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PART R, REVISED, VOLUME 1, CHAPTER 8I:
SYSTEMATIC DESCRIPTIONS:
INFRAORDER GLYPHEIDEA

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Infraorder GLYPHEIDEA
Winkler, 1881

[*nom. correct.* VAN STRAELEN, 1925, p. 156, *pro* les glyphées WINKLER, 1881, p. 74]

Subcylindrical carapace; well-developed rostrum; cervical groove, postcervical groove, and branchiocardiac grooves present and generally well developed; pleonal somites with triangular or rectangular pleural terminations, subrectangular telson; exopodite of uropods with diaeresis; third maxillipeds long, pediform; pereopod 1 pseudochelate or chelate, rarely achelate; pereopods 2–4 chelate, pseudochelate, or achelate; pereopod 5 with terminal dactylus (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 102). *Permian–Holocene*.

Superfamily ERYMOIDEA Van
Straelen, 1925

[*nom. transl.* SCHWEITZER & FELDMANN, 2001, p. 174, *pro* Erymidae VAN STRAELEN, 1925, p. 232]

Subcylindrical carapace; well-developed rostrum; cervical groove, postcervical groove, and branchiocardiac grooves present and generally well developed; gastro-orbital, hepatic, and inferior grooves present; exopodite of uropods with diaeresis; pereopods 1 always strongly developed, chelate (Erymidae) or pseudochelate (Pempficidae); pereopods 2–3 chelate or pseudochelate; pereopods 4 and 5 generally achelate, 4 may be pseudochelate (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 102). *Middle Triassic–Eocene (Bartonian)*.

Family ERYMIDAE Van Straelen, 1925

[*nom. correct.* GLAESSNER, 1929, p. 405, *pro* Erymidae VAN STRAELEN, 1925, p. 232]

Subcylindrical carapace with very deep cervical groove, with intercalated plate in anterior axial portion of carapace, gastro-orbital, hepatic, and inferior grooves present; branchiocardiac and postcervical grooves almost parallel; moderately spined rostrum; pereopod 1 with large chelae, upper margin of fixed finger often concave; carpus short, rectangular; pereopods 2 and 3 chelate or pseudochelate; pereopods 4 and 5 with terminal dactyli; carapace and first pereopod surfaces finely or coarsely granular; flat pleon with triangular pleura, sharp demarcation between terga and pleura, exopodite of uropods with diaeresis (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 102). *Middle Triassic (?Anisian), Lower Jurassic (Hettangian)–Eocene (Bartonian)*.

Eryma VON MEYER, 1840b, p. 587 [**Macrourites modestiformis* SCHLOTHEIM, 1822, p. 29, pl. 2,3; SD GLAESSNER, 1929, p. 156] [=*Klytia* VON MEYER, 1840a, p. 19, also spelled *Clytia*, emend., BEURLEN, 1928, p. 165 (type, *Glyphea ventrosa* VON MEYER, 1835, p. 328, SD GLAESSNER, 1929, p. 114); =*Erymastacus* BEURLEN, 1928, p. 171 (type, *Glyphea ornati* QUENSTEDT, 1858 in 1856–1858, p. 519, SD GLAESSNER, 1929, p. 160)]. Subcylindrical carapace; moderately toothed short rostrum; dorsal carapace with intercalated plate; deep cervical groove moderately inclined, not strongly sinuous; postcervical and branchiocardiac grooves nearly parallel, joined near their lower ends by hepatic groove; tubercles omega and chi usually distinct; pereopod 1 with stout isochelous chelae; pereopods 2 and 3 chelate, pereopods 4 and 5 achelate; surface of carapace

