow, distinctly separate, spinose at their apices (65, translated by SCOTT and WAINWRIGHT).

The Platycopina are a suborder composed of only one family. The lack of a well-defined inner calcareous lamella separates them from the Podocopina; lack of lobes, sulci, and ventral frills and the convex outline of the back in side view distinguish them from most palaeocopids, the uninterrupted contact furrow separating them from all other ostracodes, and RV-over-LV overlap further differentiating them from most Metacopina.

They are readily separated from the thlip-surids by absence of pits and furrows and from the Healdiacea by their RV-over-LV overlap and unmodified hinge. The hinges of the Healdiacea are better defined than those in the cytherellids.

Among the Cytherellidae are two very common subgenera that possess very different external characteristics; these are *Cytherella* (*Cytherella*), with a smooth unornamented carapace, and *C. (Cytherelloidea)*, with a carapace modified by ribs and in some species pits, tubercles, and a muscle-scar depression. Dimorphism in the family is recognized by the posterior swelling of the female carapace. In *Cytherelloidea* dimorphism may be expressed by greater posterior tumidity of the female and a modification of the ribs. In some females the ribs are more pronounced than in males, in others more subdued.

The Cavellinidae are very similar to the Cytherellidae and at one time were considered to be the same. They differ in muscle-scar structure, the cavellinids possessing numerous small secondary scars set in a circular to ovate cluster and the cytherellids possessing a double row of about 10 or more individual scars. In all other respects the cavellinids are like *Cytherella*; in fact, they are so similar that once they were considered merely to be dimorphs. The family has been questionably reported from the Silurian but is essentially a Devonian-to-Middle Per-

mian group, with greatest development in the Pennsylvanian, whereas the cytherellids range from Jurassic to Recent.

Cavellina is considered to be the central stock from which the cytherellids developed. The many Paleozoic forms which have been called *Cytherella* probably should be transferred to *Cavellina*. If we had no knowledge of the muscle scars we would be forced to

rely on the single factor of direction of overlap in separating cytherellids from cavellinids. Though the muscle scars are distinct, biserial, and few in *Cytherella*, and irregularly arranged and many in *Cavellina*, we cannot overlook the fact that one of the trends in ostracode evolution was reduction in the number of adductor muscle fibers. The cytherellids appear to be a direct de-

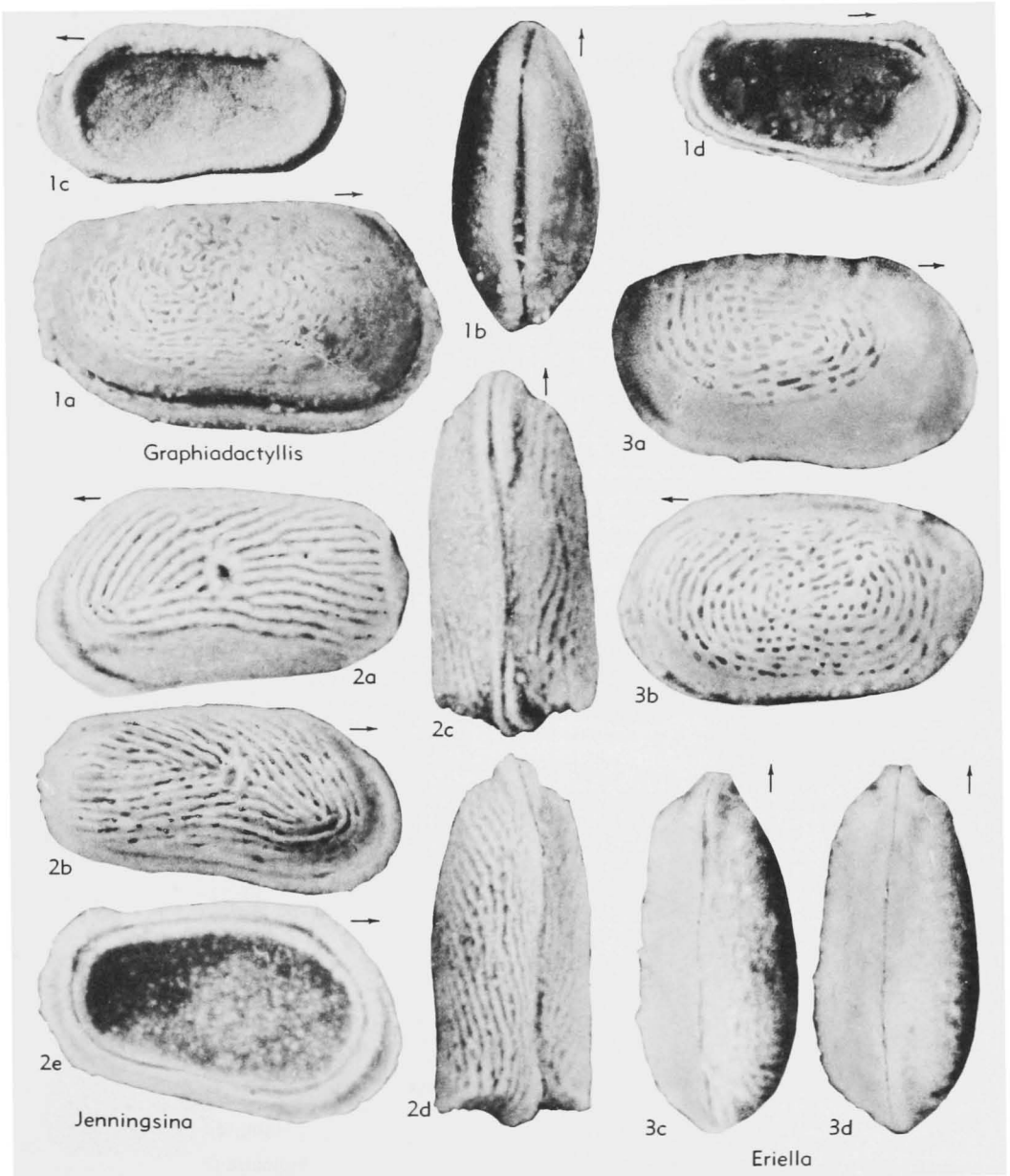


FIG. 300. Quasillitidae (p. Q375).

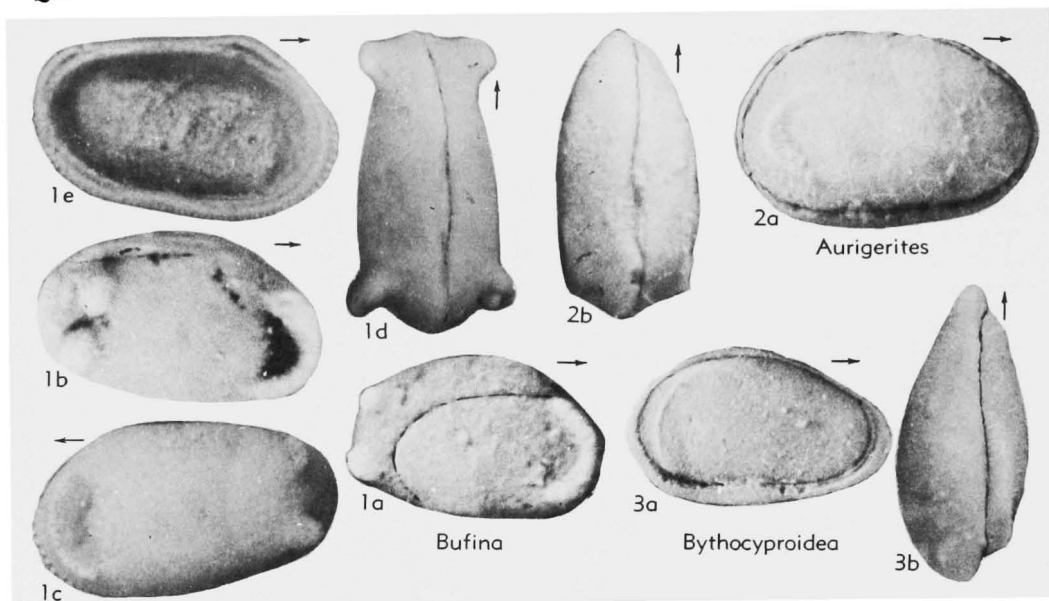


FIG. 301. Bufinidae (p. Q375-Q376).

velopment from the cavellinids by the simple process of reducing the number of muscle scars. During this reduction, the duplication, contact groove, and general outline of the carapace remained unchanged, although the dorsum tended to become straighter in the cytherellids. The only basis for separating cavellinids from cytherellids is difference in muscle-scar patterns.

The stratigraphic distribution of platycopine genera (and subgenera) is shown diagrammatically in Figure 308.

Family CYTHERELLIDAE Sars, 1866

[Materials for this family prepared by R. A. REYMENT, University of Stockholm]

Carapace mostly oval in side view, anterior and posterior ends generally subequal in height; RV typically larger than LV. Marginal pore canals lacking or (as in *Cytherella*) represented by short simple canals of normal type; contact furrow entire, hinge undifferentiated; selvage of smaller valve forming valve edge; Mesozoic and Cenozoic (including Recent) representatives with adductor-muscle field composed of 2 curved parallel rows, each with 5 to 9 elongated spots. Dimorphic, with brood section in posterior part of carapace. *Jur.-Rec.*

Cytherella JONES, 1849 [**Cytherina ovata* ROEMER, 1840; SD ULRICH, 1894] [= *Morrowina* LOETTERLE, 1937]. Carapace small to moderately large, thick-shelled; surface smooth or ornamented with

pits or ribs; RV larger than LV, its margin being grooved all around; shape and ornament of opposite valves commonly different. LV hinge with dorsal ridge, RV with corresponding furrow; no marginal pore canals, although normal canals in marginal area may resemble them. *Jur.-Rec.*, world-wide.

C. (*Cytherella*). Surface smooth to faintly ribbed concentrically, posterior weakly denticulated in some species, carapace of Recent forms milky white; egg-shaped in side view; anterior end rather compressed, rear end more inflated, especially in females, most species having equally rounded ends but some with slightly sharper rear ends; Recent species with hairs, particularly on posterior part of valves. Adductor-muscle fields with 2 usually slightly bent rows, each with 5 to 9 longitudinal to subrectangular spots, muscle field commonly on slight inner elevation that appears externally as a depression. Sexual dimorphism prominent, females being larger than

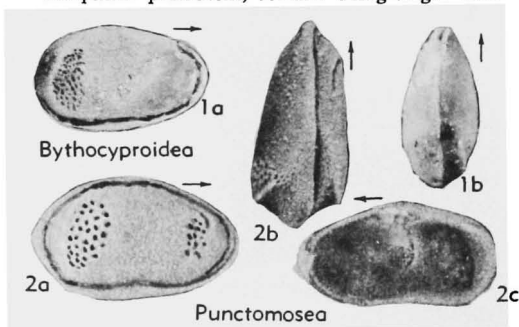


FIG. 302. Bufinidae (p. Q376).

males, with internal swellings that may divide valves into anterior and posterior parts, but such ridge being poorly developed or absent in males; extremities of Recent species greatly specialized. *Jur.-Rec.*, cosmop.—FIG. 309, *I*. **C. (C.) abyssorum* Sars, Neog., Br. Is.; *1a,b*, ♀ carapace L, dors.; *1c,d*, ♂ carapace R, dors.; all $\times 38$ (312).

C. (Cytherelloidea) ALEXANDER, 1929 [**Cytherella williamsoniana* JONES, 1849]. Differs from *C. (Cytherella)* in generally stronger ornament, especially ribbing, and generally more compressed shell form, but because variation within a single species may range from strongly ornamented to entirely smooth, distinction from *C. (Cytherella)* is provisional (97); forms regarded as females have 2 round impressions on inner surface. *Jur.-Rec.*, cosmop.—FIG. 310, *2a,b*. **C. (C.) williamsoniana* JONES, L.Cret., Eng.; *2a,b*, RV lat., LV lat., $\times 50$ (328).—FIG. 310, *2c*. *C. (C.) ouachitensis* HOWE, U.Eoc. (Jackson.), USA (La.); LV lat., $\times 50$ (328).—FIG. 310, *2d*. *C. (C.) alabamensis* HOWE, Oligo., USA (Ala.); LV lat., $\times 50$ (328).

C. (Staringia) VAN VEEN, 1936 [**Terquemia falcoburgensis*; SD HOWE & LAURENICH, 1958] [= *Terquemia* VAN VEEN, 1932 (non TATE, 1868)]. Thick-shelled, with smooth surface, carapace tending to be drawn out strongly; forms regarded as females commonly with single posterior impression in each valve and more inflated posteriorly; ventral and dorsal margins usually but not invariably weakly convex, showing tendency to be almost straight. *U.Cret. (Maastricht.)*, Holl.—FIG. 310, *1*. **S. falcoburgensis*; *1a-e*, ♀

carapace R, L, dors., vent., post.; *1f,g*, ♂ carapace R, dors.; *1h*, ♂ RV int.; all $\times 25$ (395).

?*Ankumia* VAN VEEN, 1932 [**A. bosqueti*]. Carapace thick-walled, RV larger than LV, ventral margin strongly concave; surface with smooth concentric rings. Hinge with anterior and posterior teeth. Sexual dimorphism present. *U.Cret.*, Eu. (Holl.).—FIG. 310, *3*. **A. bosqueti*; *3a-e*, ♀ RV lat., vent., dors., ant., int., $\times 25$ (395).

?*Platella* CORYELL & FIELDS, 1937 [**P. gatunensis*]. Subquadrate, thin-shelled, ornamented with numerous pits and a median, subdorsal, shallow sulcus; RV larger than LV, overlapping it along dorsal and ventral margins, receiving LV in shallow groove. Muscle scars reported to form irregular groups on interior surface of sulcus. *Mio.*, Panama.—FIG. 310, *4*. **P. gatunensis*; *4a,b*, LV lat., dors., $\times 65$ (126).

PODOCOPIDA, Suborder and Family UNCERTAIN

[Materials for this section prepared by authors as severally recorded at end of generic descriptions]

Abursus LORANGER, 1954 [**A. beaumontensis*]. Apparently differing from *Quasillites* and *Graphidactyllis* only in having surface reticulated in polygonal pattern. *U.Dev.*, Alba.—FIG. 310A, *1*. **A. beaumontensis*; *1a,b*, carapace R, dors., $\times 30$ (232). [SHAVER.]

?*Altha* NECKAJA, 1958 [**A. modesta*]. Nonsulcate, elongate and straight-backed, somewhat preplete, ventral margin mainly parallel to dorsal, RV overlapping LV along entire free margin, left overlap generally along anterior part of dorsal

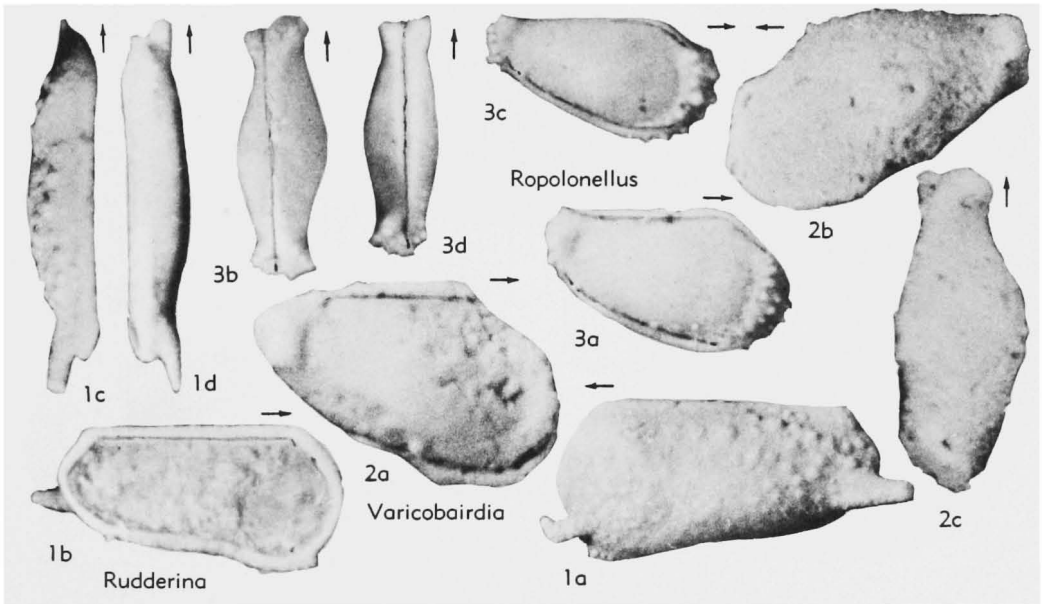


FIG. 303. Ropolonellidae (p. Q376-Q377).

margin; posterior part of hinge in depression; ad-ventral structures and interior cavellinoid partition lacking. Dimorphism not observed. Surface smooth or perforate. *L.Sil.-M.Sil.*, NW.Russia.—FIG. 143,1. **A. modesta*, Llandov., Lithuania, 1a-d, carapace (holotype), R lat., L lat., dors., ant., $\times 35$; 1e, juv. L lat., $\times 35$ (264). [HESSLAND.] [Earlier assigned questionably to Bairdiidae but emphatically rejected from this family by SHAVER.]

Anchistrocheles BRADY & NORMAN, 1889 [**A. fumata* BRADY, 1890]. Reniform in lateral view, very

narrow in dorsal view; diagnosis based on the arrangement of setae on thoracic legs and furcae and on mandibular and maxillar parts which are more slender than in *Bairdia* and *Bythocypris*. [Marine; assigned by BRADY to both *Bairdiidae* and *Cyprididae*.] *Rec.*, C.Pac.(Samoa-Fiji)-Antarctica-?N.Atl.-?Ceylon.—FIG. 310A,2. *A. ?acerosa* (BRADY), N.Atl., 2a,b, carapace R, dors., $\times 40$ (108). [SHAVER.]

Artifactella CORYELL & BOOTH, 1933 [**A. tomahawki*]. Small, egg-shaped in lateral view; shal-

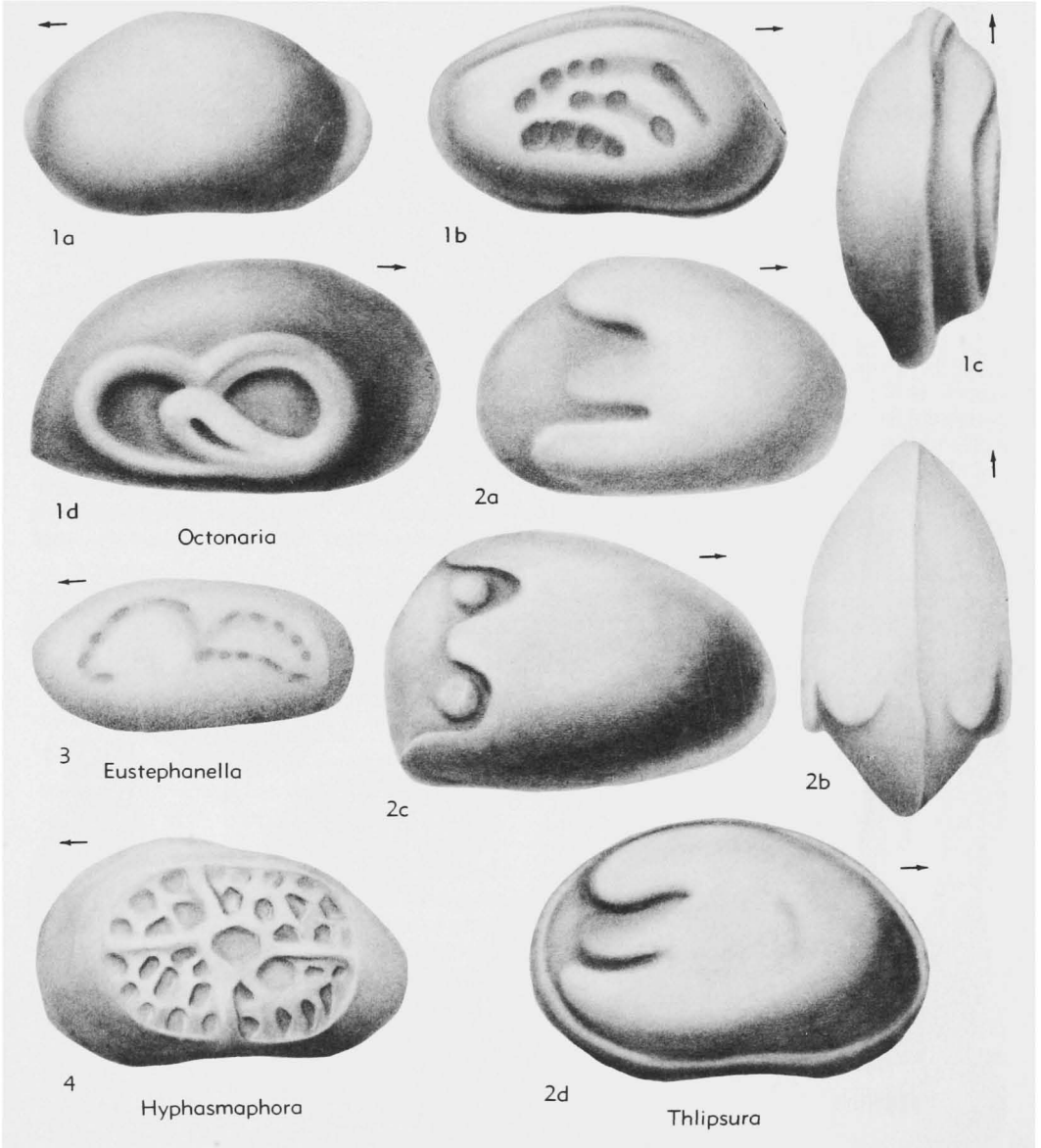


FIG. 304. Thlipsuridae (p. Q378).

low, vertically aligned depression near center of valves; LV larger than RV, with sinuate line of commissure; surface smooth. [Probably belongs in Cypridacea, but hinge, contact marginal structures, and adductor muscle scar unknown.] *U.Penn.*, N.Am.—FIG. 310A,11. **A. tomahawki*, USA (Tex.); 11a,b, carapace R, dors., $\times 60$ (124). [SHAVER.]