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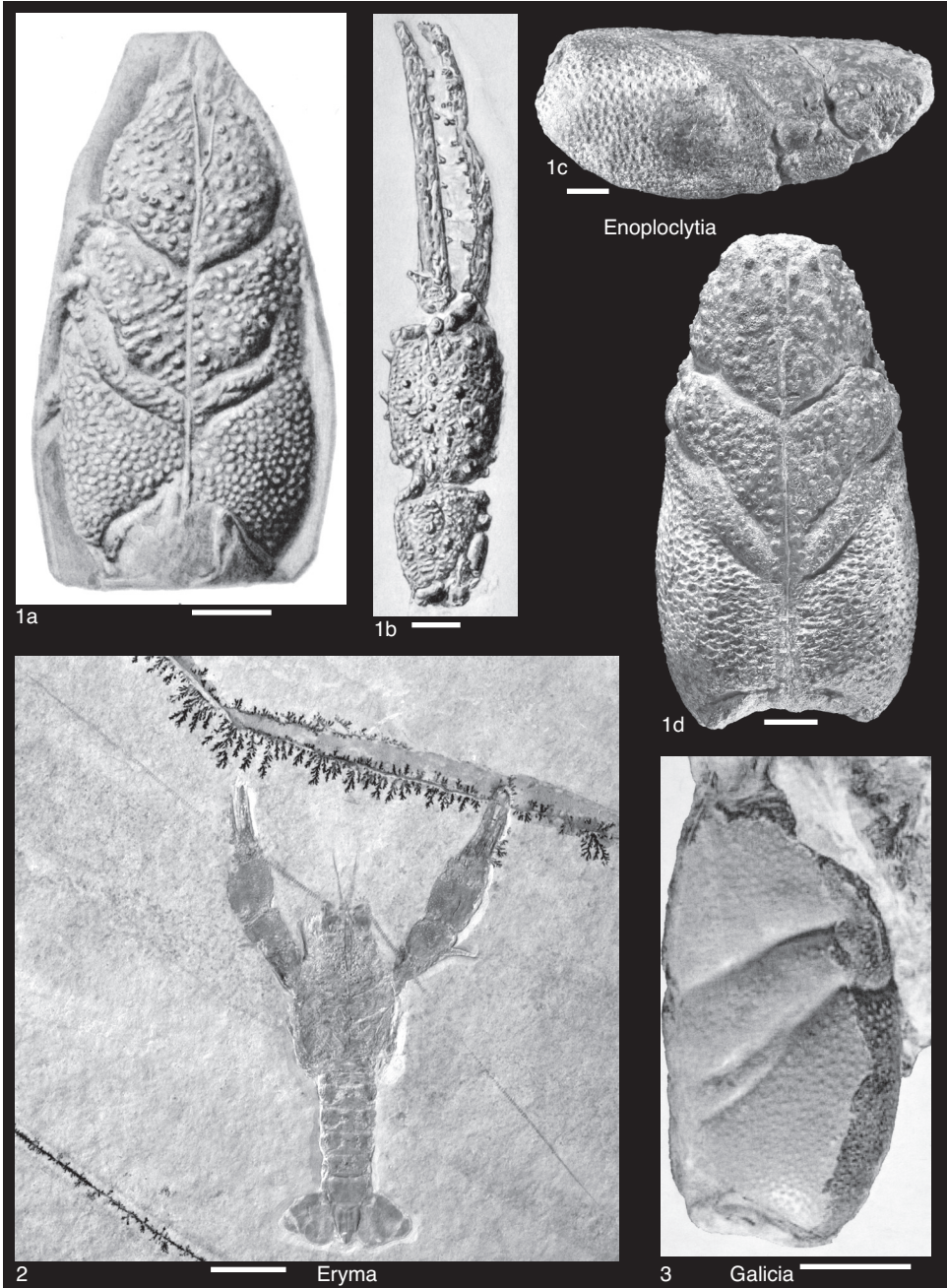


FIG. 1. Erymidae (p. 1–3).