Bosquetia BRADY, CROSSKEY, & ROBERTSON, 1874 [**B. robusta*]. Rather regularly ovate in side view,

with greatest height slightly in front of mid-length; margins well rounded, anterior broadly, posterior more narrowly, dorsal somewhat flattened in middle, ventral strongly convex; ovoid, in dorsal view widest near mid-point; surface smooth. Muscle field, hinge, marginal structures and dimorphism unknown. *Pleist.*, NW.Eu.(Scot.).—FIG. 310A,4. **B. robusta*; 4a-d, carapace L, dors., vent., ant., $\times 27$ (14). [REYMENT.]

Daleiella BOUČEK, 1937 [**Cythere corbuloides*

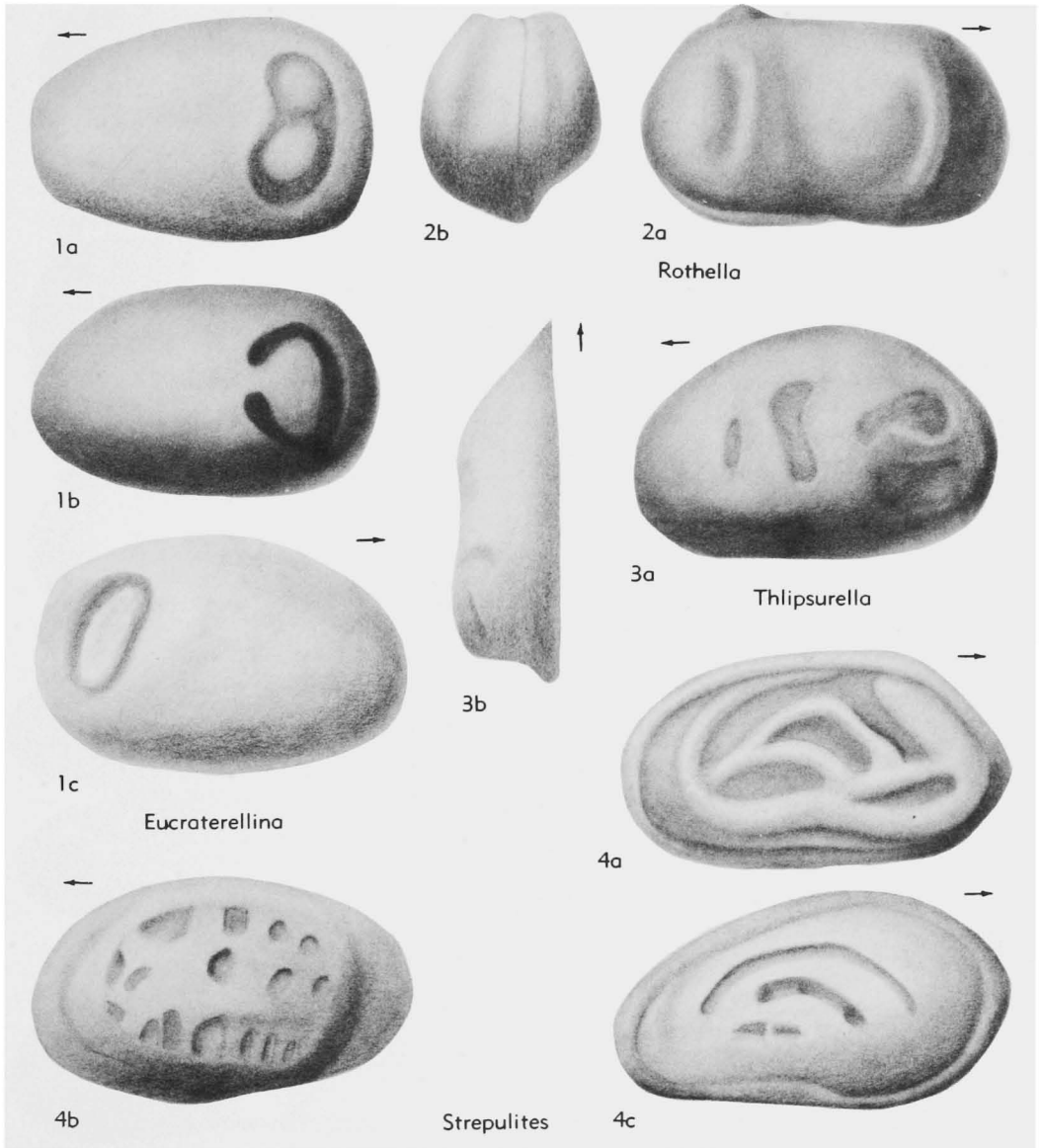


FIG. 305. Thlipsuridae (p. Q378-Q379).

JONES & HOLL, 1869]. Subtriangular in dorsal and lateral views, relatively very tall and extremely tumid; LV commonly larger than RV, with extreme dorsal overreach that differentiates genus from *Microcheilinella*; surface smooth. Hinge, contact marginal structures and adductor muscle scar unknown. *M.Sil.*, Eu.—FIG. 310A,5. **D. corbuloides* (JONES & HOLL); 5a,b, carapace R, dors., ×20 (188). [SHAVER.]

Ellesmerina GLEBOVSKAJA & ZASPELOVA in GLEBOV-

SKAJA, 1948 [**E. incognita*] [= *Mossolovella* EGOROV, 1953 (obj.)]. Apparently related to *Bairdiocypris*, having mostly similar shape and contact-marginal structures, but differing in its more complex hingement with additional ridge and groove in each valve (278). [According to GLEBOVSKAJA & ZASPELOVA in POLENOVA (1953), *Ellesmerina* and designation of *E. incognita* as its type species was published in 1948 (not seen by SHAVER). EGOROV (145) mistakenly concluded that *E. incognita* had

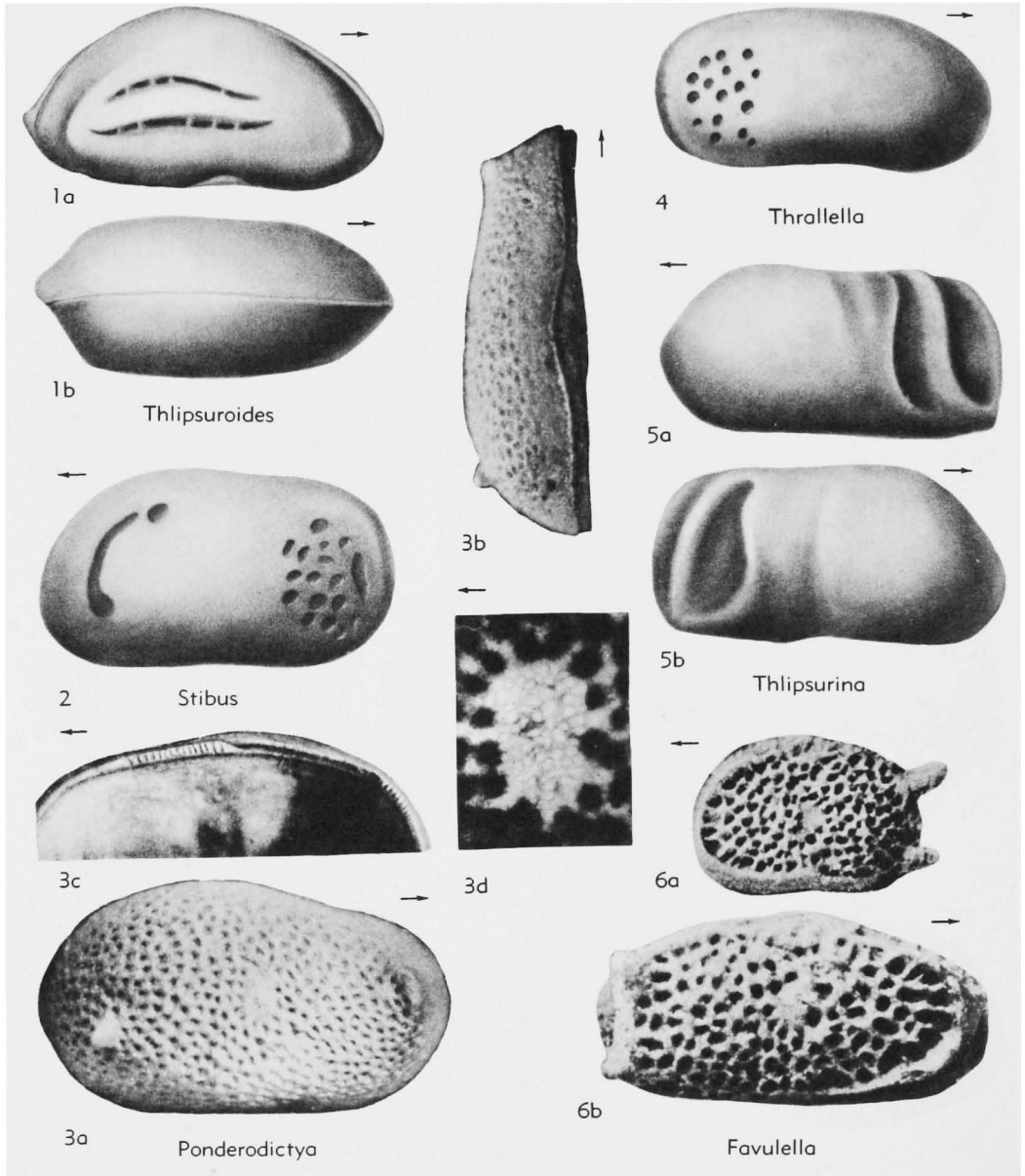


FIG. 306. Thlipsuridae (p. Q378-Q380).

been assigned by its authors to *Ellesmeria* TOLMACHOFF and therefore introduced for it the new name *Mossolovella*.] *Dev.*, Russia.—FIG. 310A,6. **E. incognita*; 6a,b, carapace R, vent.; 6c, LV int.; all $\times 50$ (145). [SHAVER.]

Healdiacypris BRADFIELD, 1935 [**H. perplexa*]. Nearly like *Bairdia* in shape, but with reversal of overlap and overreach along short depressed hinge; contact marginal structures including calcified inner lamella; adductor muscle scar unknown. *M. Penn.*, N.Am.(Okla.-Ill.).—FIG. 310A,8. **H. perplexa*, Okla.; 8a,b, carapace R, dors., $\times 55$ (11).—FIG. 310B,4. *H. acuminata* COOPER, Ill.; 4a, long. sec., LV at left; 4b, transv. sec. through hinge, LV at left; both $\times 60$ (Shaver, n). [SHAVER.]

Macrocyprides SPIVEY, 1939 [**M. clermontensis*]. Short, high, compressed; dorsum strongly arched, highest postmedially, venter nearly straight, front end narrowly rounded, extended below, posterior margin much broader; RV overlapping LV except posteroventrally where LV may slightly overlap; surface smooth. [Marine.] *M.Ord.-U.Ord.*, N.Am.—FIG. 310A,9. **M. clermontensis*, U.Ord. (Maquoketa F.), USA(Minn.); 9a,b, RV lat., int., $\times 50$ (J. R. Cornell, n). [SWAIN.]

Microcheilinella GEIS, 1933 [pro *Microcheilus* GEIS, 1932 (non KITTL, 1894)] [**Microcheilus distortus* GEIS, 1932]. Nearly like *Daleiella* but lacking great height and extreme dorsal overreach of type species of that genus; carapace elongate-oval in lateral view; overlap and overreach strong except along hinge where overreach remains LV-over-RV but overlap is reversed; contact marginal structures consist of duplicature and vestibule with related structures reminiscent of Cypridacea; adductor muscle scar unknown. *Sil.-L.Perm.*, N.Am.-Eu.—FIGS. 310A,3, 310B,3. **M. distorta*, U.Miss.

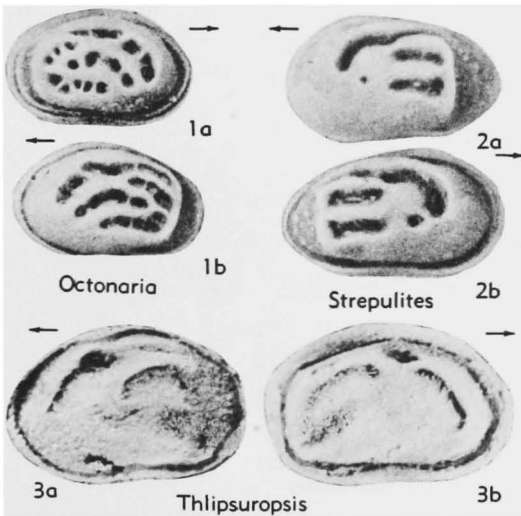


FIG. 307. Thlipsuridae (p. Q378-Q379).

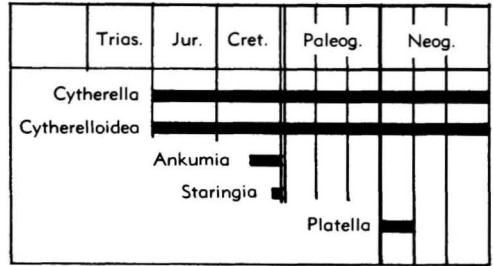


FIG. 308. Stratigraphic distribution of cytherellid genera and subgenera.

(Salem Ls.), USA(Ind.); 310A,3a,b, carapace R, dors., $\times 27$ (Shaver, n); 310B,3a,b, carapace, long. and transv. secs., LV at left, $\times 57$ (Shaver, n). [SHAVER.]

Punctaparchites KAY, 1934 [**Cytheropsis rugosus* JONES, 1858]. Small, compressed, valves subequal; hinge margin convex; venter nearly straight, anterior end broadly rounded, much wider than posterior extremity; surface coarsely pitted. [Marine.] *M.Ord.*, N.Am.—FIGS. 310A,10, 310B,1. **P. rugosus* (JONES); 310A,10a,b, LV lat., int. (M.Ord., Minn.), $\times 30$ (J. R. Cornell, n); 310B,1a-c, carapace L, R, dors., $\times 40$ (193). [SWAIN.]

Silenites CORYELL & BOOTH, 1933 [**S. silenus* (= **Carbonia? lenticularis* KNIGHT, 1928)]. Bythocypridid ostracodes with great height, dorsal convexity, and LV-over-RV overreach; lacking great tumidity of *Pachydomella*; hinge and contact marginal structures ridged and grooved as in *Bairdiocypris* but differing in its adductor muscle scar that consists of 2 vertical rows of spots in pinnate pattern. ?*Sil.*, U.Penn.-L.Perm., cosmop.—FIG. 310A,7. **S. lenticularis* (KNIGHT), U.Penn., USA (Tex.); 7a,b, carapace R, dors., $\times 35$ (124). [SHAVER.]

Order MYODOCOPIDA Sars, 1866

[nom. correct. POKORNÝ, 1953 (pro *Myodocopa* Sars, 1866) [Type genus: *Cypridina* MILNE EDWARDS, 1840; SD SYLVESTER-BRADLEY, herein] [Diagnosis by P. C. SYLVESTER-BRADLEY, University of Leicester]

Valves subequal, ornamented or smooth. Anterior rostrum and incisure may or may not be developed. Antennae (=“second antennae”) modified as swimming organs. Dimorphic. [Marine.] *Ord.-Rec.*

The order includes most planktonic ostracodes.

Suborder MYODOCOPINA Sars, 1866

[Type genus: *Cypridina* MILNE EDWARDS, 1840; SD SYLVESTER-BRADLEY, herein] [Diagnosis and discussion by P. C. SYLVESTER-BRADLEY, University of Leicester]

Dorsal margin straight or curved; an-

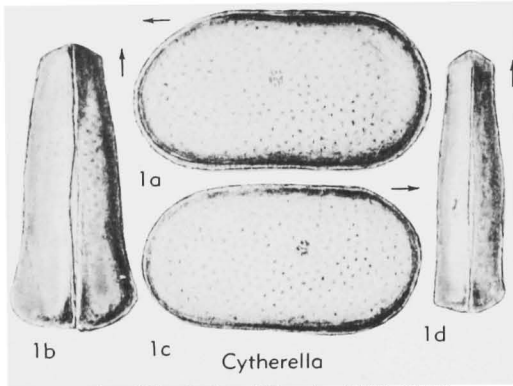


FIG. 309. Cytherellidae (p. Q382-Q383).

terior margin usually with rostral incisure, rostrum and rostral sinus; caudal siphon developed in some. Nuchal furrow may be well defined, especially in Paleozoic forms, lacking rostrum. Size highly variable, including macroscopic forms 2 or 3 cm. in diameter. Shell may lack calcification. One or both sexes usually free-swimming during at least part of life cycle. Antennules (=“first antennae”) not modified for swimming. [Marine.] *Ord.-Rec.*

The suborder can be divided conveniently into two artificial groups, in one of which no rostral incisure is developed, the other bearing a rostral incisure and usually also a rostrum and rostral sinus. The first group (without a rostral incisure) includes the superfamilies Entomozoacea, Entomoconchacea, and Thaumatoocypridacea. The second group (with rostral incisure) includes the Cypridinacea and Halocypridacea. The assemblages are artificial in the sense that the three superfamilies without rostral incisure are not necessarily more closely related to each other than to the superfamilies of the second group. The Entomozoacea may be ancestral to the Thaumatoocypridacea, but evidence of this is slight; indeed, the Entomozoacea and Entomoconchacea may not even belong to the Myodocopina.

A majority of the known myodocopid genera are restricted to rocks of Paleozoic age (30 genera); only two genera are identified definitely in post-Paleozoic deposits other than Recent (Fig. 311).

?Superfamily ENTOMOZOACEA (Jones, 1873) Přibyl, 1951

[Having priority from 1873, since family-group name Entomidae JONES, 1873, is based on a generic name which is

a junior homonym] [=Entomidae JONES, 1873, *nom. transl.* SCHMIDT, 1941 (*ex Entomidae JONES, 1873*)] [Diagnosis and discussion by P. C. SYLVESTER-BRADLEY, University of Leicester]

Large, usually over 1 mm., without rostrum or rostral sinus, with long, commonly deep nuchal furrow (slight or absent in some genera). Muscle-scar details unknown. Classed in Myodocopida with some doubt; several authors have maintained that *Bolbozoe* and some other genera are not true ostracodes. *Ord.-Perm.*

The nuchal furrow is by most authors regarded as deciding factor for orientation within superfamily, anterior being considered to lie on its concave side.

Family ENTOMOZOIDAE Přibyl, 1951

[=Entomidae JONES, 1873] [Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

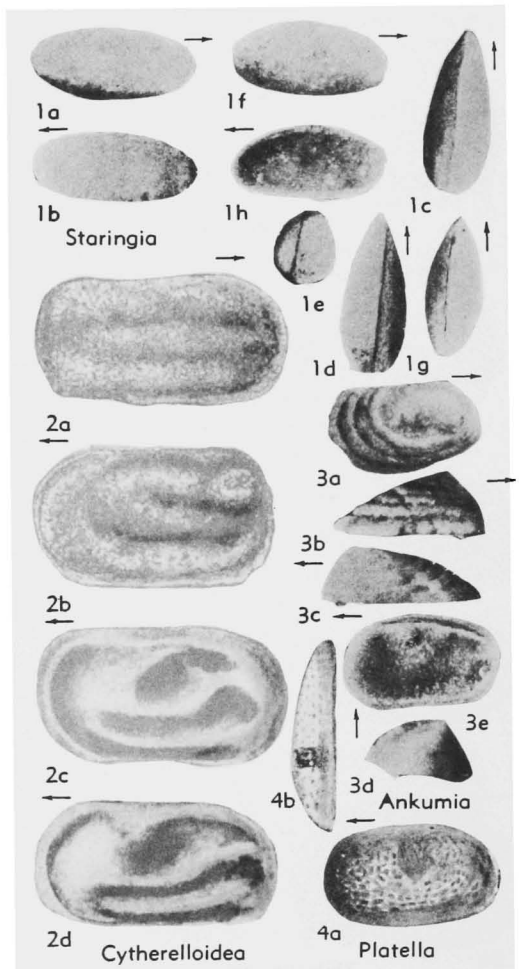


FIG. 310. Cytherellidae (p. Q383).

Like Bolbozoidae, but lacking anterodorsal swelling. Surface striate in many forms. *Ord.-Perm.*

Subfamily ENTOMOZOINAE Přibyl, 1951

Surface smooth, punctate, or variously striate. Nuchal furrow in most genera long, narrow, usually deep, more or less in center of dorsum. *Ord.-Perm.*

Entomozoe PŘIBYL, 1951 [*pro Entomis* JONES, 1861 (non HERRICH-SCHAEFFER, 1856)] [**Entomis tuberosa* JONES, 1861]. Like *Richteria*, but surface smooth or punctate, not striate. *Sil.-Perm.*, cosmop. —FIG. 312,2a-e. *E. zoppii* (CANAVARI), Sil., Sardinia; 2a-e, carapace R, L, dors., vent., post., ×20 (119). —FIG. 312,2f. **E. tuberosa* (JONES), U. Sil., Scot.; RV lat., ×8 (182a). —FIG. 312,2g-j.

E. meneghinii (CANAVARI), Sil., Sardinia; 2g-j, carapace R, L, dors., vent., ×25 (119).

Bertilionella STEWART & HENDRIX, 1945 [**B. subcircularis*] [= *Waldeckella* RABIEN, 1954]. Like *Entomoprimitia* but muscle-scar pit absent. *Dev.*, Eu.-N.Am. —FIG. 313,4a. **B. subcircularis*, Dev., Ohio; carapace R, ×60 (Sylvester-Bradley, n). —FIGS. 313,4b, 314,5. *B. erecta* (RABIEN) (type species of *Waldeckella*), U.Dev., Ger.; 313,4b, RV lat. (external impression), ×80; 314,5a-c, RV (steinkern) lat., dors., ant., ×30 (292).

Entomoprimitia KUMMEROW, 1939 [**Primitia hattingensis* MATERN, 1929 (= **Cypridina nitida* ROEMER, 1850)] [= *Omphalentomis* KUMMEROW, 1953]. Like *Nehdentomis* but nuchal furrow reduced to inconspicuous groove or, in many species, to dimple-like depression just anterior to midpoint of dorsal margin; surface striations con-

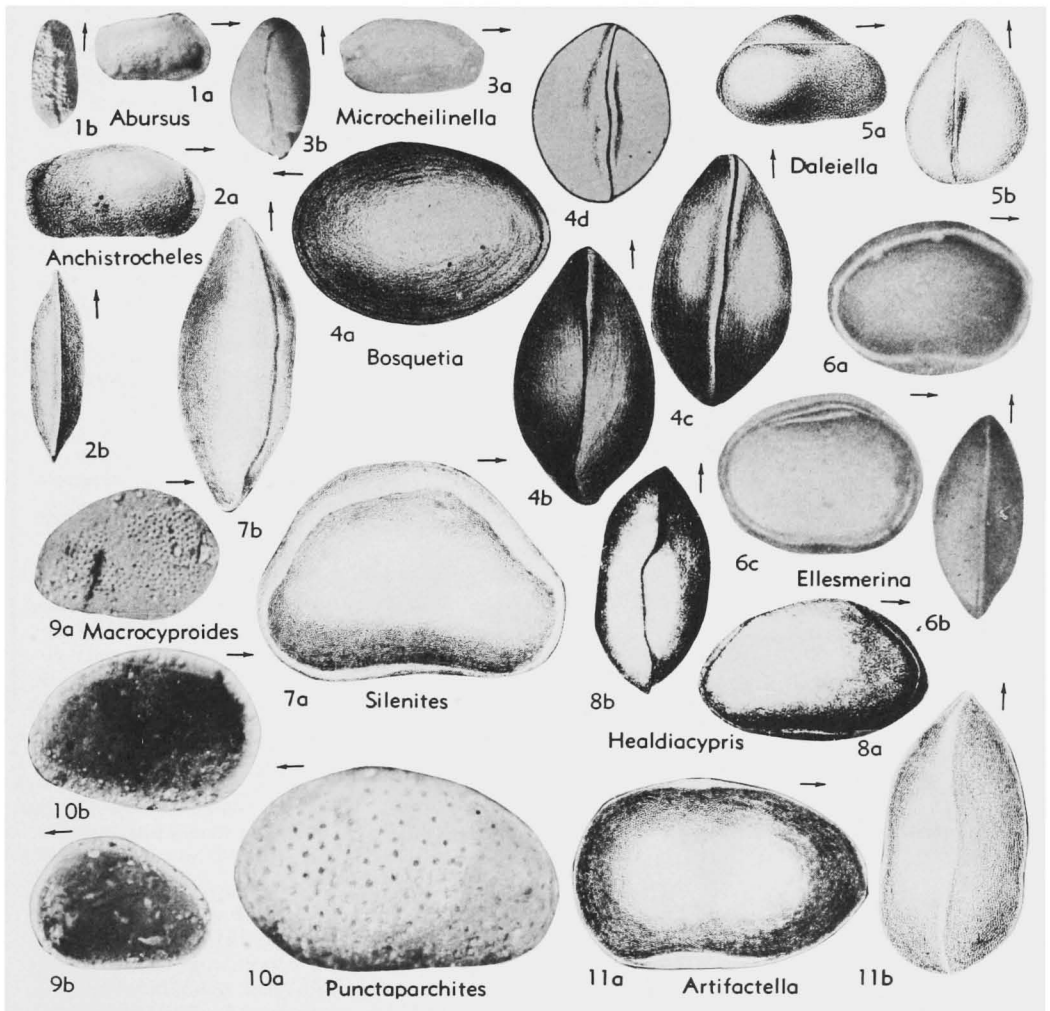


FIG. 310A. Podocopida, Suborder and Family Uncertain (p. Q383-Q387).

centrally arranged round muscle-scar pit. *Dev.*, cosmop.—FIG. 315,1a-c. **E. nitida* (ROEMER) (steinkern), U.Dev., Ger.; 1a-c, RV lat., dors., post., $\times 30$ (292).—FIG. 315,1d,e. *E. splendens* (WALDSCHMIDT, 1885), U.Dev., Ger.; 1d,e, carapace R, dors., $\times 15$ (292).

Nehdentomis MATERN, 1929 [**Entomis* (*Nehdento-*

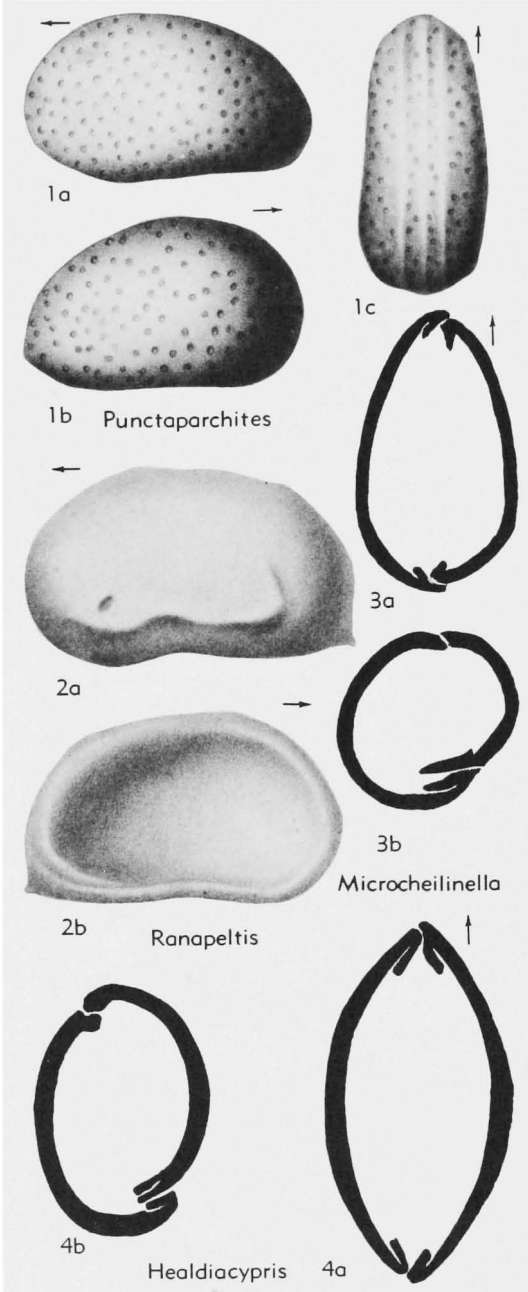


FIG. 310B. Podocopida, Suborder, and Family Uncertain (p. Q252-Q253, Q387).

mis) *nehdensis*]. Like *Richteria*, but with nuchal furrow terminating in a well-defined external muscle-scar pit. *Dev.*, Ger.—FIG. 315.4. **N. nehdensis* (MATERN), U.Dev., Ger.; 4a,b, LV lat., dors., $\times 50$ (244).

Pseudoentomozoe PŘIBYL, 1951 [**Entomis pteroides* CANAVARI, 1899]. Like *Rhombentomozoe* but without ventral spine, and with a posteroventral carina running diagonally upwards from mid-point of ventral margin. *U.Sil.*, Sardinia.—FIG. 315.3. **P. pteroides* (CANAVARI), L.Ludlov., Sardinia; 3a,b, LV lat., vent., $\times 20$; 3c,d, RV lat., vent., $\times 20$ (119).

Rhombentomozoe PŘIBYL, 1951 [**Cryptocaris? rhomboidea* BARRANDE, 1872]. Carapace subtriangular, striate, with pronounced ventral spine. *Ord.-Sil.*, Eu.-N.Am.—FIG. 315.2. **R. rhomboidea* (BARRANDE), Sil., Boh.; RV lat., $\times 20$ (284).

Richteria JONES, 1874 [**Cypridina serratostrata* SANDBERGER, 1842; SD KEGEL, 1933] [= *Entominella* LIVENTAL, 1945]. Carapace oblong, with nuchal furrow extending downwards more than halfway. Dorsal margin nearly straight, cardinal angles curved. Surface ornamented with striations which are usually longitudinal or concentric. With or without small anterodorsal tubercle. *Sil.-Perm.*, cosmop. (284, 292).—FIG. 312.1. **R. serratostrata* (SANDBERGER), U.Dev., Ger.; RV lat., $\times 30$ (244).—FIG. 313.1. *R. lamarmorai* (CANAVARI), Sil., Sardinia; 1a-e, carapace R, L, dors., vent., post., $\times 15$ (119).

Ungerella LIVENTAL, 1948 [**Cypridina calcarata* RICHTER, 1856] [= *Franklinella* STEWART & HENDRIX, 1945 (non NELSON, 1937)]. Like *Rhombentomozoe*, but with posterodorsal spine in addition to mid-ventral spine (284). *U.Dev.-L. Carb.*, Eu.-N.Am.—FIG. 313,3a,b. *U. novocosta* (STEWART & HENDRIX) (type species of *Franklinella*), 3a,b, carapace L, R, $\times 40$ (Sylvester-Bradley, n).—FIG. 313,3c. **U. calcarata* (RICHTER), U. Dev., Ger.; RV lat., $\times 40$ (284).

Vltavina BOUČEK, 1936 [**V. bohémica*]. Carapace striate, elongate, dorsal margin straight with cardinal angles produced into horizontal spines directed anteriorly and posteriorly. Nuchal furrow rather shallow. *U.Dev.*, Boh.—FIG. 313.2. **V. bohémica*; RV lat., $\times 50$ (10).

Subfamily BOUCIINAE Přibyl, 1951

Like Entomozoinae, but with posteroventral sulcus in addition to nuchal furrow. *U.Sil.*

Boucia AGNEW, 1942 [*pro Basslerella* BOUČEK, 1936 (non KELLETT, 1935; nec HOWE, 1935)] [**Basslerella ornatissima* BOUČEK, 1936]. Carapace bean-shaped, with concave dorsal margin. Ornamented with fine transverse striations. *U.Sil.*, Bohemia.—FIG. 314.6. **B. ornatissima* (BOUČEK), M.Ludlov., Bohemia; 6a,b, RV lat., dors., $\times 30$ (10).

Subfamily RICHTERININAE Sylvester-Bradley, nov.

Carapace accurately elliptical or circular in side view, and thus equilateral; ornamented with fine or strong raised striae. Nuchal furrow slight or absent. *Dev.*

Richterina GÜRICH, 1896 [**Cytherina costata* RICHTER, 1869]. Elliptical; no nuchal furrow; ornament uninterrupted by muscle-scar pit. *Dev.*, Eu. —FIG. 314.3a. **R. costata*, U.Dev., Ger.; ?L or RV, lat., ×30 (244). —FIG. 314.3b,c. *R. vittata* (GÜRICH), U.Dev., Ger.; 3b,c, RV lat., vent., ×60 (244).

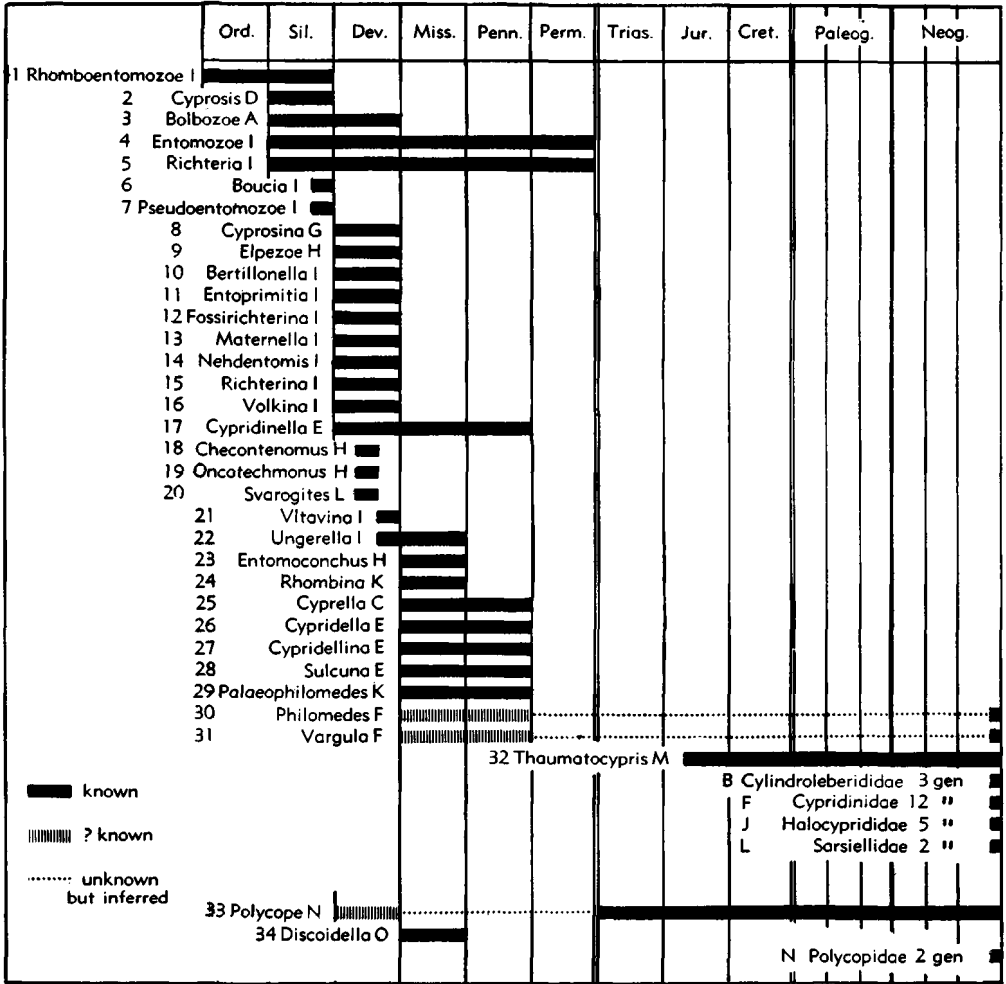


FIG. 311. Stratigraphic distribution of myodocopid ostracode genera (Moore, n). Classification in families is indicated by letter symbols (A—Bolbozoidae, B—Cylindroleberididae, C—Cyprellidae, D—Cypridinaceae, Family Uncertain, E—Cypridinellidae, F—Cypridinidae, G—Cyrosinidae, H—Entomoconchidae, I—Entomozoidae, J—Halocyprididae, K—Rhombinidae, L—Sarsiellidae, M—Thaumatozoidae, N—Polycopidae, O—Cladocopina, Family Uncertain). An alphabetical list of genera furnishes cross reference to the serially arranged numbers on the diagram.

Generic Names with Index Numbers

- Bertillonella—10
- Bolbozoe—3
- Boucia—6
- Checontonomus—18
- Cyrella—25
- Cypridella—26
- Cypridellina—27
- Cypridinella—17
- Cyrosina—8

- Cyprosis—2
- Discoidella—34
- Elpezoe—9
- Entomoconchus—23
- Entomozoe—4
- Entoprimitia—11
- Fossirichterina—12
- Maternella—13
- Nehdentomis—14

- Oncotechmonus—19
- Palaeophilomedes—29
- Philomedes—30
- Polycope—33
- Pseudoentomozoe—7
- Rhombina—24
- Rhombentomozoe—1
- Richteria—5

- Richterina—15
- Sulcuna—28
- Svarogites—20
- Thaumatozoe—32
- Ungerella—22
- Vargula—31
- Vltavina—21
- Volkina—16

Fossirichterina MATERN, 1929 [**Richterina* (*Fossirichterina*) *intercostata*]. Like *Richterina*, but ornament interrupted by muscle scar pit. *Dev.*, Eu.—FIG. 314.2. **F. intercostata* (MATERN), U. *Dev.*, Ger.; 2*a,b*, ?RV lat., ?vent., ×30 (244).

Maternella RABIEN, 1954 [**Richterina* (?) *costata* (RICHTER) var. *dichotoma* PÄEKELMANN, 1913]. Like *Richterina* but subcircular and slightly asymmetrical, with anterior margin more sharply curved than posterior; in dorsal view anterior slope less

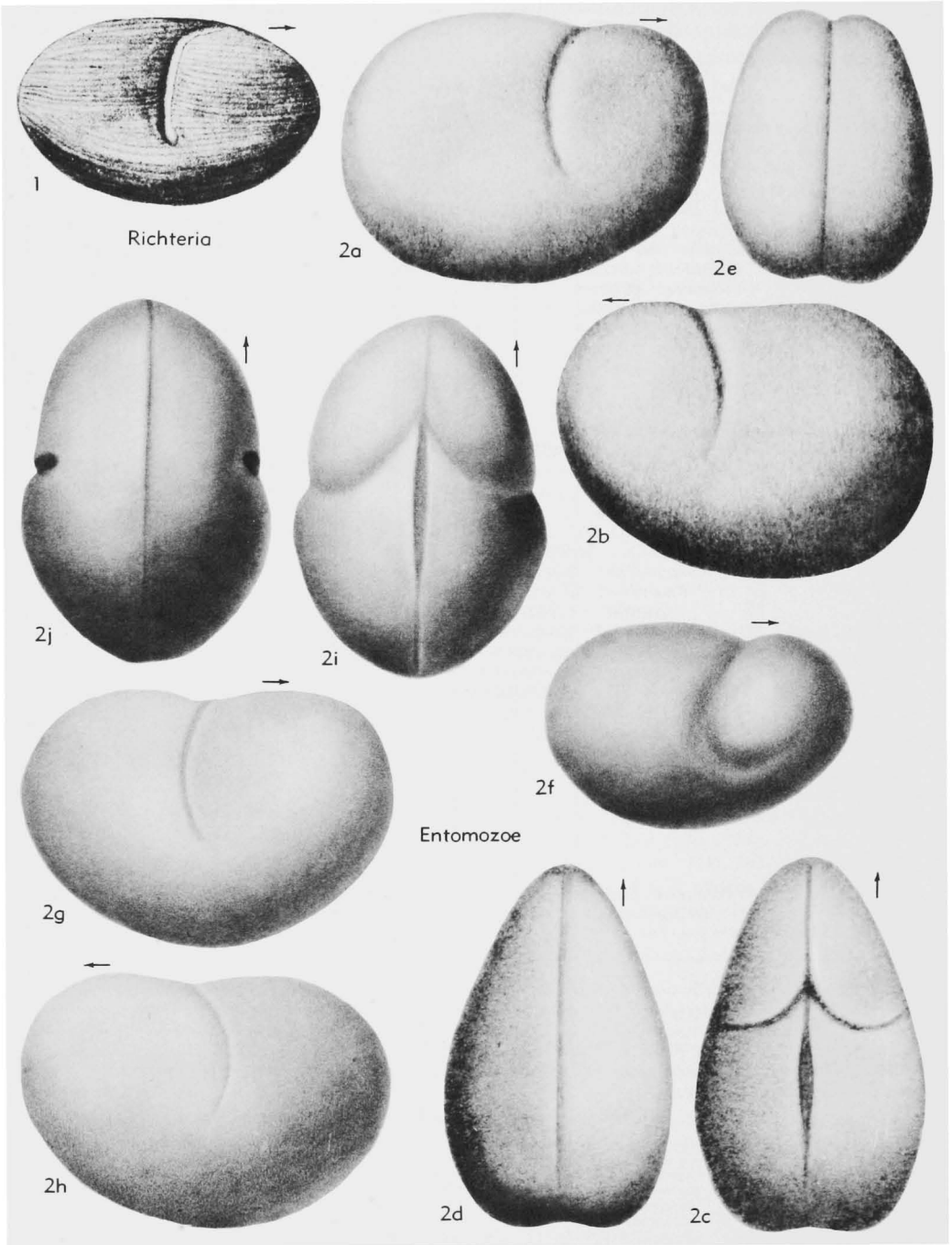


FIG. 312. Entomozoidae (Entomozoinae) (p. Q389-Q390).

abrupt than posterior. *Dev.*, Eu.—FIG. 314, I. **M. dichotoma* (RABIEN), U.Dev., Ger.; 1a, LV (external impression); 1b, RV (external impression); 1c-e, (steinkern), LV lat., dors., post.; all $\times 30$ (292).

Volkina RABIEN, 1954 [*Entomis* (*Nehdentomis*)

zimmermanni VOLK, 1939]. Like *Richterina*, but with distinct dimple just anterior to mid-point of dorsal margin representing nuchal furrow. *Dev.*, Eu.—FIG. 314, J. **V. zimmermanni* (VOLK), U.Dev., Ger.; 4a,b, LV lat., dors., $\times 60$, $\times 90$ (292).

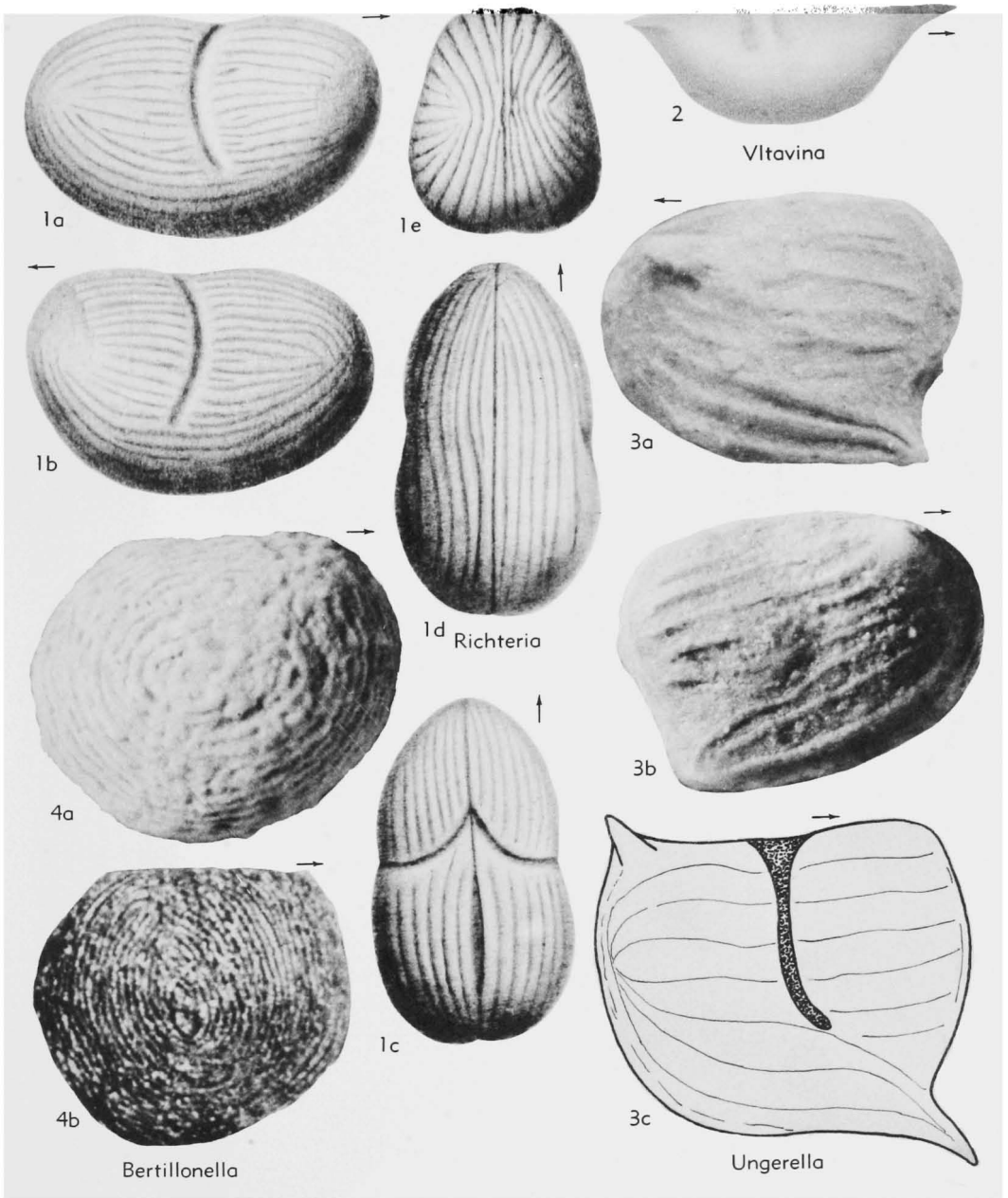


FIG. 313. Entomozoidae (Entomozoinae) (p. Q389-Q390).