and pleon strongly tuberculate. *Lower Jurassic (Sinemurian)–Upper Cretaceous*: Canada (Northwest Territories), Italy, *Sinemurian*; France, Germany, *Pliensbachian*; France, Germany, *Toar-*

cian; France, *Lower Jurassic*; France, *Aalenian*; Canada (British Columbia), *Bajocian–Bathonian*; France, Germany, *Bathonian*; France, Germany, Russia, USA (Wyoming), *Callovian*; France,

- Germany, UK, *Callovian–Oxfordian*; France, Germany, Russia, UK, USA (Utah), *Oxfordian*; France, Germany, Madagascar, *Kimmeridgian*; Japan, *Kimmeridgian–Tithonian*; Czech Republic, France, Germany, Italy, Madagascar, Russia, UK, *Tithonian*; France, *Berriasian–Valanginian*; France, Germany, *Hauterivian*; Japan, *Barremian*; Lebanon, *Cenomanian*; USA (Alabama, Tennessee), *Campanian–Maastrichtian*; USA (North Carolina), *Upper Cretaceous*; Poland, *Unknown age*.—FIG. 1, 2. **E. modestiforme* (SCHLOTHEIM), MB.A. Inv. Nr. 1995.4, *Tithonian*, Germany, scale bar, 1 cm (new).
- Enoploclytia** M'COY, 1849, p. 330 [**Astacus leachi* MANTELL, 1822, p. 221, pl. 29, 1, 4; OD]. Subcylindrical carapace with a deep cervical groove, deep postcervical groove, and branchiocardiac grooves; short rostrum with subrostral teeth; pereopod 1 with long and strong chelae; chi and omega swellings strong; surface of carapace and pereopods strongly tuberculate. *Upper Jurassic (Kimmeridgian)–Eocene (Bartonian)*: France, *Kimmeridgian*; France, *Berriasian–Hauterivian*; Australia (Queensland), *Aptian*; Germany, USA (Texas), *Albian*; UK, USA (Texas), *Albian–Cenomanian*; USA (Texas), *Coniacian*; UK, *Coniacian–Campanian*; Germany, *Coniacian–Maastrichtian*; Madagascar, *Santonian*; Madagascar, USA (Tennessee), *Campanian*; Mexico (Coahuila), USA (Alabama), *Campanian–Maastrichtian*; Canada (British Columbia), UK, *Upper Cretaceous (undifferentiated)*; Spain, *Bartonian*.—FIG. 1, 1a–b. **E. leachi* (MANTELL); a, dorsal carapace, Turonian, UK, (BMNH) I 1977, scale bar, 1 cm (Woods, 1925–1931, pl. 24, 4); b, right cheliped, Turonian, UK, CAMSM B.8906, scale bar, 1 cm (Woods, 1925–1931, pl. 25, 1).—FIG. 1, 1c–d. *E. collignoni* SECRETAN, holotype, Campanian, Madagascar, MNHN FR.03925; c, right lateral view of carapace; d, dorsal view of carapace, scale bars, 1 cm (Charbonnier, Garassino, & Pasini, 2012, fig. 7A–B; photos by Christian Lemzaouda, provided by Sylvain Charbonnier).
- Galiccia** GARASSINO & KROBICKI, 2002, p. 55 [**G. marianae*; OD]. Carapace subcylindrical, rostrum short, without supra- and subrostral spines; cervical groove well defined, gastro-orbital groove present at about midheight of cervical groove; postcervical groove and branchiocardiac grooves very closely positioned, merging close to hepatic groove; inferior and antennar grooves well developed; carapace surface regularly and coarsely granular. *Upper Jurassic (Oxfordian–Tithonian)*: Poland, *Oxfordian*; Germany, *Kimmeridgian–Tithonian*.—FIG. 1, 3. **G. marianae*, holotype, KSGR/AGH/K/4, Oxfordian, Poland, scale bar, 1 cm (Garassino & Krobicki, 2002, fig. 7).