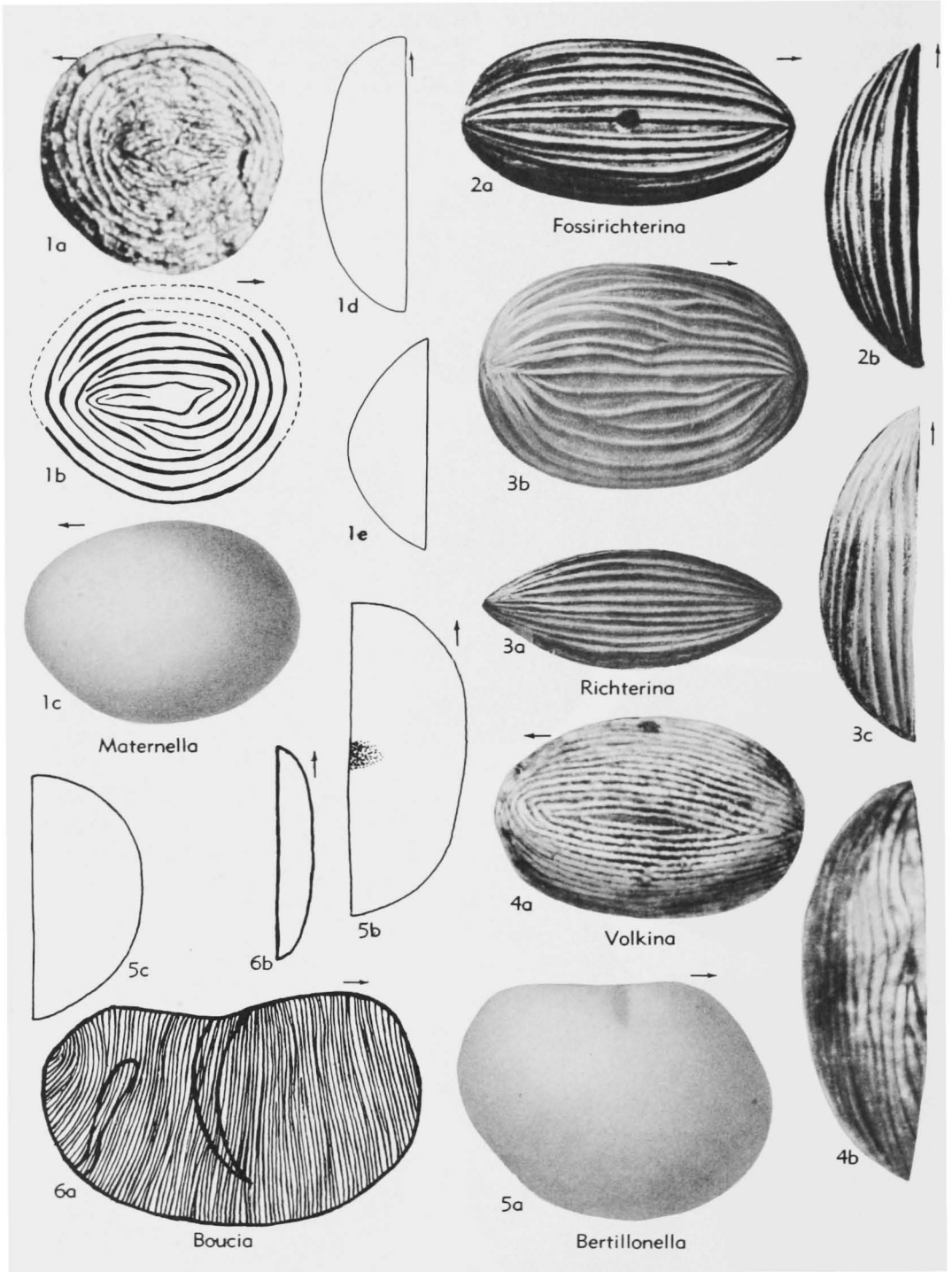


FIG. 314. Entomozoidae (Entomozoinae, Bouciinae, Richterinae) (p. Q389-Q393).

Family BOLBOZOIDAE Bouček, 1936

[Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Hemispherical, anterodorsal swelling developed immediately in front of nuchal fur-

row. Subsidiary ventral sulcus present in some forms. Surface smooth, punctate or reticulate. *Sil.-Dev.*, Eu.

Bolbozoe BARRANDE, 1872 [**B. anomala* SD BASSLER & KELLETT, 1934]. With characters of family.

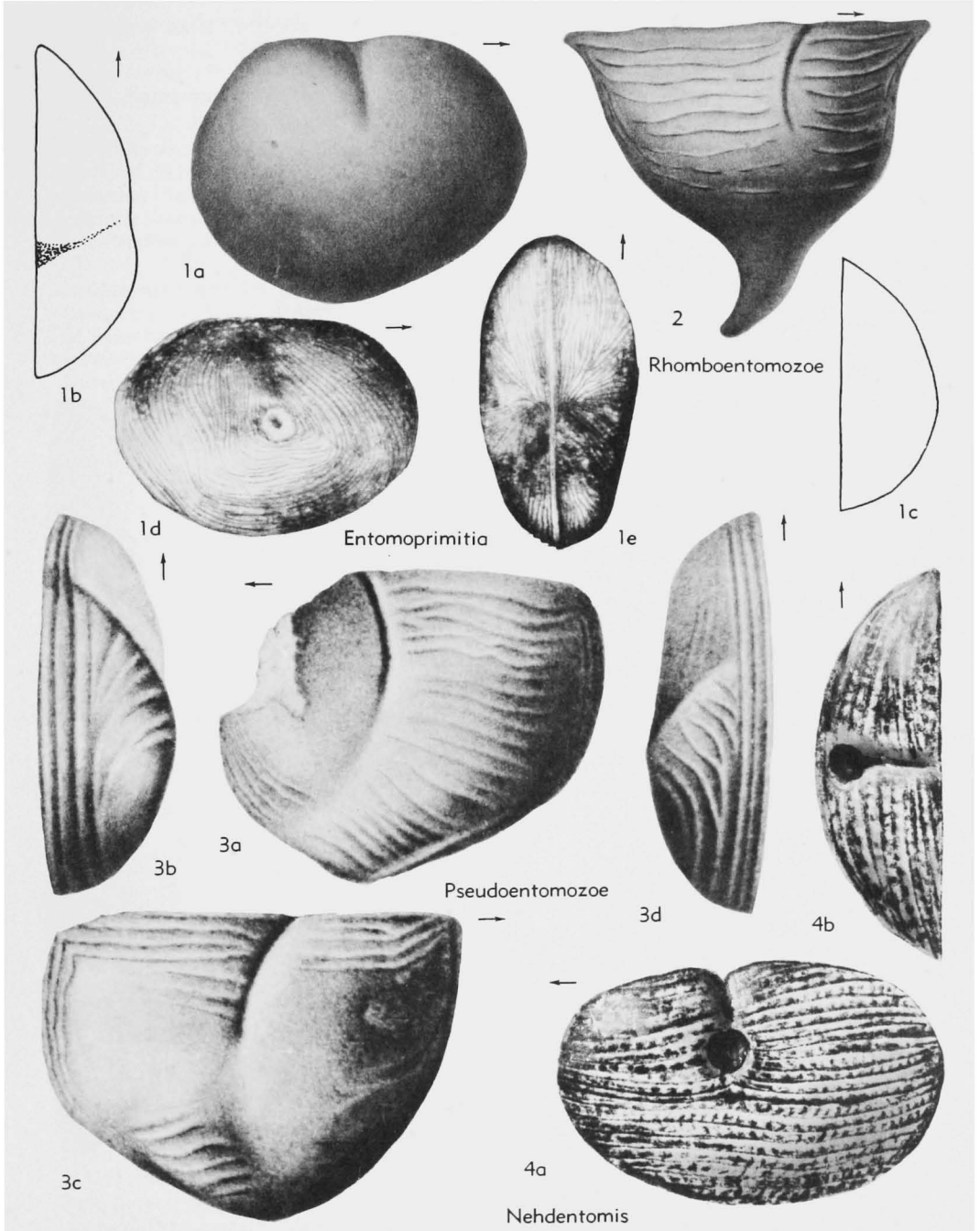


FIG. 315. Entomozoidae (Entomozoinae) (p. Q389-Q390).

Sil.-Dev., Eu.—FIG. 316,1c-f. **B. anomala*, internal cast; *Sil.*, Boh.; 1c,d, LV lat., dors.; 1e,f, RV lat., vent.; all $\times 7$ (95).—FIG. 316,1a,b. *B. bohemica* BARRANDE; *Sil.*, Boh.; 1a,b, RV lat., LV lat., $\times 3$ (95).—FIG. 316,1g-i. *B. bohemica?*, *Sil.*, Sardinia; 1g-i, LV lat., dors., vent., $\times 5$ (119).

**Superfamily
ENTOMOCONCHACEA
Brady, 1868**

[*nom. transl.* SYLVESTER-BRADLEY, 1953 (ex Entomoconchidae BRADY, 1868)] [Diagnosis by P. C. SYLVESTER-BRADLEY, University of Leicester]

Macroscopic, without rostrum or rostral sinus, usually with a posterior siphon. Muscle-scar pattern oval, composed of radiate linear scars. *Dev.-Carb.*

Family ENTOMOCONCHIDAE Brady, 1868

[Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Anterior margin vertical, almost straight. Left valve usually larger than right, overreaching it particularly at anterodorsal and anteroventral angles. Caudal siphon usually developed. *Dev.-Carb.*

Subfamily ENTOMOCONCHINAE Brady, 1868

[*nom. transl.* SYLVESTER-BRADLEY, herein (ex Entomoconchidae BRADY, 1868)]

Carapace smooth, unornamented, usually rather tumid. *Dev.-Carb.*

Entomoconchus M'COY, 1839 [**E. scouleri*]. Sub-spheroidal; anterior margin flanked by shallow or deep furrows; anterodorsal and anteroventral angles slightly protuberant. Siphon at posteroventral corner or in middle of posterior margin, but lacking in some. *L.Carb.*, Eu.—FIG. 317,1. **E. scouleri*, *L.Carb.*, Eire; 1a-d, carapace L, ant., vent., post., $\times 2$ (366a).

Elpezoë PŘIBYL, 1950 [*pro Elpe* BARRANDE, 1872 (non ROBINEAU-DESVOIDY, 1863)] [**Elpe inchoata*

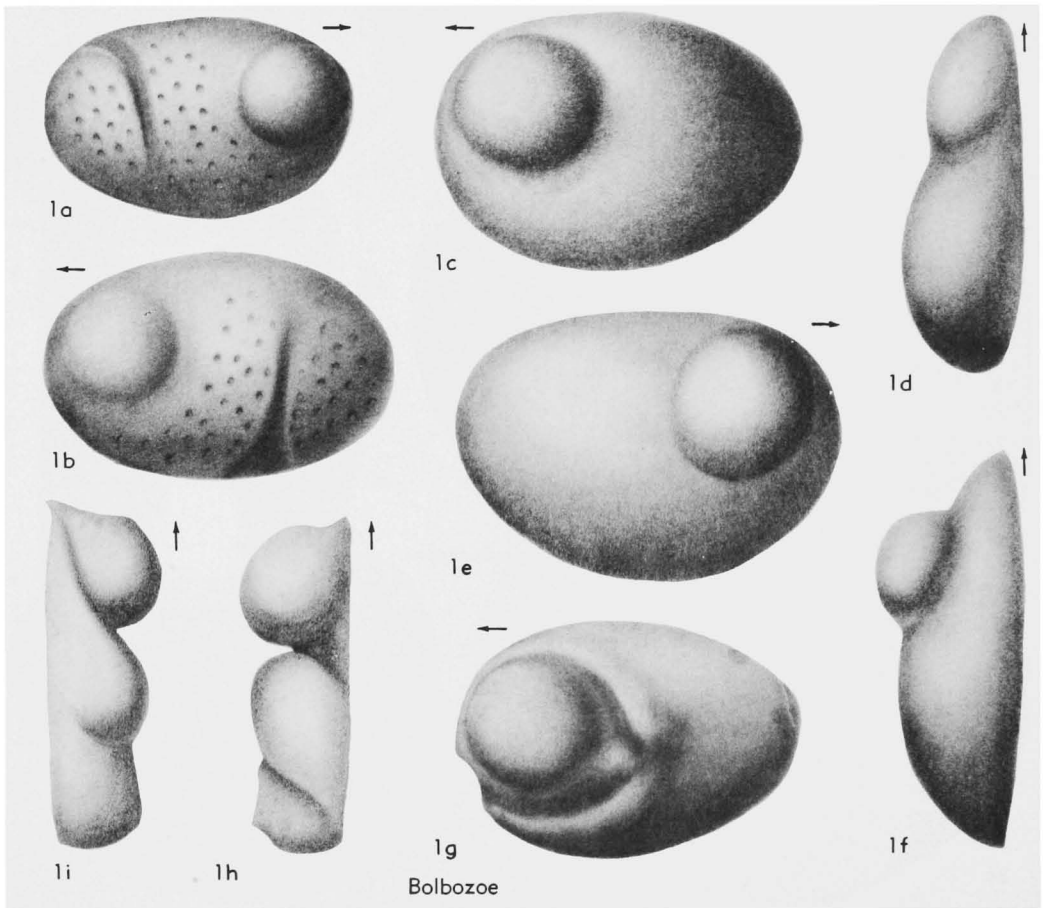


FIG. 316. Bolbozoidae (p. Q395-Q396).

BARRANDE, 1872]. Like *Entomoconchus* but more compressed anteriorly, compressed area being limited posterodorsally by a pronounced "cheek." *Dev.*, Eu.—FIG. 317,2. **E. inchoata*, L.Dev., Bohemia; carapace R, $\times 6$ (283).

Subfamily ONCOTECHMONINAE Kesling, 1954

Carapace coarsely punctate, ornamented with small ridges more or less concentric round anterior. *M.Dev.*

Oncotechmonus KESLING, 1954 [**O. chemotus*]. Carapace oval in side view, compressed, tapering sharply to posterior. Ornamented ridges crowded anteriorly, more widely spaced towards posterior. Posteroventral gape wide, long. *M.Dev.*, N.Am.—FIG. 318,1. **O. chemotus*, M.Dev., Lake Erie; 1a-d, carapace (holotype) R, L, dors., vent., $\times 4.5$ (202).

Checontonomus KESLING, 1954 [**C. cophus*]. Like *Oncotechmonus*, but posteroventral gape narrow or absent, and ornamental ridges restricted to anterior. *M.Dev.*, N.Am.—FIG. 318,2. **C. cophus*, M.Dev., Lake Erie; 2a-e, carapace R, L, dors., vent., ant., $\times 4.5$ (202).

Family CYPROSINIDAE Whidborne, 1890

[Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Siphon produced as caudal process directed upward (or siphon may be interpreted as rostrum when orientation is reversed, dorsal becoming ventral, anterior becoming posterior); shallow nuchal furrow present. *Dev.*

Cyprosina JONES, 1881 [**C. whidbornei*]. Ovoid, widest in posterior 3rd, tapering forward; anterior margin receding toward venter. *Dev.*, Eng.—FIG. 319,1. **C. whidbornei*; LV lat., $\times 2$ (366a).

**Superfamily
THAUMATOCYPRIDACEA
G. W. Müller, 1906**

[*nom. transl. et correct.* SYLVESTER-BRADLEY, herein (ex *Thaumatocyprinae* G. W. MÜLLER, 1906)] [Diagnosis by P. C. SYLVESTER-BRADLEY, University of Leicester]

Carapace subcircular in outline, with no rostrum, sinus or incisure, but with projecting spines or processes developed close to plane of commissure. *M.Jur.-Rec.*

The recognition of a superfamily containing a single known family and genus seems anomalous, even though such monotypical taxa are not unique. In the case of *Thaumatocypridacea* such classification is well justified, because *Thaumatocypris* is a very distinctive, long-ranging genus with soft parts (observed in Recent specimens) that confirm correct placement in the Myo-

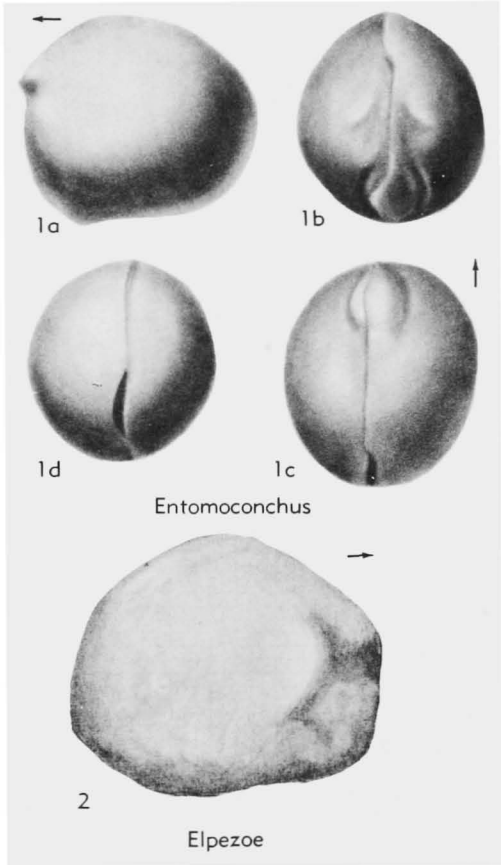


FIG. 317. Entomoconchidae (Entomoconchinae) (p. Q396-Q397).

docopina; at the same time it is far removed from other superfamilies of the suborder. New fossil species of *Thaumatocypris* from post-Paleozoic strata keep coming to light.

**Family THAUMATOCYPRIDIDAE
G. W. Müller, 1906**

[*nom. transl. et correct.* SYLVESTER-BRADLEY, herein (ex *Thaumatocyprinae* G. W. MÜLLER, 1906)] [Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Characters of superfamily. *M.Jur.-Rec.*

Thaumatocypris G. W. MÜLLER, 1906 [**T. echinata*]. Anomalous rare genus with unique method of swimming; known from one Recent and several Jurassic species. *M.Jur.-Rec.*, cosmop.—FIG. 320,1. **T. echinata*, Rec., Ind.O.; 1a-c, carapace L, R (juv.), dors., $\times 30$ (258a).

**Superfamily CYPRIDINACEA
Baird, 1850**

[*nom. transl.* SYLVESTER-BRADLEY, herein (ex *Cypridinidae* BRADY, 1868, *nom. correct. pro* *Cypridinidae* BAIRD, 1850)] [=Cypridiniformes SKROGEBERG, 1920] [Diagnosis by P. C. SYLVESTER-BRADLEY, University of Leicester]

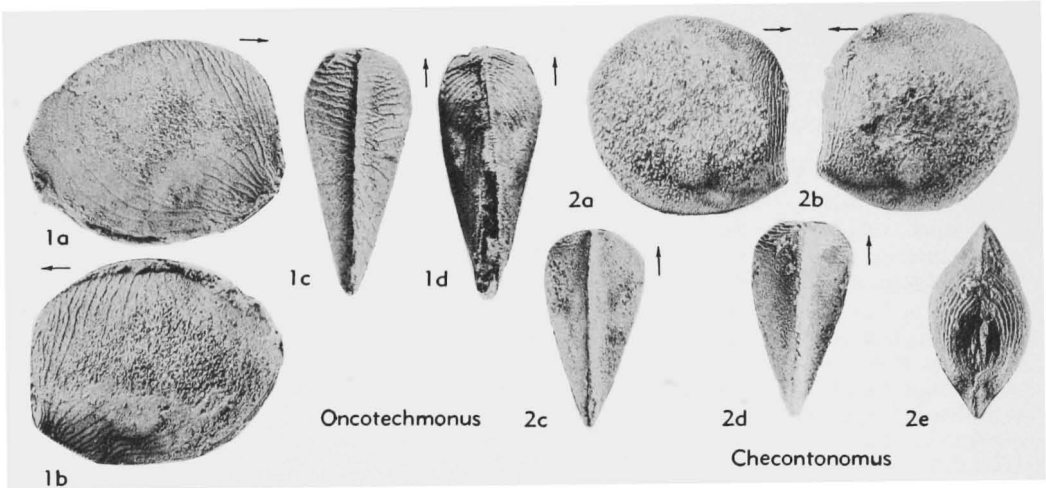


FIG. 318. Entomoconchidae (Oncotechmoninae) (p. Q397).