- Olinaeacaris** VAN STRAELEN, 1925, p. 277 [**O. carinatus*; M]. Carapace with a rostrum, cervical groove, and branchiocardiac groove; granular ornamentation. *Middle Jurassic (Bajocian)*: France.—FIG. 2, 1a–b. **O. carinatus*, whereabouts of specimen unknown; a, images of actual specimen (ostensibly), scale bar, 1 cm; b, line drawing (Van Straelen, 1925, pl. 9, 4–5).
- ?**Oosterinkia** KLOMPMAKER & FRAAIJE, 2011, p. 6 [**O. neerlandica*; M] [Genus questionably placed within Erymidae (see discussion in KARASAWA, SCHWEITZER, & FELDMANN, 2013)]. Carapace longer than wide; rostrum broad, triangular; possible intercalated plate long, narrow, may actually be broken axial ridge; cervical and branchiocardiac grooves deep; possible gastro-orbital groove deep; hepatic and epibranchial swellings moderate; pleonal somites with posteriorly directed pleura. *Middle Triassic (Anisian)*: the Netherlands.—FIG. 2, 2. **O. neerlandica*, holotype, MAB k2854, scale bar, 1 cm (new; photo by A. Klompmaker).
- Palaeastacus** BELL, 1850, p. 344 [**Astacus sussexiensis* MANTELL, 1822, p. 124, fig. 2; SD GLAESSNER, 1929, p. 289; =*Palaeastacus dixonii* BELL, 1850, p. 344, pl. 37, 1–5]. Cylindrical carapace with deep cervical and postcervical grooves and weak gastro-orbital and branchiocardiac grooves; short rostrum with subrostral teeth; pereopod 1 with short and stout chelae with dactylus and index equal in length. *Lower Jurassic (Hettangian)–Upper Cretaceous*: France, *Hettangian–Pliensbachian*; Germany, *Hettangian–Toarcian*; Switzerland, *Aalenian*; France, *Aalenian–Callovian*; France, *Oxfordian*; Germany, *Kimmeridgian*; Germany, *Tithonian*; Queensland, Australia, USA (Texas), UK, *Albian*; West Antarctica, *Lower Cretaceous*; France, Germany, UK, USA (California), *Cenomanian*; USA (Texas), *Coniacian*; UK, *Coniacian–Maastrichtian*; USA (Texas), *Campanian*; Canada (British Columbia), USA (Alabama), UK, *Upper Cretaceous*.—FIG. 2, 3a–c. **P. sussexiensis* (MANTELL); a, dorsal view, Brighton Museum specimen, Cenomanian, UK, scale bar, 1 cm (Woods, 1925–1931, pl. 24, 1); b, left lateral view, BMNH 5629, Cenomanian, UK, scale bar, 1 cm (Woods, 1925–1931, pl. 24, 2); c, left cheliped, Cenomanian, UK, Brighton Museum specimen, scale bar, 1 cm (Woods, 1925–1931, pl. 24, 3).
- Pustulina** QUENSTEDT, 1857 in 1856–1858, p. 807 [**P. suevica*; M] [= *Phlyctisoma* BELL, 1863, p. 34 (type, *P. tuberculatum*, SD GLAESSNER, 1929, p. 314)]. Arcuate subcylindrical carapace; deep gastro-orbital and cervical grooves; strongly developed postcervical groove reaching the hepatic groove; extremely short branchiocardiac groove; pereopod 1 with strongly elongate chelae; rough and slightly differentiated ornamentation of carapace and pleon. *Lower Jurassic (Sinemurian)–Upper Cretaceous (Maastrichtian)*: Italy, *Sinemurian*; Germany, *Bajocian, Callovian*; France, *Oxfordian*; France, Germany, *Kimmeridgian*; Germany, *Tithonian*; Madagascar, *Valanginian–Hauterivian*; UK, *Albian*; UK, *Cenomanian*; Canada (British Columbia), *Campanian–Maastrichtian*.—FIG. 3, 1a–b. *P. minuta* (SCHLOTHEIM, 1822); a, KSU