Carapace usually calcified, strongly in some; rostrum downcurved usually below line of dorsal border, overhanging an anterior incisure (or gape) through which antennae of living animal protrude. Specialized hinge structure may be developed or lacking, but if present, it rarely consists of more than terminal teeth in RV, with long narrow smooth groove between and corresponding elements in LV. *Sil.-Rec.*

Family CYPRIDINIDAE Baird, 1850

[*nom. correct.* BRADY, 1868 (*pro* Cypridinidae BAIRD, 1850); *nom. transl.* BRADY, 1868 (*ex* Cypridinidae DANA, 1852, *nom. transl. et correct. ex* Cypridinidae BAIRD, 1850)] [Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Rostrum down-curved, overhanging well-marked sinus; incisure more or less cruciform. *?Carb., Rec.*

A description of cypridinid appendages and eye structures given by SARS (65), translated by SCOTT & WAINWRIGHT, follows:

Only one pair of feet that are unique in shape, the appendages being elongate and curved above, flexible, annular, vermiform, forming spines toward their apices. Upper antennae [antennules] large, distinctly articulate, geniculate at the base. The characteristic part of the mandibles is absent. Second maxillae [third post-oral limb] are provided with large branchial plates. Composite eyes stalked, widely separated; anteriorly between these is a large, simple and tentaculate eye on the small forehead.

Subfamily CYPRIDININAE Baird, 1850

[*nom. transl. et correct.* DANA, 1852 (*ex* Cypridinidae BAIRD, 1850)]

Carapace more or less strongly calcified, usually smooth; dorsal border arched, anterior margin of rostrum evenly curved or sinuous. Mostly rather large forms (more than 2 mm.); sexual dimorphism weak or absent. *?Carb., Rec.*

Cypridina MILNE EDWARDS, 1840 [**C. reynaudi*] [= *Daphnia* M'COY, 1844 (*non* MÜLLER, 1776); *Pyrocypis* G. W. MÜLLER, 1890; *Eupathistoma* BRADY, 1898]. Pronounced anterodorsal angle leading to downwardly directed rostrum, posteroventral extremity produced; carapace not calcified; animal phosphorescent. *Rec., trop.*—FIG. 321,1. *C. inermis* (G. W. MÜLLER) (= **C. reynaudi*), Malaya; ♂ carapace L, ×30 (53, 109).

Azygocypridina SYLVESTER-BRADLEY, 1950 [*pro* *Crossophorus* BRADY, 1880 (*non* HEMPRICH & EHRENBERG, 1828)] [**Crossophorus imperator* BRADY, 1880]. Carapace like *Gigantocypris* but smaller, with rostrum proportionally larger. *Rec., cosmop.*—FIG. 321,8. *A. gibber* (G.W.MÜLLER), E.Indies; carapace L, ×15 (Sylvester-Bradley, n).

Codonocera BRADY, 1902 [**C. cruenta*]. Carapace strongly calcified, oval, with or without anterior cardinal angle, bearing a blunt caudal process, which perhaps forms a siphon. *Rec., E.Indies-Ind. O.*—FIG. 321,2. **C. cruenta*, E.Indies; 2a, ♂ carapace L, ×20; 2b, muscle scar, ×60 (Brady, 1902).

Gigantocypris G. W. MÜLLER, 1895 [**G. agassizi*; SD SYLVESTER-BRADLEY, herein]. Carapace large (more than 10 mm.), globular, not calcified; rostrum small. *Rec., cosmop.*—FIG. 321,4. **G. agassizi*, Pac.; ♂ carapace L, ×2 (255a).

Heterodesmus BRADY, 1865 [**H. adamsi* BRADY, 1866] [= *Siphonostra* SKOGSBERG, 1920]. Carapace produced posteriorly into a siphon; hinge anterior

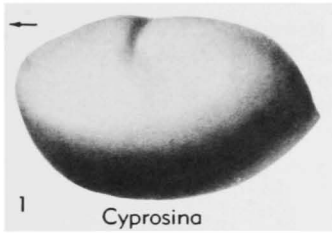


FIG. 319. Cyprosinidae (p. Q397).

with projecting tooth in R valve. *Rec.*, Japan-Austral.—FIG. 321.3. *H. spinifer* (SKOGSBERG), Austral.; ♀ carapace L, ×20 (71).

Macrocypridina SKOGSBERG, 1920 [**Cypridina castanea* BRADY, 1897]. Carapace weakly calcified, tapering backward; rostrum sinuous. *Rec.*, Atl.O.-Ind.O.—FIG. 321.5. **M. castanea* (BRADY), Atl.; ♀ carapace L, ×8 (16).

Monopia CLAUS, 1873 [**Cypridina monopia* CLAUS, 1873] [= *Eumonopia* CLAUS, 1891; *Cypridinodes* BRADY, 1902]. Shell heavily calcified, smooth or sculptured, oval, produced posteriorly as acuminate or truncate caudal process; rostrum sinuous, incurved. *Rec.*, Pac.—FIG. 321.6. *M. acuminata* SKOGSBERG; ♂ carapace L, ×8 (71).

Vargula SKOGSBERG, 1920 [**Cypridina norvegica* BAIRD, 1860]. Carapace smooth, LV slightly larger than RV with little overlap except at posteroventral corner; dorsal border evenly arched, continuous with rostrum, posteroventral corner little produced; hinge without teeth. ?*Carb.*, *Rec.*, cosmop.

V. (Vargula). ?*Carb.*, *Rec.*, cosmop.—FIG. 321.7. **V. norvegica* (BAIRD), off Norway; 7a,b, ♀ carapace L, ant., ×15 (Sylvester-Bradley, n); 7c, ♂ carapace R, ×15 (365); 7d, muscle scar, RV int., ×40 (71).

V. (Doloria) SKOGSBERG, 1920 [**Cypridina (D.) levis*]. Carapace as in *V. (Vargula)*. *Rec.*, Ant-art.-S.Am.

Subfamily PHILOMEDINAE G. W. Müller, 1912

Shell strongly calcareous, ornamented (except smooth in *Philomedes*); dorsal border straight or arched; rostrum truncate, rounded or pointed; posteroventral corner angular, or produced as slight caudal process. Sexual dimorphism commonly very marked. ?*Carb.*, *Rec.*

Philomedes LILJEBORG, 1853 [**P. longicornis*] [= *Bradycinetus* SARS, 1866]. Shell calcified, smooth; LV very slightly larger than RV; rostrum abruptly truncated; hinge very weak but an elongated tooth may be developed at posterior end of hinge line in RV with corresponding socket in LV. Pronounced sexual dimorphism in both shape of shell (males longer) and rostral sinus (males wider and shallower). ?*Carb.*, *Rec.*, cosmop.—

FIG. 322.3. *P. brenda* (BAIRD) (?=**P. longicornis*), *Rec.*, off Norway; 3a,b, ♀ carapace L, ant., ×20; 3c, ♂ carapace L; all ×20 (65).

Pleoschisma BRADY, 1890 [**P. moroides*; SD SYLVESTER-BRADLEY, herein]. Shell ornamented with puncta, reticula, or tubercles; rostral sinus absent or very slight. *Rec.*, Pac.—FIG. 322.4. **P. moroides*; 4a,b, carapace R, dors., ×40 (108).

Pseudophilomedes G. W. MÜLLER, 1894 [**P. foveolata*] [= *Paramekodon* BRADY & NORMAN, 1896]. Relatively small (less than 2 mm.), ornamented with puncta and in some with ridges and other projections; rostrum blunt, caudal process short, ill-defined; hinge probably as in *Tetragonodon*. *Rec.*, Medit.-Atl.—FIG. 322.2. **P. foveolatus*, Medit.; ♀ carapace L, ×60 (53).

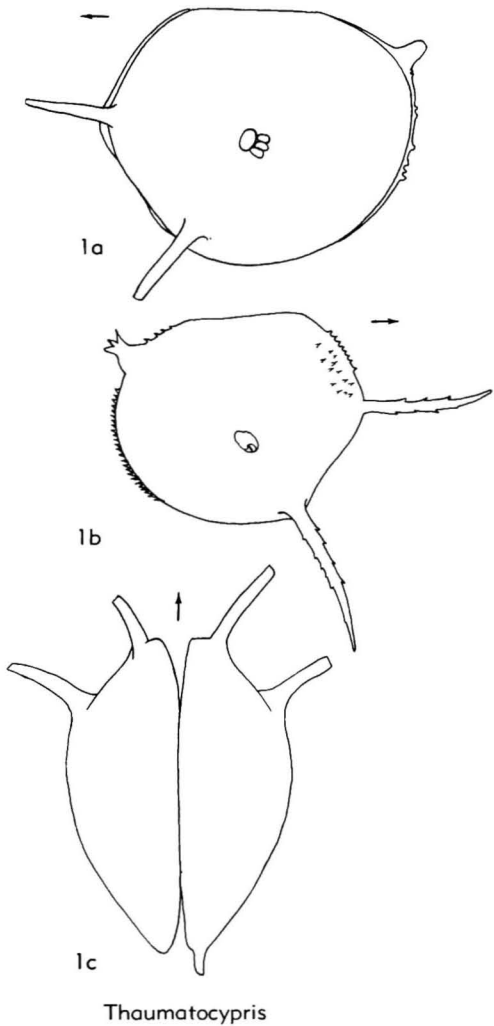


FIG. 320. Thaumatoocyprididae (p. Q397).

Streptoleberis BRADY, 1890 [**S. crenulata*] [= *Scleroconcha* SKOGSBERG, 1920]. Relatively large (more than 2 mm.); surface highly sculptured; like *Pseudophilomedes* but rostrum and

caudal process more pronounced. *Rec.*, cosmop. —FIG. 322, *I. S. appellöfi* (SKOGSBERG), Antarct.; ♀ carapace L, ×15 (71). **Tetragonodon** BRADY & NORMAN, 1896 [**T. cten-*

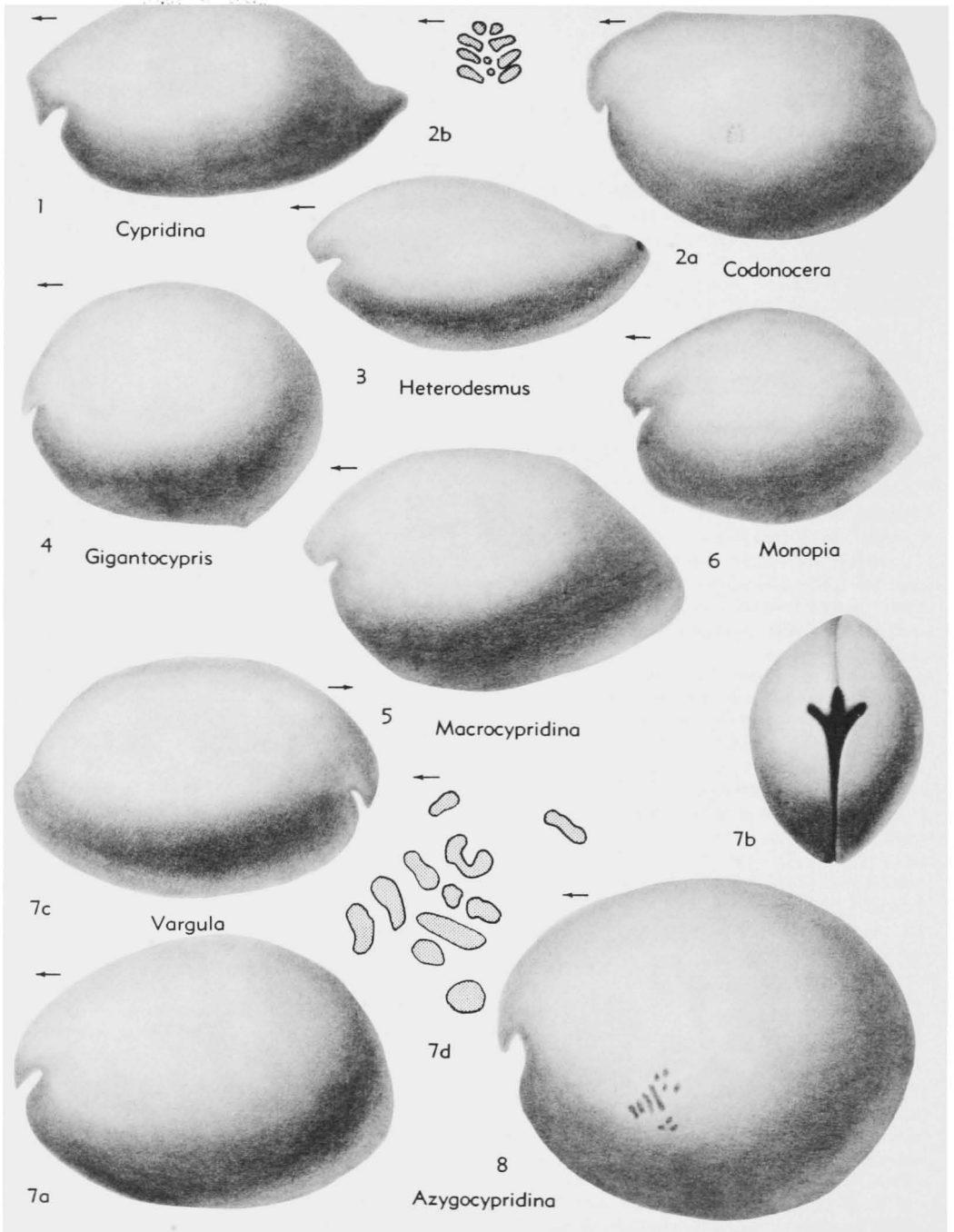


FIG. 321. Cypridinidae (Cypridininae) (p. Q398-Q399).

orhynchus; SD SYLVESTER-BRADLEY, herein]. Shell ornamented with spines or puncta; LV larger; rostrum long, pointed, projecting forward at about 45 degrees; posteroventral caudal process directed

diagonally upward in continuation of ventral margin. Hinge straight, median bar with terminal sockets in LV, very narrow median groove with terminal teeth in RV. *Rec.*, Atl.—FIG. 322,5. *T.

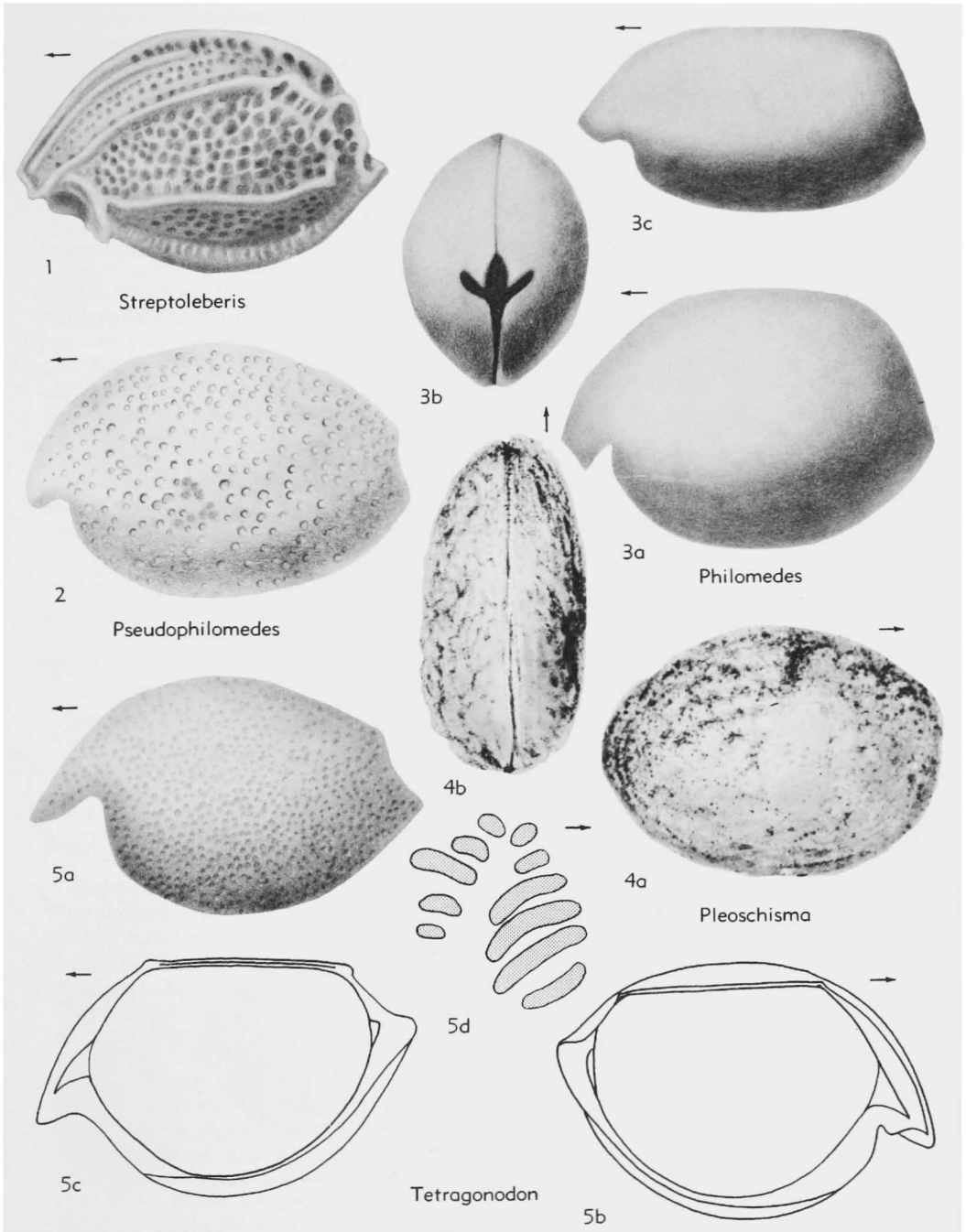


FIG. 322. Cypridinidae (Philomedinae) (p. Q399-Q402).

ctenorhynchus; 5a, ♀ carapace L, ×25 (16); 5b,c, ♀ LV int., ♀ RV int., ×25; 5d, muscle scar, RV ext., ×50 (Sylvester-Bradley, n).

Family CYLINDROLEBERIDIDAE
G. W. Müller, 1906

[*nom. transl. et correct.* SYLVESTER-BRADLEY, herein (*ex* *Cylindroleberinae* G. W. MÜLLER, 1906)] [=Asteropidae BRADY, 1874] [Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Rostrum down-curved, overhanging rostral incisure and almost overlapping rostral sinus; muscle-scar pattern spiral. *Rec.*

Cylindroleberis BRADY, 1867 [*pro* *Asterope* PHILIPPI, 1840 (*non* HÜBNER, 1816; *nec* MÜLLER & TROSCHERL, 1840)] [**Asterope mariae* BAIRD, 1840; SD SYLVESTER-BRADLEY, herein] [=Copechaete HESSE, 1878; *Copechaeta* CARUS, 1880 (*nom. van. pro* *Copechaete*); *Asteropina* STRAND, 1928 (*nom. van. pro* *Asterope*)]. Shell calcareous, smooth, more or less elongate, posterior evenly rounded. Males longer than females, with sinuous dorsal margin making anterior higher than posterior. Muscle-scar pattern consisting of less than 20 rounded scars arranged in a loose spiral. *Rec.*, cosmop.—FIG. 323,3. **C. mariae* (BAIRD), off Norway; 3a,b, ♀ carapace L, ant., ×20; 3c, ♂ carapace R, ×20; 3d, muscle scar, RV ext., ×75 (107).

Cyclasterope BRADY, 1897 [**C. hendersoni*; SD SKOGSBERG, 1920]. Like *Cylindroleberis* but posterior acuminate in some, or outline may be sub-circular; muscle-scar pattern consisting of many elongate scars (30 to 40) arranged in a close spiral. *Rec.*, cosmop.

C. (Cyclasterope). *Rec.*, cosmop.—FIG. 323,2.

C. fascigera BRADY, E.Indies; 2a, ♂ carapace L, ×8; 2b, muscle scar, RV int., ×20 (107).

C. (Cycloleberis) SKOGSBERG, 1920 [**Cylindroleberis lobiancoi* G. W. MÜLLER, 1895], *Rec.*, cosmop.

Asteropteron SKOGSBERG, 1920 [**Asterope fusca* G. W. MÜLLER, 1894]. Shell highly sculptured with strongly projecting ridges or with lateral winglike expansions. *Rec.*, cosmop.—FIG. 323,1. **A. fuscum* (G.W.MÜLLER), Japan; 1a,b, carapace L, dors., both ×15 (53).

Family CYPRELLIDAE Sylvester-Bradley, n. fam.

[Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Carapace annulate; rostrum down-curved; incisure horizontal; posterior produced into caudal siphon. *Carb.*

Cyprella DEKONINCK, 1841 [**C. chrysalidea*]. With low subcentral tubercle and rather deep and narrow sinuate nuchal furrow behind. Venter commonly inflated, particularly toward anterior. *Carb.*, Eu.—FIG. 324,1. **C. chrysalidea*, L.Carb. (Visé.), Belg.; 1a,b, carapace R, ant.; 1c, dorsal view of partly opened carapace; all ×10 (Sylvester-Bradley, n).

Family CYPRIDINELLIDAE
Sylvester-Bradley, n. fam.

[Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Rostral incisure transverse, with antero-

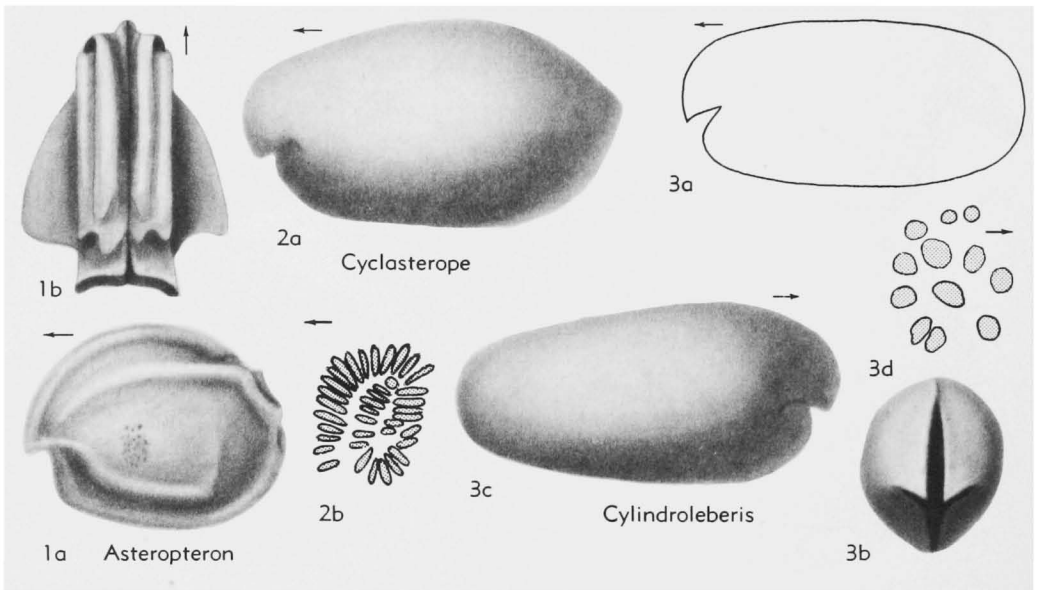


FIG. 323. Cylindroleberididae (p. Q402).

ventral prow projecting at least as far forward as rostrum. Caudal siphon invariably present, although not developed uniformly as a projecting process. *Dev.-Carb.*

Cypridinella JONES & KIRKBY, 1874 [**C. cummingi*; SD BASSLER & KELLETT, 1934] [= *Offa* JONES & KIRKBY, 1874]. Size medium (2 to 10 mm.); prow more or less produced, more prominent than rostrum; rostral incisure a narrow, horizontal slit; caudal process blunt or acuminate. *Dev.-Carb.*, Eu.—FIG. 325, 1. *C. monitor* JONES & KIRKBY, L. Carb. (Visé.), Belg.; 1a-c, carapace R, dors., post., $\times 5$ (Sylvester-Bradley, n).

Cypridella DEKONINCK, 1841 [*non VÁVRA*, 1895] [**C. cruciata*]. Like *Cypridellina*, but with subcentral swelling replaced by pronounced backwardly directed tubercle, curved nuchal furrow developed behind tubercle; other tubercles may be present; prow not so pronounced, commonly extending no farther than rostrum; caudal siphon well developed. *Carb.*, Eu.—FIG. 325, 2. *C. sp.*, Carb. (Visé.), Belg.; 2a-d, carapace L, dors., ant., post. (rostrum reconstr.), $\times 10$ (365).

Cypridellina JONES & KIRKBY, 1874 [**C. clausa*; SD BASSLER & KELLETT, 1934]. Like *Cypridinella* but with subcentral swelling slightly above center on each valve. *Carb.*, Eu.—FIG. 325, 3. *C. galea* JONES & KIRKBY, Eire; carapace L, $\times 7$ (39).

Sulcuna JONES & KIRKBY, 1874 [**S. lepus*; SD BASSLER & KELLETT, 1934]. Like *Cypridellina* but subcentral swelling replaced by backwardly directed dorsal protuberance and defined posteriorly by shallow nuchal furrow. *Carb.*, Eu.—FIG. 325, 4. *S. cuniculus* JONES & KIRKBY, Eire; LV lat. (reconstr., rostrum and sinus hypothetical), $\times 8$ (Sylvester-Bradley, n).

Family RHOMBINIDAE
Sylvester-Bradley, 1951

[Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Rostrum truncate, down-curved; anteroventral border receding; marginal rim developed more or less strongly along ventral border. *Carb.*

Rhombina JONES & KIRKBY, 1874 [**R. hibernica*; SD BASSLER & KELLETT, 1934]. Posterior tumid, posterior margin evenly curved; no nuchal furrow. *L.Carb.*, Eu.—FIG. 326, 2. *R. oblonga* (JONES & KIRKBY), Eire; 2a,b, LV lat., dors., $\times 10$; 2c, muscle scar, $\times 20$ (366).

Palaeophilomedes SYLVESTER-BRADLEY, 1951 [**Philomedes bairdiana* JONES & KIRKBY, 1874]. Posterior margin triangular, possibly with siphon; short nuchal furrow pointing toward posteroventral corner. *Carb.*, Eu.—FIG. 326, 1. **P. bairdianus* (JONES & KIRKBY), L.Carb., Eire.; RV lat., $\times 10$ (366).

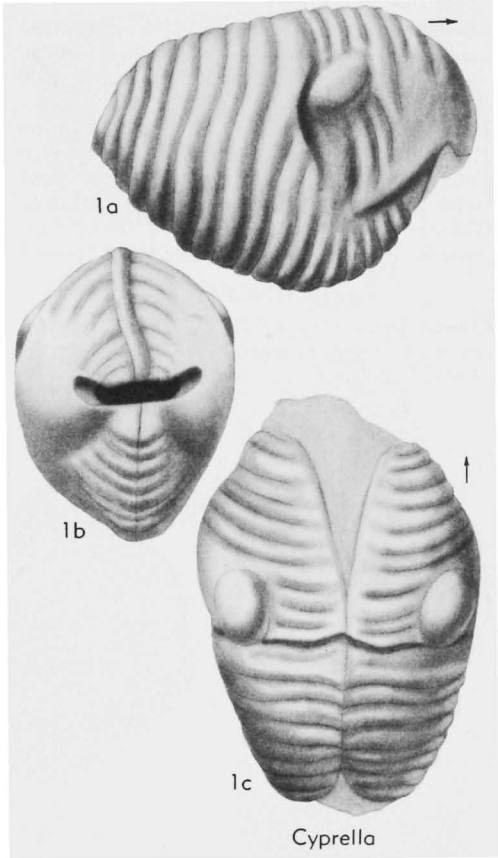


FIG. 324. Cypridellidae (p. Q402).

Family Sarsiellidae
Brady & Norman, 1896

[= Rutidermatidae BRADY & NORMAN, 1896] [Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester, with addition by I. G. SOHN, U.S. Geological Survey]

Carapace strongly calcified, heavily sculptured and ornamented, subcircular or oval in lateral outline, with pronounced caudal process; rostrum and sinus present or absent. Sexual dimorphism extreme. ?*M.Dev.*, *Rec.*

Sarsiella NORMAN, 1869 [**S. capsula*] [= *Eurypylus* BRADY, 1869; *Nematohamma* BRADY & NORMAN, 1896]. Prominent, more or less acuminate caudal process somewhat below mid-line, and usually with less prominent posterodorsal process; carapace of female subcircular, without rostrum or sinus, that of male with pronounced overhanging blunt rostrum, as in *Streptoleberis*. *Rec.*, cosmop.—FIG. 327, 1. **S. capsula*, Medit.; 1a, ♂ carapace L; 1b,c, ♀ carapace L, dors.; all $\times 40$ (?).

Rutiderma BRADY & NORMAN, 1896 [**R. compress.*]. Males unknown, females resembling males of

Sarsiella but longer and with less pronounced rostrum and caudal process. *Rec.*, cosmop.—FIG. 328, I. **R. compressa*, Atl.; ♀ carapace L, ×40 (258a).

?*Svarogites* PŘIBYL, 1951 [**S. spinosus*]. Differs from *Sarsiella* in large size (3 mm.-6 mm.), presence of an anterodorsal node and posterodorsal spine, and subcentral circular impression. *M.Dev.*, C.Eu.—FIG. 327, 2. **S. spinosus*, Czech.; 2a, b, carapace (holotype) R, post., ×50 (248a). [SOHN.]

Family UNCERTAIN

Cyprosis JONES, 1881 [**C. haswelli*]. Genus based on single specimen, subsequently lost; characters doubtful. *Sil.*, Scot.

**Superfamily HALOCYPRIDACEA
Dana, 1852**

[*nom. transl. et correct.* SYLVESTER-BRADLEY, herein (ex Halocypridae DANA, 1852)] [=Halocypriformes SKOGSBERG, 1920] [Diagnosis by P. C. SYLVESTER-BRADLEY, University of Leicester]

Carapace almost or entirely uncalcified; rostrum projecting in continuation of more or less straight dorsal border. *Rec.*

Family HALOCYPRIDIDAE Dana, 1852

[*nom. correct.* SYLVESTER-BRADLEY, 1956 (pro Halocypridae DANA, 1852)] [Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Characters of superfamily. *Rec.*

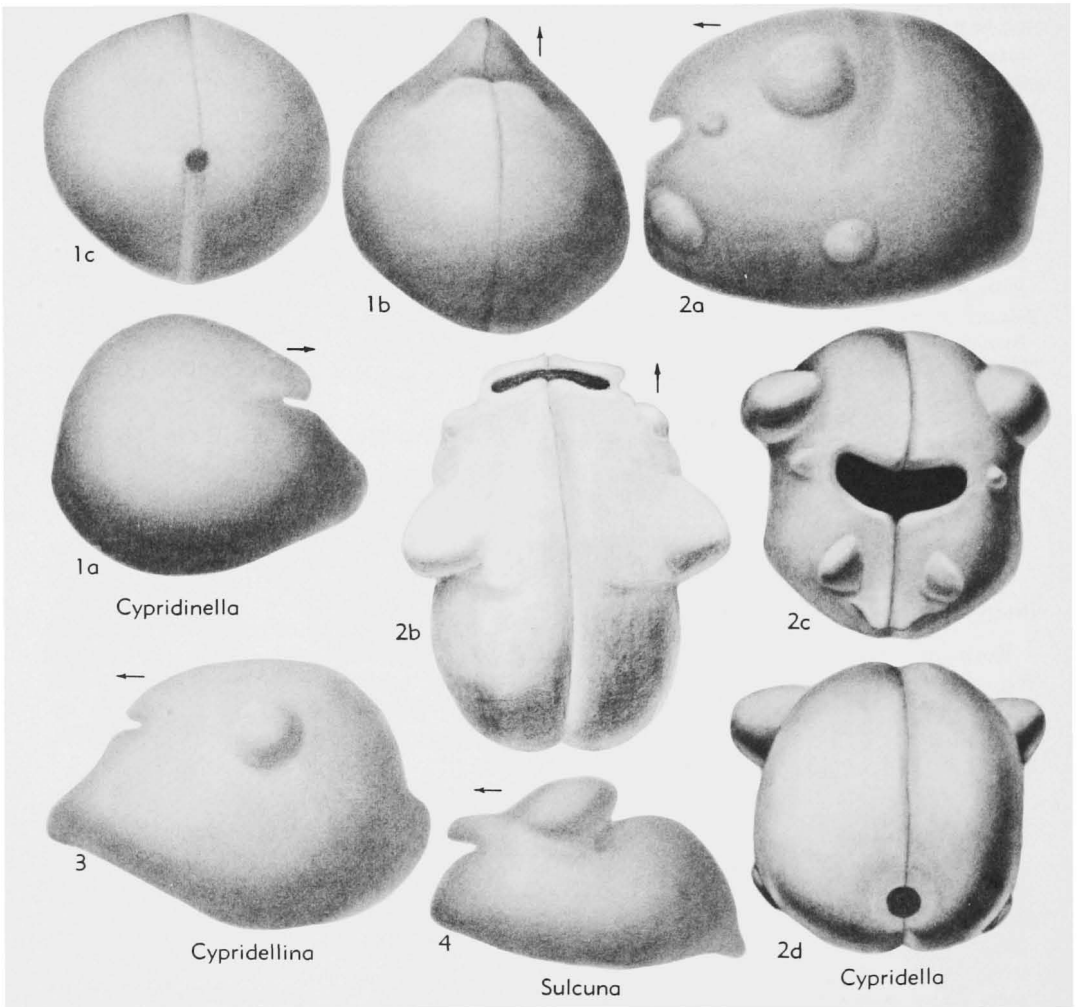


FIG. 325. Cypridinellidae (p. Q403).

Halocypris DANA, 1852 [**Conchaecia inflata* DANA, 1849; SD SYLVESTER-BRADLEY, 1956] [= *Halocypris* CLAUS, 1874]. Carapace short, rostrum slight. *Rec.*, cosmop.—FIG. 329,2. **H. inflata* (DANA), *Rec.*, ♂ carapace L, $\times 30$ (Dana, 1852).

Conchoecia DANA, 1849 [**C. magna* CLAUS, 1874 (ICZN pend.)] [= *Conchaecia* DANA, 1849 (ICZN pend.); *Conchoecetta*, *Conchoecilla*, *Conchoecissa*, *Mikroconchoecia*, *Pseudoconchoecia*, *Paraconchoecia* CLAUS, 1890; *Microconchoecia* G.W.MÜLLER, 1894; *Metaconchoecia* GRANATA & CAPORIACCO, 1949]. Carapace elongate, rostrum pronounced, pointed. *Rec.*, cosmop.—FIG. 329,1. *C. spinirostris* (CLAUS), *Atl.*; ♂ carapace L, $\times 50$ (Sylvester-Bradley, n).

Macroconchoecia GRANATA & CAPORIACCO, 1949 [**Conchoecia reticulata* MÜLLER, 1906]. Like *Conchoecia*, but shell reticulate. *Rec.*, *Atl.*, Ind.O.—FIG. 329,3. **M. reticulata*, *Rec.*, *Atl.*; carapace L, $\times 60$ (258a).

Euconchoecia G. W. MÜLLER, 1890 [**E. chierchiae*]. Carapace as in *Conchoecia* except that so-called asymmetrical glands are symmetrical. *Rec.*, cosmop.

Archiconchoecia G. W. MÜLLER, 1894 [**A. striata*]. Shell as in *Conchoecia*. *Rec.*, cosmop.

Suborder CLADOCOPINA Sars, 1866

[*nom. correct.* SYLVESTER-BRADLEY, herein (*pro* Cladocopa Sars, 1866)] [Type: = *Polycope* Sars, 1866; SD SYLVESTER-BRADLEY, herein] [= *Polycopiformes* SKOGSBERG, 1920] [Diagnosis by P. C. SYLVESTER-BRADLEY, University of Leicester]

Carapace subcircular in lateral outline, without gape of any kind; muscle-scar pattern composed of 3 closely juxtaposed scars. Described species (except doubtful Paleozoic fossils) all rather small (less than 0.8 mm.). Both antennules (= "first antennae") and antennae (= "second antennae") modified for swimming. ?*Dev.*, *Miss.-Rec.*

The description of this division by Sars (1866) is as follows:

"Lower antennae [antennae proper] biramous, both rami fully evolute, mobile and natatory. Upper antennae [antennules] also natatory, not geniculate, terminated by a small bundle of long setae. Mandibles distinguished by a short and very small, pediform palp that serves as a branchial appendage. There are only two pairs of thoracic limbs, the anterior large, bifid, natatory, the posterior membranous and branchial. No eyes. Post abdomen divided into two short plates [furcal rami] that are pointed posteriorly." [Transl. by SCOTT & WAINWRIGHT.]

Family POLYCOPIIDAE Sars, 1866

[Materials for this family prepared by P. C. SYLVESTER-BRADLEY, University of Leicester]

Characters of order. ?*Dev.*, *L.Jur.-Rec.*

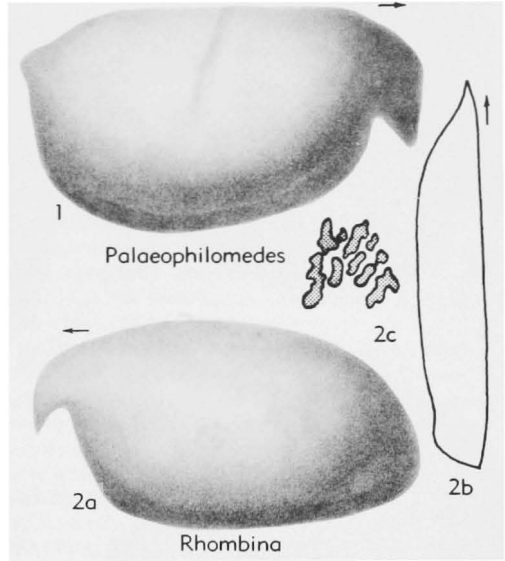


FIG. 326. Rhombinidae (p. Q403).

Polycope Sars, 1866 [**P. orbicularis*] [= *Cypridinopsis* ARMSTRONG, 1871]. Carapace entire in lateral outline except for minute downward-directed spine developed on anterior margin in some, perfect circle of outline broken by faint indication of cardinal angles and slightly protuberant anterior end; surface smooth, punctate or reticulate. Narrow vestibules developed in both valves in posteroventral area; hinge line straight, sunk in slight dorsal furrow; in type species anterior and posterior elements of LV hinge with short ridge, above groove, above projecting ridge and RV with ridge above groove; median element simple, in some other species (as *P. sublaevis*) this structure is reversed. ?*Dev.*, *L.Jur.-Rec.*, cosmop.—FIG. 330,2a-c. **P. orbicularis*, *Rec.*, off Norway; 2a,b, ♂ carapace L, dors., $\times 70$ (65); 2c, LV int., $\times 70$ (Sylvester-Bradley, n).—FIG. 330,2d,e. *P. sublaevis* Sars, *Rec.*, *Atl.*; 2d,e, LV int., RV int. (showing reversed hinge), $\times 70$ (Sylvester-Bradley, n).

Polycopis G. W. MÜLLER, 1894 [**Polycope compressa* BRADY & ROBERTSON, 1869; SD SYLVESTER-BRADLEY, herein]. Like *Polycope* but more compressed and with anterior border serrate. *Rec.*, cosmop.—FIG. 330,1. **P. compressa*, off Norway; 1a,b, carapace L, dors., $\times 70$ (65).

Parapolycope KLIE, 1936 [**P. germanica*]. Shell as in *Polycope*. *Rec.*, Balt.

Family UNCERTAIN

?**Discoidella** CRONEIS & GALE, 1938 [**D. simplex*]. Carapace small, subcircular, coarsely reticulate, widest dorsally. Hinge line short, straight, lying below dorsal border in conspicuous hinge channel.

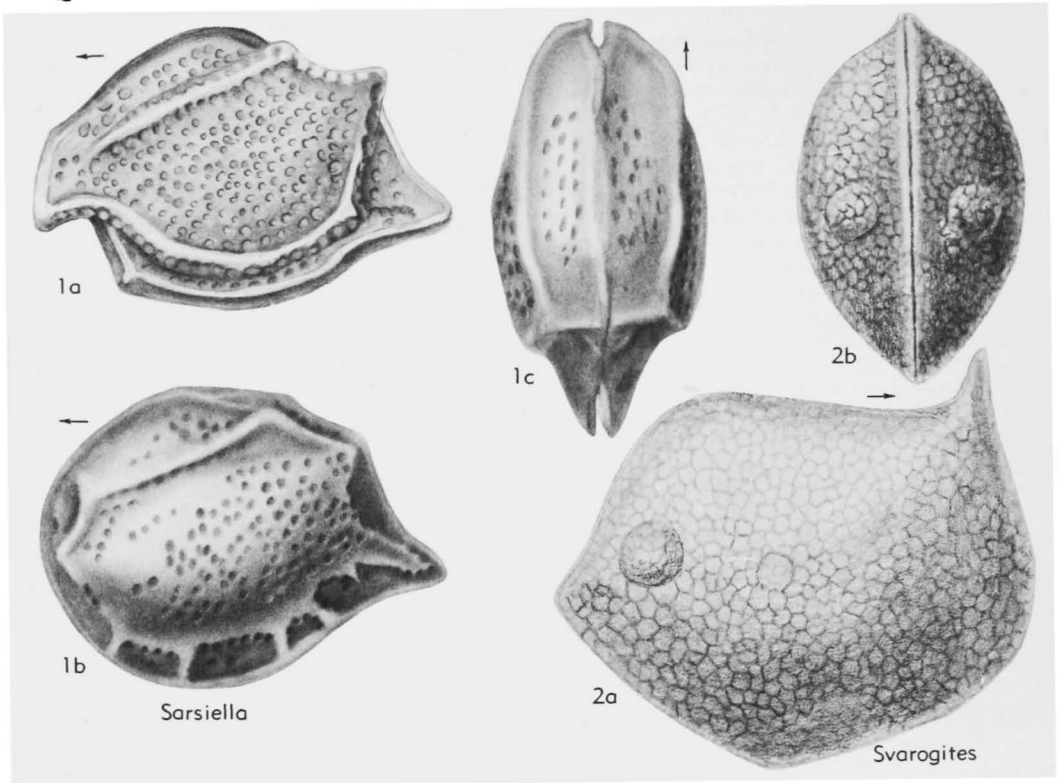


FIG. 327. Sarsiellidae (p. Q403-Q404).

This genus is referred to the Cladocopina with considerable doubt. *Miss.*, N.Am.—FIG. 330,3a. **D. simplex*, *Miss.* (Chester), Ill.; carapace L, $\times 100$ (132).—FIG. 330,3b. *D. ampla* COOPER, *Mis.* (Chester); carapace post., $\times 100$ (Sylvester-Bradley, n).

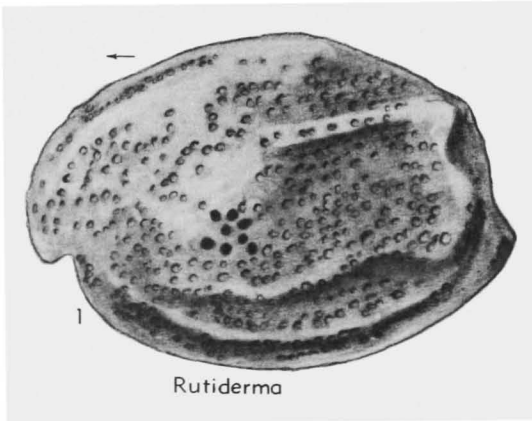


FIG. 328. Sarsiellidae (p. Q403-Q404).

OSTRACODA, Order and Suborder UNCERTAIN

Family BUREGIIDAE PolenoVA, 1953

[Materials for this family prepared by R. H. SHAVER, Indiana University and Indiana Geological Survey]

Carapace subovate, with straight dorsal border, high, rounded at extremity, RV commonly overlapping LV, some with ventral projections or spines. *Dev.*

Buregia ZASPELOVA in POLENOVA, 1953 [**B. bispinosa*]. Characters of family. *Dev.*, Russ.—FIG. 331,1a-d. **B. bispinosa*; 1a-d, RV lat., dors., LV lat., dors., $\times 33$ (278).—FIG. 331,1e-g. *B. krestovnikovi* POLENOVA; 1e-g, carapace (holotype) L, dors., vent., $\times 30$ (278).

OSTRACODA, Order, Suborder, and Family UNCERTAIN

[Materials for this section prepared by authors as severally recorded at end of generic descriptions. Included also by the editor are names of genera published in the USSR 1960 Treatise which are not contained in preceding sections of this Treatise.]

Acrossula KUMMEROW, 1953 [**A. u-scripta*]. Straight-backed, with long hinge line; quadri-lobate or trilobate, with large L_2 and sharp-ridged

L_1 joined with L_3 by connecting structure; velar structure seemingly developed and some with carinal ridge; subvelar area stated to be channeled. Dimorphism not observed. *Dev.*, Eu.—FIG. 332, 1. **A. u-scripta*, M.Dev., Ger.; 1a, RV (holotype), $\times 12$; 1b,c, carapace vent., post., $\times 12$ (47). [HESSLAND.]