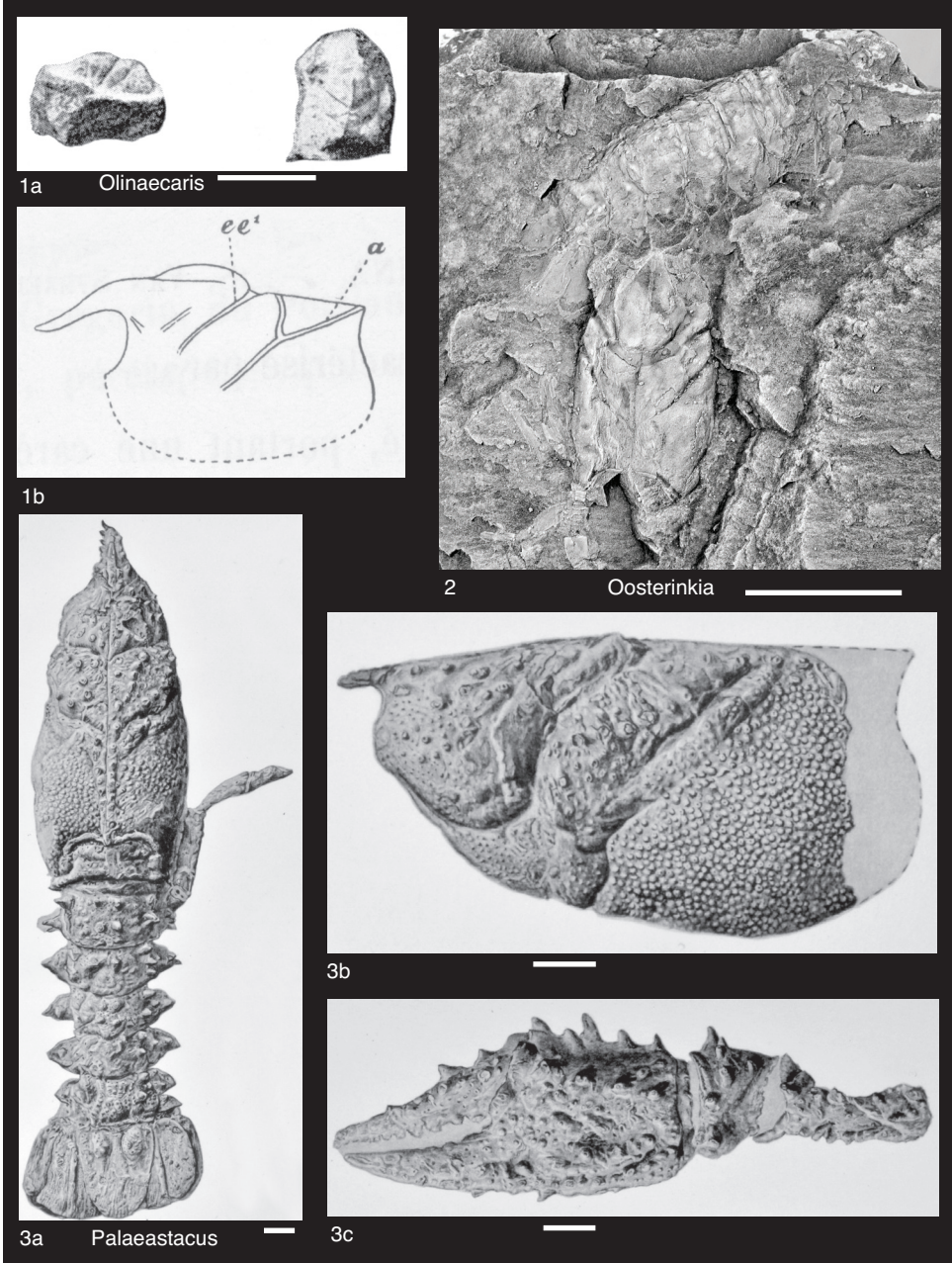


FIG. 2. Erymidae (p. 3).