Ampuloides POLENOVA, 1952 [**A. verrucosa*]. Straight-hinged, somewhat preplete, nonsulcate, LV slightly larger than RV; adult specimens generally very gibbous, with furrow along free margin corresponding to interior septum in anterior part; dimorphism possibly indicated by difference in gibbosity; surface warty. *M.Dev.-U.Dev.* USSR.—FIG. 333,1. **A. verrucosa*, M.Dev. (U. Givet.); 1a, carapace (holotype) L; 1b, vent. (post. end up), $\times 45$ (60). [HESSLAND.]

Arcuaria NECKAJA, 1958 [**A. sineclivula*]. Generally high, lateral outline subtriangular, anterior margin sloping more steeply than posterior, ventral concave in central part; valves globose (most in dorsal region), LV overlapping RV along free margin and RV overlapping LV along central or posterocentral part of dorsal margin; no adventral or interior structures or dimorphism reported; surface smooth but some shells provided with tubercles or fine spines in posterior part. *M.Ord.* Eu.(NW.Russian Platform).—FIG. 333,4. **A.*

sineclivula, Lithuania; 4a,b, carapace (holotype) R, dors.; 4c, RV lat. (juv. instar), all $\times 15$ (264). [HESSLAND.]

Ballardina HARRIS, 1957 [**B. concentrica*]. Hinge line straight, carapace less than 2 mm. long in known species, compressed, elongate-oval, S_2 a centrodorsal depression or pit, elongate, sloping posteroventrally, constricted medially, lying below and behind prominent dorsal ridge that curves downward in anterodorsal part of valve; velar ridge, apparently restricted. *M.Ord.*, N.Am.—FIG. 333,2. **B. concentrica*, USA(Okla.); RV lat., $\times 25$ (161). [KESLING.]

Balticella THORSLUND, 1940 [**B. oblonga*]. Subquadrate, long, straight-backed, bisulcate; LV overlapping RV, especially along ventral margin; deep median sulcus extending more than half of valve height; anterior sulcus subdued; well-defined large ovate lobe at anterior margin of median sulcus not reaching dorsal margin. *Ord.*, Eu.-N.Am.—FIG. 332,3. *B. deckeri* HARRIS, M.Ord. (Edinburg F.), USA (Va.); 3a-c, RV lat., int., LV lat., $\times 20$ (J. C. Kraft, n). [MOORE.]

Boucekites PŘIBYL, 1951 [**B. devonicus*]. Nonsulcate, equivalved, without overlap, smooth, ample or somewhat preplete; dorsal margin slightly convex, hinge straight; cardinal angles ending in short rounded spines; no adventral structures un-

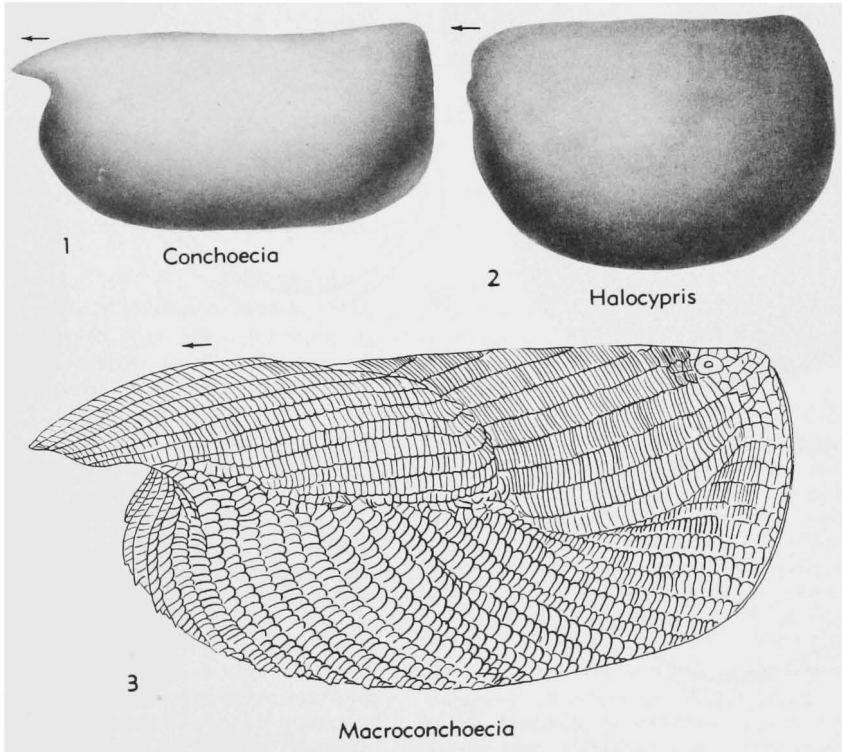


FIG. 329. Halocyprididae (p. Q405).

less represented by permanent posteroventral tubercles one on each valve. Dimorphism not observed. *M.Dev.*, Eu.—FIG. 332,5. **B. devonicus*, Czech.; LV lat., $\times 35$ (284). [HESSLAND.]

Brachycytheropteron KUZNETSOVA, 1960 [**Cytheropteron bicornutum* ALEXANDER, 1933]. *L.Cret.*, Eu. (Caucasus), N.Am.(Tex.).

Celechovites POKORNÝ, 1950 [**C. cultratus*]. Straight-backed, elongate, anterior margin rounded, posterior end pointed at about mid-height, ventral margin parallel to dorsal, anterior and ventral part of posterior areas pinched; inequivalved (LV larger than RV); no adventral structures, dimorphism not observed. *M.Dev.*, Eu.—

FIG. 332,2. **C. cultratus*, Czech.; 2a,b, carapace (holotype) R, vent., $\times 50$ (275). [HESSLAND-SHAVER.]

Ceratocypris POULSEN, 1934 [**C. symmetrica*]. Non-sulcate, nonsculptured, without adventral structure except possibly a rounded adventral bend, area between bend and ventral margin being slightly channelled; ventral region swollen and extended backward into hollow spine; surface smooth; possibly dimorphic, as indicated by differences in gibbosity. *Ord.-Sil.*, Eu.(Baltoscandia)-Greenl.—FIG. 332,9. **C. longispina* HESSLAND, L.Ord. (Llanvirn.), Swed.; 9a-c, LV lat., vent., ant., $\times 45$ (30). [HESSLAND.]

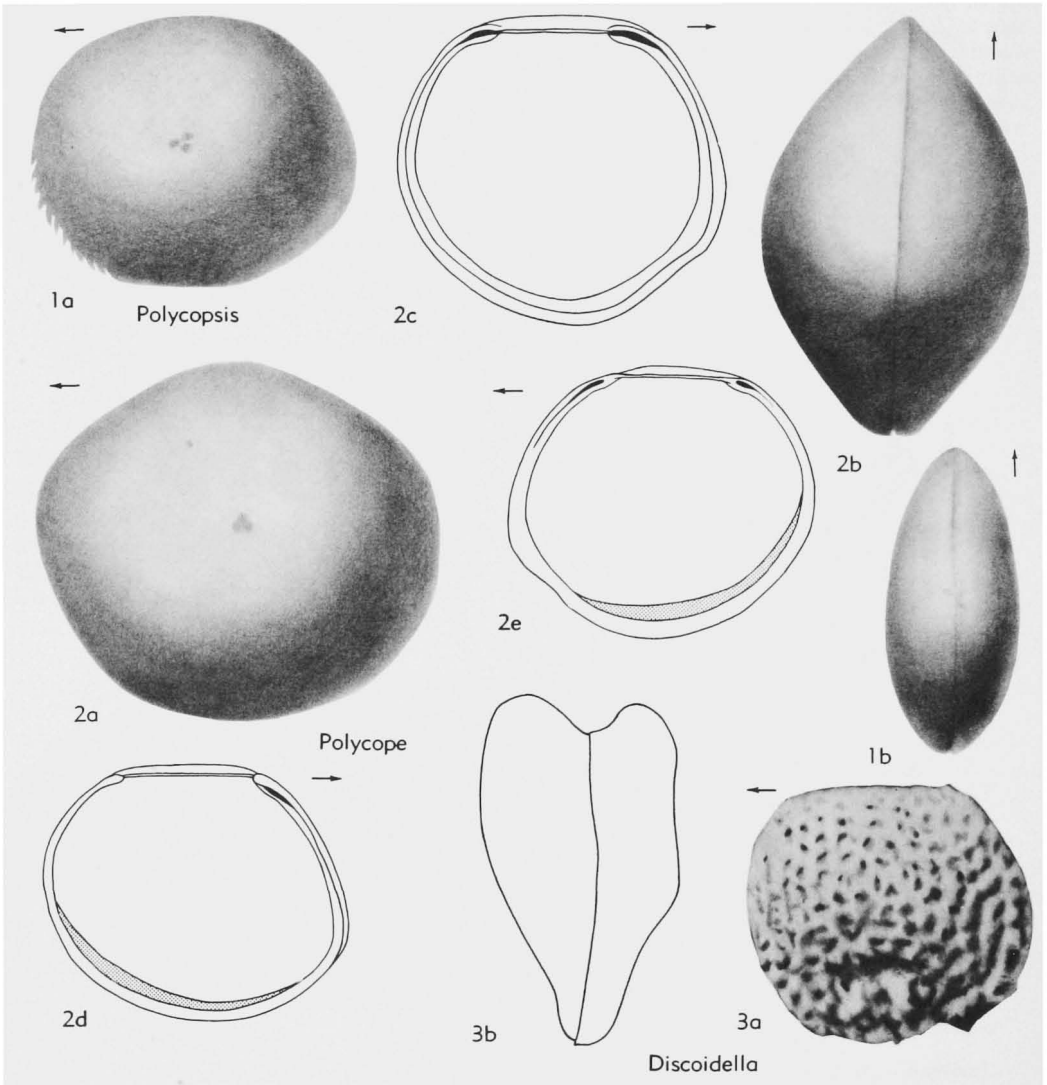


FIG. 330. Polycopidae, Cladocopina, Family Uncertain (p. Q405-Q406).

Coeloenellina POLENOVA, 1952 [**C. parva*]. *Dev.*, USSR.

Craspedopyxion JAANUSSON, 1957 [**Primitia undulosa* ÖPIK, 1937]. Outline subcircular, straight-backed, postplete, strongly convex; with single deep sulcus almost at mid-length of valve, and prominent node behind sulcus; flattened marginal border widest at front and rear. *M.Ord.*, NW.Eu. (Est.).—FIG. 334,1. **C. undulosum* (ÖPIK); LV lat.(reconstr.), $\times 35$ (36). [MOORE.]

Ginella V. IVANOVA, 1960 [(*pro Pinella* IVANOVA, 1955) (*non* STEPHENSON, 1941)] [**Pinella tenuispina* IVANOVA, 1955]. *M.Ord.*, USSR.

Hemiaechminoides MORRIS & HILL, 1952 [**H. monospinosus*]. Nonsulcate, smooth, slightly postplete, hinge straight, dorsal margin somewhat convex; valves unequal, RV overlapping LV along entire free border, LV provided with dorsal spine directed laterally-backward; no adventral structures. Dimorphism not observed. *M.Sil.*, N.Am.—FIG. 332,8. **H. monospinosus*, USA (Tenn.); 8a,b, carapace (reconstr.) L, post., $\times 40$ (254). [HESSLAND.]

Hupehella HOU, 1955 [**H. lunata*]. Outline subovate, nonsulcate (or possibly with slight sulcal depression), swollen umbo extending above hinge which is straight and provided with terminal sockets and slitlike central furrow in LV (no structures are observed in hinge of RV); ventral margin and ventral parts of terminal margins surrounded by broad flange which may be concave ventrally. Dimorphism not reported. Surface smooth or reticulate. *U.Dev.*, E.Asia.—FIG. 333, 3. **H. lunata*, Hsiehkingso F., China (Changyang Distr., Hupeh Prov.); 3a, RV (syntype) lat.; 3b, LV (syntype) int.; $\times 37$ (176). [HESSLAND.]

Ilmenoindivisia EGOROV, 1954 [**I. wjadica*]. *Dev.*, USSR.

Indivisia ZASPELOVA, 1954 [**I. indistincta*]. *Carb.*, USSR. (Type genus of Indivisiinae EGOROV, 1954).

Ivaria NECKAJA, 1960 [(*pro Glossopsis* NECKAJA, 1953) (*non* BUSH, 1904; *nec* HESSLAND, 1949)] [**Glossopsis robusta* HESSLAND, 1949]. *Ord.*, USSR.

Moorea JONES & KIRKBY in JONES & HOLL, 1869 [**M. silurica* JONES & HOLL, 1869; SD S. A. MILLER, 1892]. Small, straight-backed, subhemicircular, with raised marginal rim continuing along dorsum below contact for about 0.7 of length of dorsal margin, then turning sharply down and ?posterovertrally to merge with convexity of valve; surface pitted. *Sil.*, Eng. [SOHN.]

Paleocythere TOLMACHOFF, 1926 [**P. tyra*]. Reminiscent of male cavellinids, with ovate outline in lateral view, moderately blunt posterior extremity in dorsal view, and strong RV-over-LV overreach; narrow anterior sulcus and differentiated ridge-and-groove hinge with terminal teeth in LV and sockets in RV may denote placement in Palaeocopida;

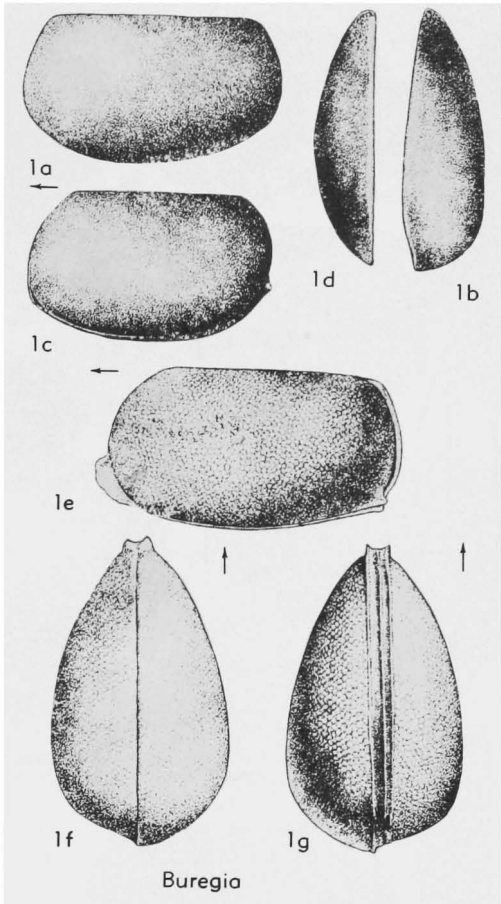


FIG. 331. Ostracoda, Order and Suborder Uncertain (p. Q406).

seemingly differs from *Ellesmeria* only by its smooth surface. Adductor muscle scar and contact-marginal structures unknown. *M.?Dev.*, Ellesm.—FIG. 332,6. **P. tyra*; 6a,b, carapace L, dors., $\times 13$ (370). [SHAVER.]

Parapyxion JAANUSSON, 1957 [**Primitia subovata* THORSLUND, 1948]. Straight-backed, nonsulcate or unisulcate, dorsal region steeply sloping but not protruding above hinge line, peripheral area along free margins gently sloping, without marginal depression; adductor muscle impression well defined on lateral surface, rounded, moderately large. *M.Ord.-U.Ord.*, Eu.(Swed.-Czech.).—FIG. 334, 2. **P. subovatatum* (THORSLUND), *M.Ord.*, Swed.; LV lat. (reconstr.), $\times 35$ (36). [MOORE.]

Platyrhomboides HARRIS, 1957 [**P. quadratus*]. Trapezoidal in side view, straight-hinged, equivalved, triangular in transverse section, thickest through edge of flattened venter; surface smooth, punctate, reticulate or spinose. *Ord.*, N.Am.—FIG. 332,7. *P. sp.*, *M.Ord.*(Edinburg F.), USA

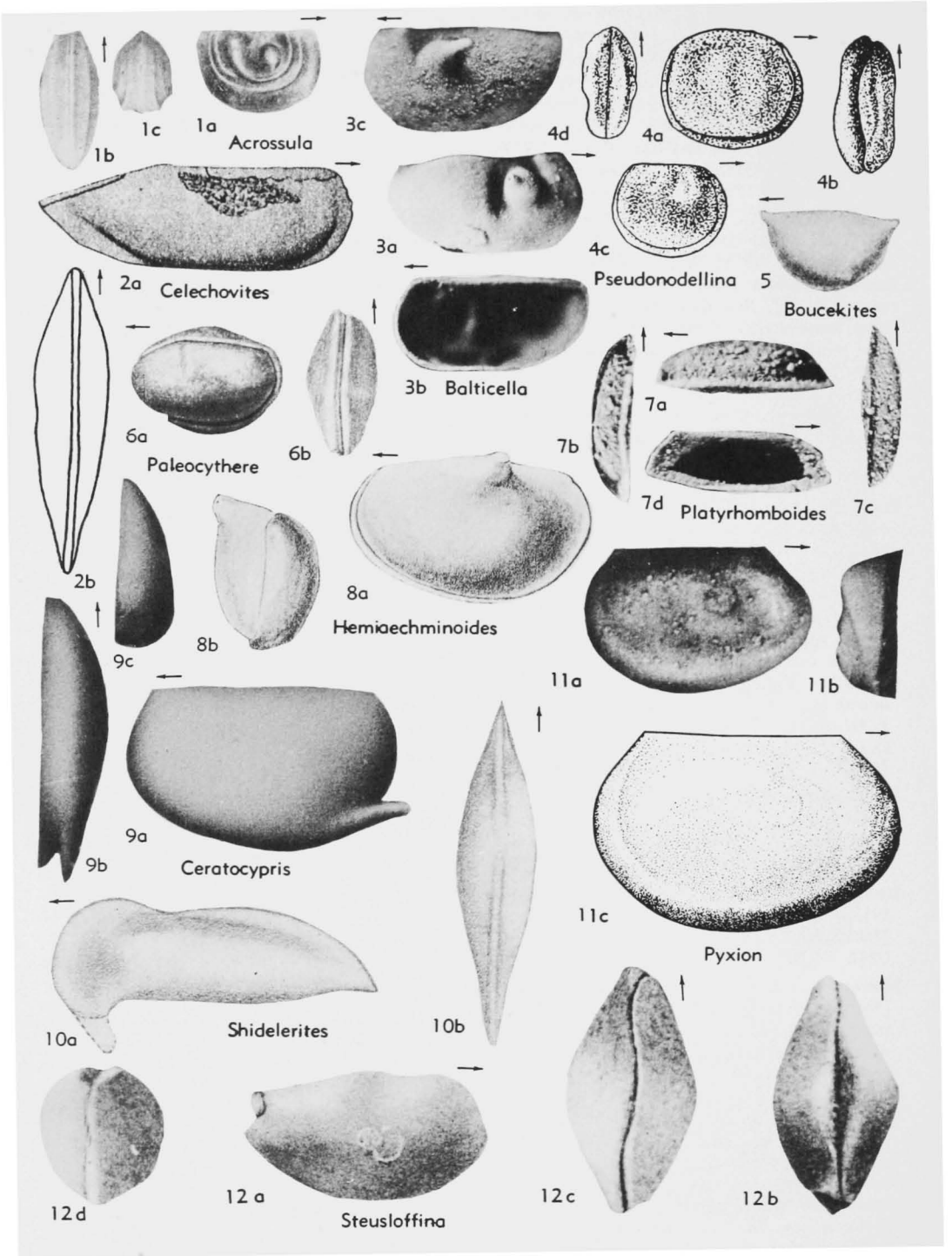


FIG. 332. Ostracoda, Order, Suborder, and Family Uncertain (p. Q406-Q412).

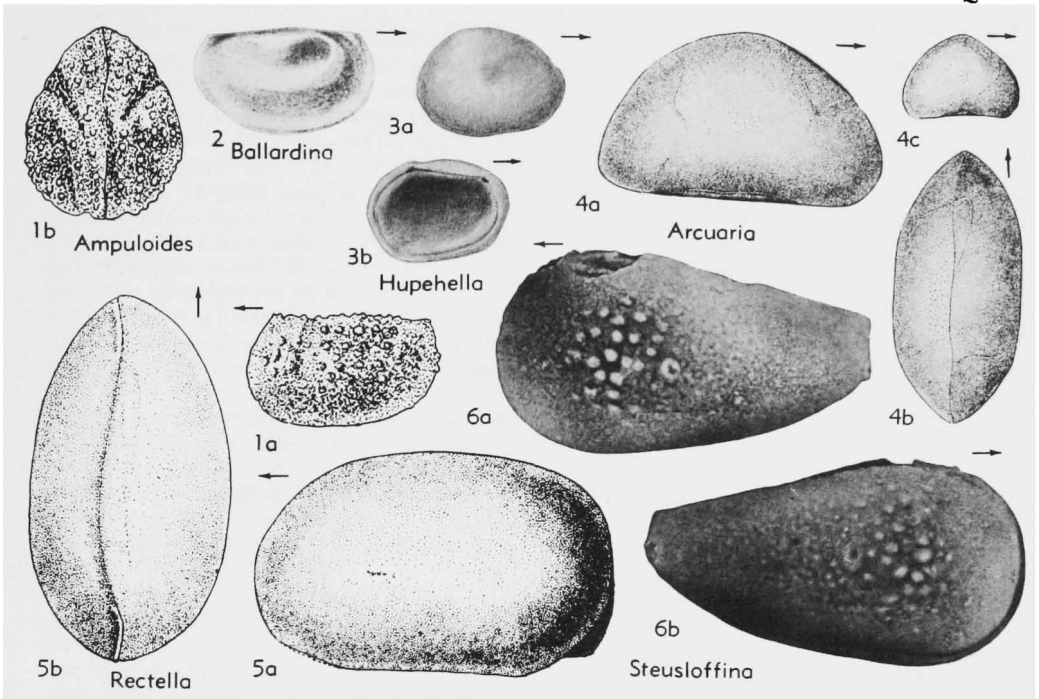


FIG. 333. Ostracoda, Order, Suborder, and Family Uncertain (p. Q407-Q412).