D 463, cast of SM X/m93, Tithonian, Germany, scale bar, 1 cm (new); *b*, KSU D 62, cast of MB.A. Inv. Nr. 254, Tithonian, Germany, scale bar, 1 cm (new).—FIG. 3, *1c*. *P. dawsoni* (WOODWARD), left lateral view, KSU D 1447, cast of GSC 5969,

Campanian–Maastrichtian, British Columbia, scale bar, 1 cm (new).
 ?*Stenodactylina* BEURLIN, 1928, p. 175 [**S. liasina*; M]
 [Genus questionably placed within Erymidae, as it is represented only by a chela]. Manus with spines on

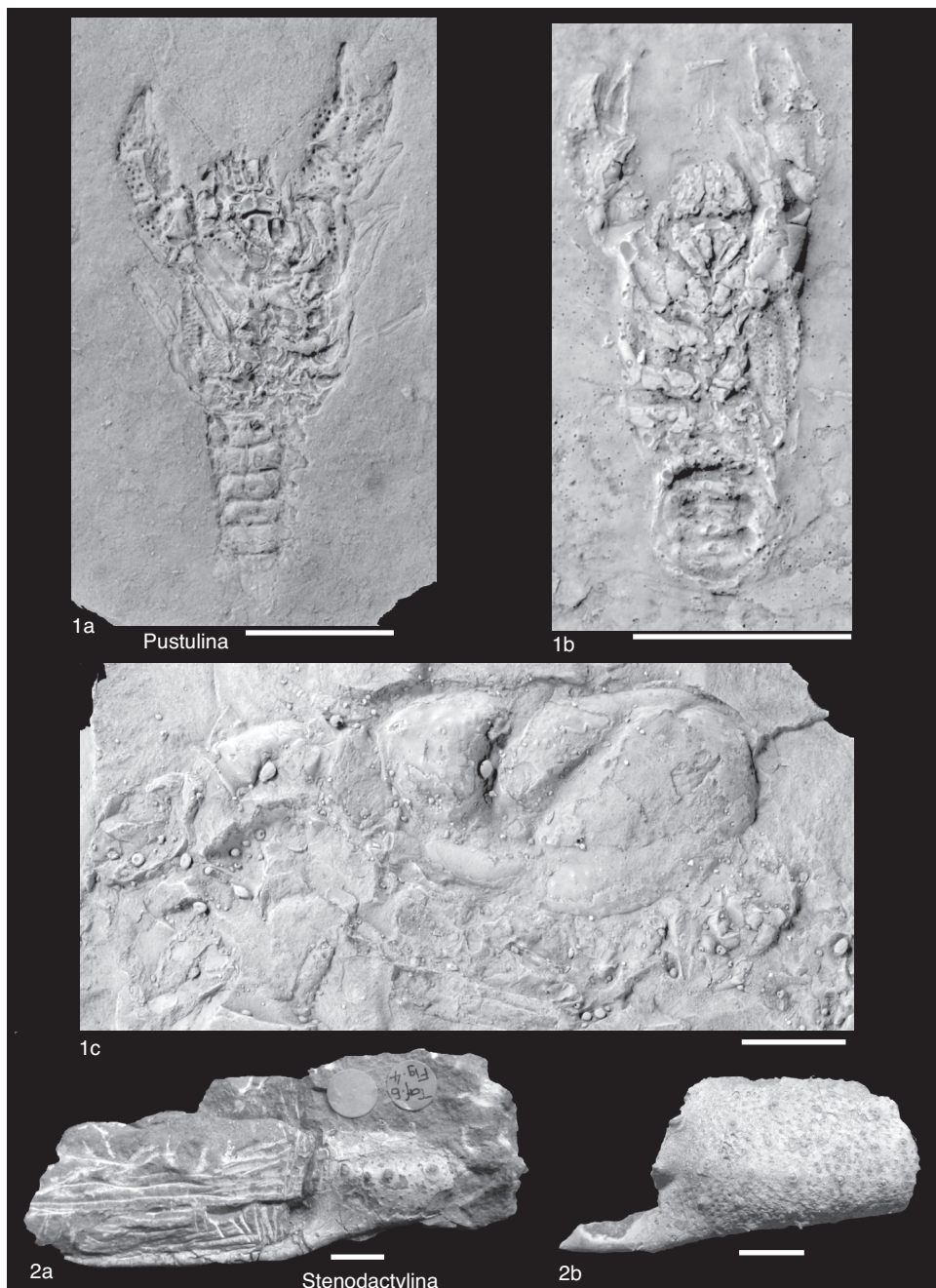


FIG. 3. Erymidae (p. 3–5).

upper surface; fixed finger extremely long, slender; directed upward. *Lower Jurassic (Toarcian)*—*Middle Jurassic (Aalenian)*: Germany.—FIG. 3, 2a. **S. liasina*, holotype, SMNS 7785, Toarcian, scale bar, 1

cm (new; photos by G. Schweigert).—FIG. 2b. *S. rogerfurzei* SCHWEIGERT, left chela, holotype, SMNS 70043, Aalenian, scale bar, 1 cm (new; photos by G. Schweigert).

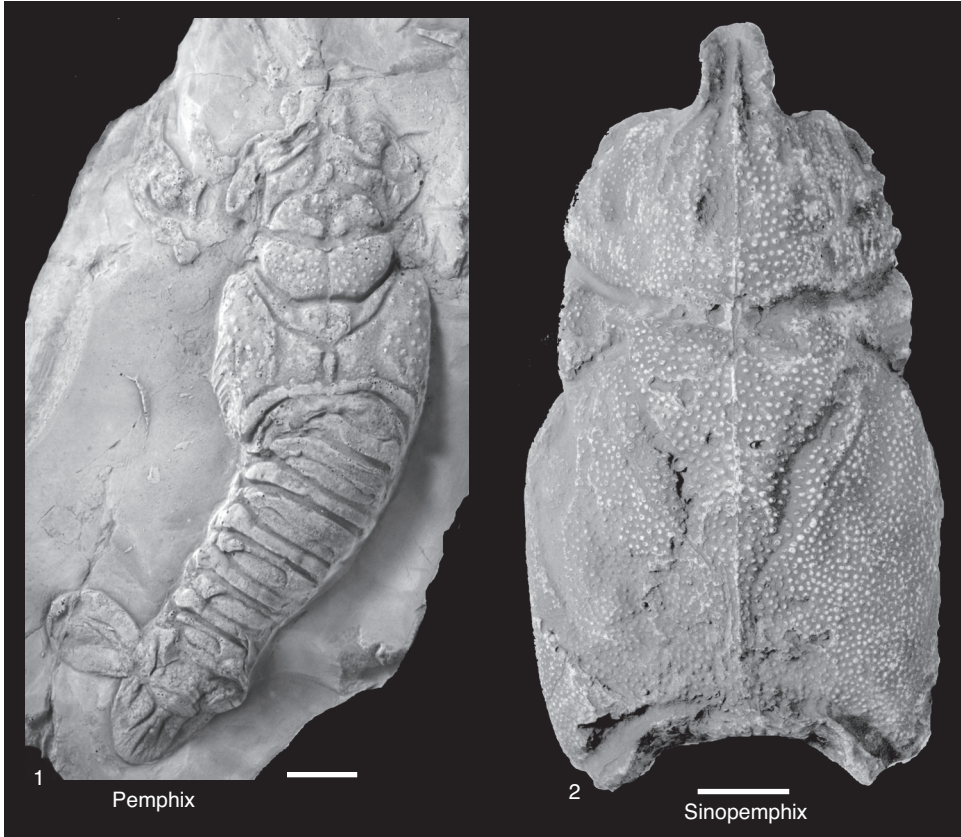


FIG. 4. Pemphicidae (p. 6–7).