(Va.); 7a-d, LV lat., dors., vent., int., $\times 30$ (J. C. Kraft, n). [MOORE.]

Pseudonodellina POLENOVA, 1955 [**Nodella? parvula* POLENOVA, 1953]. Small, very high in relation to length, almost circular in lateral aspect; LV larger than RV, overlapping it along free margin; with elongate umbos, extending above hinge to cause convexity of dorsal margin; with 3 feeble dorsoventral lobes, no adventral structures. No dimorphism reported. *Dev.*, USSR.—FIG. 332,4a,b. *P. rotundata* POLENOVA; 4a,b, carapace R, dors., $\times 45$ (279).—FIG. 332,4c,d. *P. strelniensis* POLENOVA; 4c,d, carapace R, dors., $\times 45$ (279). [HESLAND-REYMENT.]

Pseudoperisocytheridea MANDELSTAM, 1960 [**Protocythere crassula* MANDELSTAM, 1947]. *Jur.*, Asia (Kazakhstan), S.Am.

Pyxion THORSUND, 1948 [**Primitia carinata* HADDING, 1913]. Postplete, nonsulcate to unisulcate (broad depression), presulcal node consisting of fairly large oblong knob, some shells also with postsulcal dorsal inflation; adventral structure constituting ridge or bend along entire free margin. Dimorphism not observed. *M.Ord.*, Eu.(Baltoscandia).—FIG. 332,11. **P. carinatum* (HADDING), M.Ord.(Caradoc), Swed.; 11a,b, RV (lectotype, THORSUND, 1948) lat., ant., $\times 25$; 11c, RV lat. (reconstr.), $\times 35$ (36). [HESLAND.]

Rectella NECKAJA, 1958 [*nom. subst. pro Mica* NECKAJA, 1952 (non BUDDE-LUND, 1908; nec PETRUNKEVITCH, 1925)] [**Mica inaequalis* NECK-

AJA, 1952]. Nonsulcate, lengthened, preplete, dorsal and ventral margins approximately parallel, dorsal corners rounded; inequivalved (LV larger); hinge depressed (dorsum epicline); dimorphism not observed; spines may be developed in posterior part. *Ord.*, ?*Dev.*, Eu.(Baltoscandia).—FIG. 333,5. **M. inaequalis*, M.Ord.(Caradoc), Lithuania; 5a,b, carapace L, vent., $\times 53$ (262).

Reginacypris SCHNEIDER, 1960 [**Cytherina abcessa* REUSS, 1850]. *Mio.*, Czech.-USSR(Urals).

Shidelerites MORRIS & HILL, 1951 [**S. typus*]. Subequivalved, smooth, slender, attenuate in dorsal and lateral views but with rounded anterior border in lateral view; anterior beaklike projection reminiscent of Cypridinidae but lacking slit; re-entrants in 2 long borders offer mechanical difficulty to either choice of hinge border; contact marginal structures and adductor muscle scar unknown. *M.Sil.*, Ind.—FIG. 332,10. **S. typus*; 10a,b, carapace (holotype) L, dors., $\times 28$ (253). [SHAVER.]

Sigillium KUZNETSOVA, 1960 [**S. procerum*]. [Type genus of Sigilliuminae MANDELSTAM, 1960 (*recte* Sigilliinae)]. *Paleog.*, USSR(Azerbaijan).

Steusloffina TEICHERT, 1937 [**S. ulrichi*]. Dorsal margin long, hinge depressed (dorsum epicline); outline of free margin asymmetrical, posterodorsal angle acute; nonsulcate; lateral prominence (bulb or spine) generally present, tending to be broken at base leaving characteristic crater-like depression; no adventral structure. Dimorphism not ob-

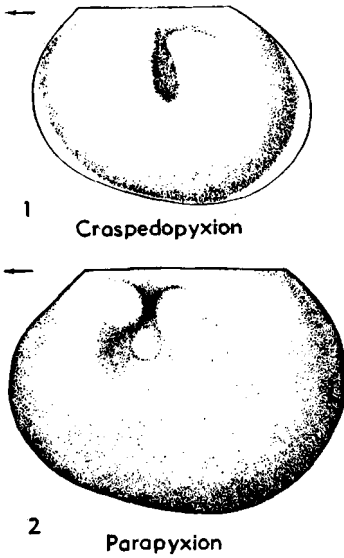


FIG. 334. Ostracoda, Order, Suborder, and Family Uncertain (p. Q409).

served. *M.Ord.-U.Ord.*, NW.Eu.(Baltoscandia)-Greenl.-N.Am.(Arct. Can.).—FIG. 332,12. **S. ulrichi*, *M.Ord.*(Trenton.), Can.(Arct.); 12a-d, carapace (holotype) R lat., dors., vent., ant., $\times 30$ (368).—FIG. 333,6. *S. papillosa* HESLAND, *U.Ord.* (Ashgill.), Est.; 6a,b, carapace (holotype) L, R, $\times 27$ (30). [HESLAND.]

Timanella EGOROV, 1950 [**T. typica*]. *Dev.*, USSR (Timan).

NOMINA DUBIA

Generic names published for ostracodes which in the course of collaborative work by authors contributing to the *Treatise* have not been placed in some category given in previous pages are gathered together here with such annotations as are available.

Allostraca ULRICH & BASSLER, 1932 [**A. fimbriata*]. Name given as explanation of a figured specimen of some representative of the Hollinacea, possibly *Apatobolbina* or *Chilobolbina*; no published description. Unrecognizable. *L.Miss.*, USA(Tenn.). [SCOTT.]

Antomis GÜRICH, 1896 [**A. bisulcata*]. Assigned to Leperditiiidae by author but may belong to Entomozoidae (5); description and illustrations insufficient for recognition. *Sil.*, Eu.(Pol.). [MOORE.]

Aparchitellina POLENOVA, 1955 [**A. decorata*]. Referred by author to Leperditellidae. *Dev.*, USSR.

Bernix JONES, 1884 [**Beyrichia tatei* JONES, 1864]. Based on poorly preserved specimens; seemingly differs from *Hypotetragona* in that dorsum is not incised. Unrecognizable. *Carb.*, Eng. [SHAVER.]

Bohemia SNAJDR, 1951.

Bryocypris RØEN, 1956.

Budnianella BOUČEK, 1936 [**B. caroli*]. Referred to Kirkbyidae by author; classified with Beyrichiacea, family uncertain by Henningsmoen (29). *Sil.*, Eu.(Czech.). [MOORE.]

Bursulella JONES, 1887 [**B. triangularis*]. Type species consists of small triangular shells with 2 spines projecting from ? ventral border; described as bivalved with crenulate contact margins. [Probably not an ostracode; species assigned to the genus by later authors not considered to be congeneric.] *U.Sil.*, Swed.(Gotl.). [SHAVER.]

Callizoe BARRANDE, 1872. Broken fragments of unidentifiable ostracode related to Isochilinidae. [SCOTT.]

Carnarvonopsis SWARTZ, 1954 [no type species]. Undescribed and unknown; *nom. nud.* [SCOTT.]

Caryon BARRANDE, 1872 [**C. bohemicum*] [= *Caryon* BARRANDE in BIGSBY, 1868 (*nom. nud.*)]. Two large (length up to 30 mm.), dissimilar valves described from molds; cannot be classed as representing Ostracoda; probably cephalic parts of trilobites. *U.Ord.*, Czech. [SHAVER.]

Colpos MOBERG, 1895 [**C. insignis*]. Unidentifiable. *U.Sil.*, Swed. [SHAVER.]

Cornia LUTKEVICH, 1939 [**C. papillaria* LUTKEVICH, 1937] [= *Cornia* LUTKEVICH, 1937, *nom. nud.*]. Holotype of type species is oval fossil with growth lines and length of 3.8 mm., poorly preserved in matrix; classified by LUTKEVICH and others as Phyllopora but listed by AGNEW as Ostracoda. *U.Perm.*, Russ. [SHAVER.]

Ctenentoma SCHMIDT, 1941 [**Entomis umbonata* STEUSLOFF, 1894]. Type species with frill and small node anterior to long median sulcus. The one known specimen and holotype possibly is an internal mold and is thought by some authors to belong to *Steusloffia*. Many species assigned to *Ctenentoma* are referable to other genera (29). ?*L.Ord.* (glacial erratic), Ger. [SHAVER.]

Cuselina AMMON in REIS, SCHUSTER, KOEHNE & AMMON, 1910 [**C. impressa*]. Type material consists of molds and broken carapaces in matrix; identified by author as Phyllopora or preferably Ostracoda; lectotype selected by GUTHÖRL has length of 4 to 5 mm. and is unidentifiable. *L.Perm.*, Ger. [SHAVER.]

Cyclocytheridea MANDELSTAM in LYUBIMOVA, 1955 [*?Type species.]. Carapace ovate with rounded ends, valves reticulate; hinge with terminal rounded teeth and median groove in RV. Name printed on plate as designation of *Camptocythere nordvikensis* MANDELSTAM (attributed to SHARAPOVA but a *nomen nudem*). [REYMENT-BOLD.]

Cytheropsis M'COY, 1849 [*non* SARS, 1866]. No species mentioned; first species assigned to genus is *Cytheropsis aldensis* M'COY, 1851. ?Senior synonym of *Pontocypris* BASSLER & KELLETT, 1934. *Cam.-Ord.*, Scot.

Cytherurina MANDELSTAM, 1958 [**Hemicytherura*

- cellulosa* HORNIBROOK (non NORMAN, ?date)]. [Genus currently invalid because based on junior homonym.] [BOLD.]
- Diagonella** SWARTZ, 1945 [no type species]. Undescribed and unknown; *nom. nud.* [SCOTT.]
- Dithyrocaris** PORTLOCK, 1843 [(*pro Argas* SCOULER, 1835) (non LATREILLE, 1795)] [**Dithyrocaris colei* PORTLOCK, 1843; SD SHAVER, herein]. Since PORTLOCK states: "Not having yet received Dr. SCOULER's generic characters," it is evident that the first valid publication and description of *Dithyrocaris* in PORTLOCK is solely by him, although he attributed the name to SCOULER. Not Ostracoda, although the 1850 examples of JONES probably are referable to Kirkbyidae. [SHAVER.]
- Donellina** EGOROV, 1950 [*D. grandis*]. Assigned by author to Kloedenellidae. *U.Dev.*, USSR. [LEVINSON.]
- Ellesmeria** TOLMACHOV, 1926 [**E. ovata*]. Subovate, RV overlapping LV all around; surface punctate (5). *Dev.*, Arct. N.Am.(Ellesmereland). [MOORE.]
- Elpinella** PŘIBYL & ŠNAJDR, 1950 [*Leperditia radiata* 1879]. Doubtfully referred to Entomoconchidae. *Ord.*, USA(Ohio). [HOWE.]
- Entomidella** JONES, 1873 [**Entomis buprestis* JONES in HICKS, 1872; SD JONES, 1884] [= *Leperditia buprestis* SALTER in HICKS, 1865 (*nom. nud.*)]. Holotype of type species is an elongate bivalved carapace 9 mm. long, with transverse fractures erroneously thought by JONES comparable to furrows of *Entomis*; possibly a branchiopod. ?*L. Cam.*, *M. Cam.*, ?*L. Ord.*, ?*Can.*(N.B.). [SHAVER.]
- Eocytherella** BONNEMA, 1933 [No type species designated]. Provisional name to include *Cytherella smithi* JONES, 1887, and *C. troedssoni* BONNEMA, 1933 (*nom. subst. pro Primitia tenera* TROEDSSON, 1918). *Sil.*, Eu.(Swed.). [HOWE.]
- Famenella** POLENOVA, 1953 [**F. incoeditis*].
- Fidelitella** V. IVANOVA, 1960 [*pro Trilobella* V. IVANOVA, 1955 (non WOODWARD, 1924)] [**Trilobella unica* V. IVANOVA, 1955]. Referred to Tetradellidae by author. *M. Ord.*, USSR. [LEVINSON.]
- Geffenites** CORYELL & SOHN, 1938 [**G. jungae*]. Based on inadequate material that probably is related to Hollinidae. *Miss.* USA(W.Va.). [SCOTT.]
- Gibba** FUCHS, 1920 [**Beyrichia (gibba) spinosa*]. Type species is invalid junior homonym of *B. spinosa* (HALL, 1852) HALL, 1859. [= *Paraechmina spinosa*]. *Dev.*, Eu.(Ger.). [HOWE.]
- Gipsella** EGOROV, 1950 [**G. polkvoii*]. Illustrations inadequate for recognition. *U.Dev.*, USSR. [SCOTT.]
- Glyptolichwinella** POSNER in SAMOILOVA, 1951.
- Golcondella** CRONEIS & GALE, 1938 [*G. sulcata*]. Type specimens examined by SCOTT, who considered them to be molts of unknown ostracodes. *Miss.*, USA(Ill.). [SCOTT.]
- Goniocypris** BRADY & ROBERTSON, 1870 [**G. mitra*]. Originally assigned to Ostracoda but consisting of tiny, smooth, triangular, bivalved shells later identified by BRADY & NORMAN as "fry of *Anodonta cygnaea*" (Mollusca) (BRADY & NORMAN). *Rec.*, Eng. [SHAVER.]
- Gravia** POLENOVA, 1952 [**G. aculata*]. *Dev.*, USSR. Type genus of Graviidae POLENOVA, 1952.
- Hesvechilus** BRADY, 1875. In list of Ostracoda by BRADY as *Hesvechilus contortus* (NORMAN); original source, if any, and combination unknown; (*nom. nud.*) *Rec.*, Fr.-Eng. [SHAVER.]
- Hlubocepina** PŘIBYL, 1955.
- Huarpina** RUSCONI, 1954.
- Isocythere** TERQUEM, 1885 [**I. nova*]. P. C. SYLVESTER-BRADLEY reports (19 February, 1960) that his examination of TERQUEM's type specimens establishes that they are "clearly not as described." *Jur.*, Eu.(Fr.). [MOORE.]
- Jonesina** ULRICH & BASSLER, 1908 [**Beyrichia fastigiata* JONES & KIRKBY, 1867]. Straight-backed small trilobate ostracodes, hinge and overlap unknown (type lost, *fide* JOHNSON, 1936). [Most species referred to this genus belong to *Geisina* and *Hypotetragona*.] *L. Carb.*, Eng.
- Junctocytheretta** Anonymous, 1956, in MANDELSTAM *et al.* Printed as name on plate for species *J. signata* MANDELSTAM; in descriptive text referred to as *Eucytherura signata* M. The name *Junctocytheretta* is crossed over in MANDELSTAM's personal copy of the paper. [REYMENT.]
- Kelletella** DELO, 1930 [**K. naviculata*]. Only known specimen is believed to be a steinkern; indeterminable. *U. Penn.*, Tex. [SCOTT.]
- Leioditia** ULRICH in JONES, 1891 (*nom. nud.*). ?Equivalent to *Elpezoe* PŘIBYL, 1950.
- Leioprimitia** KUMMEROW, 1939 [**L. punctata*]. Referred to Primitiidae [Leperditellidae] by author. *L. Carb.*, Eu.(Ger.). [MOORE.]
- Leptoprimitia** KUMMEROW, 1953 [**L. compressa*]. Referred to Primitiidae [Leperditellidae] by author. *Dev.*, Eu.(Pol.). [MOORE.]
- Lichwinella** POSNER, 1948.
- Lucasella** STEWART, 1936 [**L. mundula*]. Holotype a badly corroded steinkern of undeterminable affinities. Species described by STEWART & HENDRIX belong to *Graphiadactyllis*. *Dev.*, Ohio.
- Monoculus** LINNÉ, 1758. Apparently, no type species designated subsequently among 9 referred to genus by LINNÉ, of which 6 have been assigned by later authors to other genera in several orders of non-ostracode Crustacea and 3 are considered to be unidentifiable ostracodes; at least *M. conchaceus* has had fresh-water cypridids assigned to it by later authors. *Rec.* [SHAVER.]
- Neochilina** MATERN, 1929 [**N. binsenbachensis*]. Referred to Eurychiliniinae by author and Beyrichiacea, family uncertain, by HENNINGSMOEN, 1953. *Dev.*, Eu.(Ger.). [HOWE.]
- Nezamyslia** PŘIBYL, 1955.
- Nothozoe** BARRANDE, 1872 [**N. pollens*] [= *Nothozoe* BARRANDE in BIGSBY, 1868 (*nom. nud.*)]. Nearly featureless internal molds shaped like

- some ostracodes, but excessively large (length up to 65 mm.; possibly a leperditiid (BARRANDE). ?*Cam.*, ?*Sil.*, Eu.-?N.Am. [SHAVER.]
- Novakina** BOUČEK, 1936 [**N. applanans*]. Referred to Aechmininae by author and to Beyrichiacea, family uncertain by HENNINGSMOEN (29). *Sil.*, Eu.(Czech.). [HOWE.]
- Opisthoplax** KUMMEROW, 1943 [**O. compressa*]. Referred to Primitiidae [Leperditellidae] by author. *Sil.*, Eu.(E.Ger.). [HOWE.]
- Orozoe** BARRANDE, 1872. Based on molt stages of form possibly similar to Aristozoe, unidentifiable. [SCOTT.]
- Orthocochoecia** GRANATA & CAPORACCIO, 1949 [no type species designated]. Referred to Halocyprididae by authors. *Rec.*, *Medit.* [HOWE.]
- Paradoxorhyncha** CHAPMAN, 1904 [**P. foveolata*]. Based on misinterpreted type specimen obscured by matrix; unrecognizable. *Jur.*, W.Austral. [SYLVESTER-BRADLEY.]
- Paragraphylus** CORYELL & ROZANSKY, 1942 [**P. reticulatus*]. [Holotype a broken and corroded specimen; unrecognizable.] *Miss.*, Ill.
- Parajonesites** IVANOVA, 1955 [**P. notabilis*]. Referred to Primitiidae [Leperditellidae] by author. *U.Ord.*, USSR. [LEVINSON.]
- Parenthetica** SWARTZ, 1945. Undescribed; name only given in list. *L.Dev.*, N.Y.-Md.-W.Va. [SWARTZ (January, 1959, letter to SHAVER) states name is not a misprint or *lapsus calami* for *Parenthatia* KAY, as suggested by HOWE (1955), but a *nomen nudum*.] [SHAVER.]
- Plagioneophrodes** MOREY, 1935 [**P. uninodosus*]. [Types lost, according to R. E. PECK (October, 1955). Illustrations and descriptions inadequate for determining affinities.] *Dev.*, ?*L.Miss.*, Mo.
- Pulvillites** ÖPIK, 1937 [**P. triangulum*]. Referred to Cypridacea by author. *Ord.*, Eu.(Est.). [HOWE.]
- Pyxiprimitia** SWARTZ, 1936 [**P. ventriclefta*]. Referred to Primitiidae [Leperditellidae] by author, Drepanellidae by SCHMIDT (69), and Beyrichiacea family uncertain, by HENNINGSMOEN (29). *Dev.*, USA (Pa.). [HOWE.]
- Quadricollina** ÖPIK, 1953 [**Q. initialis*]. Referred to Drepanellidae by author. *L.Sil.*, Austral. [LEVINSON.]
- Russia** POLENOVA, 1952 [**Gravia (Russia) unicosata*]. Referred to Acronotellidae by author. *Dev.*, USSR. [HOWE.]
- Sacculus** NEVIANI, 1928 [non GOSSE, 1851; nec HIRASE, 1927]. RUGGIERI (305) reports that name was published for 2 species; *Cythereis (Sacculus) trigibbosa* and *C. (S.) tetragibbosa*, the first classed by RUGGIERI as synonym of *Cypridina haidingeri* REUSS (1849), which he thinks probably belongs to *Bradleya*. The second species is really not identifiable, but probably is some representative of *Gaudites. Tert.*, Italy. [HOWE.]
- Selebratina** POLENOVA, 1952 [**Gravia (S.) dentata*].
- Semilukiella** POLENOVA, 1952 [**S. zaspelovae*]. ?*Hor.*, USSR.
- Spinosa** LORANGER, 1954 [No type species]. *Nom. nud.* probably intended as subgenus of *Cytheridea*. [HOWE.]
- Sulcatia** POLENOVA, 1952 [?]. ?*Hor.*, USSR.
- Sulcocavellina** POLENOVA, 1952 [**S. incognita*]. ?*Hor.*, USSR.
- Sulcoindivisa** EGOROV, 1954 [**S. suinordensis*].
- Synaphe** CHAPMAN, 1914 [non HUEBNER, 1825; nec THOMSON, 1864; nec JONES & KIRKBY, 1896] [**S. mesozoica*]. Invalid junior homonym. *Trias.*, Austral.
- Tetrasulcata** MATERN, 1929 [**T. fluens*]. Based on partly exfoliated right valve that differs from *Jonesina* in having 4 instead of 3 lobes, rearmost compressing a node. *U.Dev.*, Eu.(NE.Ger.). [SOHN.]
- Tricornina** BOUČEK, 1936 [**T. navicula*]. Referred to Primitiidae [Leperditellidae] by author and Alanellidae [Beecherellidae] by HENNINGSMOEN (29). *Sil.*, Eu.(Czech.). [HOWE.]
- Trubinella** PŘIBYL, 1949 [**Hippa latens* BARRANDE, 1872 (non *Hippa* FABRICIUS, 1787)]. Probably an ostracode instar; unidentifiable. *Ord.*, Czech. [SCOTT.]
- Zaborovia** POLENOVA, 1952 [**Z. obscura*]. Referred to Leperditellidae by author. *Dev.*, USSR. [HOWE.]

Generic Names Incorrectly Classed by Authors as Belonging to Ostracoda

- Cryptocaris** BARRANDE, 1872. Referred by the author to Phyllopora; 8 species, one of which (*C. ?rhomboidea*) has been defined by PŘIBYL (1951) as type species of *Rhombentomozoe*, a myodocopid ostracode. *Sil.*, Czech.
- Lepidilla** MATTHEW, 1886 [**L. anomala*]. Classed by author as an ostracode but regarded as conchostracan by ULRICH & BASSLER (87). *Cam.*, Can. (N.B.).
- Lepiditta** MATTHEW, 1886 [**L. alata*]. Same entry as for *Lepidilla*. *Cam.*, Can.(N.B.).
- Zonozoe** BARRANDE, 1872 [**Z. drabowiensis*]. Not an ostracode. *Sil.*, Czech.