Family PEMPHICIDAE
Van Straelen, 1928

[Pemphicidae VAN STRAELEN, 1928, p. 499]

Subcylindrical carapace with antennal carina; gastro-orbital, hepatic, and inferior grooves present; cervical, postcervical, and branchiocardiac grooves all well developed, latter two joining on flank, with cervical groove deepest and widest of the three; gastric and hepatic regions differentiated; carapace ornamented with coarse or fine granules; long and spatulate rostrum; pereiopod 1 strongly developed and subchelate, merus rectangular, short; pereiopods 2–3 slender and subchelate; pereiopods 4–5 with terminal achelate dactylus; subrectangular pleonal somites; exopodite of uropods with diaeresis; subrectangular telson (KARA-

SAWA, SCHWEITZER, & FELDMANN, 2013, p. 104). *Middle Triassic (Anisian–Ladinian)*.

Pemphix VON MEYER, 1835, p. 328 [**Palinurus suevii* DESMAREST, 1817, p. 513; OD]. Subcylindrical carapace slightly compressed dorsoventrally, strongly sculptured by deep grooves; gastric, hepatic, mesogastric, metagastric, and epibranchial regions well defined; cervical, postcervical, and branchiocardiac grooves well developed; long and spatulate rostrum lacking supra- and subrostral teeth but broadly rimmed; short antennules; long antennae with leaf-shaped scaphocerite; pereiopod 1 strongly developed and subchelate; pereiopods 2–3 slender and subchelate; pereiopods 4–5 with terminal dactylus; subrectangular pleonal somites with wide articulating rings; pleura blunt-triangular, directed posteriorly; subrectangular telson; exopodite with diaeresis. *Middle Triassic (Anisian–Ladinian)*: Germany.—FIG. 4, 1. **P. suevii* (DESMAREST), cast of SMNS 4701, dorsal view, scale bar, 1 cm (Karasawa, Schweitzer, & Feldmann, 2013, fig. 9B).

Sinopemphix LI, 1975, p. 136 [**S. guizhouensis*; M]. Carapace strongly compressed dorsoventrally;

cervical groove deep, much deeper and wider than postcervical and branchiocardiac grooves; lacking anterodorsal segment of postcervical groove (doesn't cross the midline); gastro-orbital groove and mesogastric grooves weak; rostrum well developed, downturned, with axial crest; hepatic and epibranchial regions weakly defined; entire carapace axially keeled. *Middle Triassic*: China. —FIG. 4, 2. **S. suizhouensis*, dorsal carapace, cast of holotype, BSP1988 III 126, scale bar, 1 cm (new).

Superfamily
GLAESSNERICARIOIDEA
Karasawa, Schweitzer, &
Feldmann, 2013

[Glaessnericarioidea KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 104]

Cylindrical carapace with cervical, post-cervical, and branchiocardiac grooves; median suture present; long rostrum bearing three suprarostal teeth; dorsal margin of carapace with spines arranged in two longitudinal parallel rows; exopodite of uropod with diaeresis; pereopods 1–4 chelate (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 104). *Upper Triassic (Norian)*.

Family GLAESSNERICARIDIDAE
Karasawa, Schweitzer, & Feldmann, 2013

[Glaessnericarididae KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 104]

Description as for superfamily. *Upper Triassic (Norian)*.

Glaessnericaris GARASSINO & TERUZZI, 1993, p. 21 [**G. macrochela*; OD]. Cylindrical carapace with cervical, postcervical, and branchiocardiac grooves; long rostrum bearing three suprarostal teeth; dorsal margin of carapace with spines arranged in two longitudinal parallel rows; pereopods 1–4 chelate; exopodite of uropod with diaeresis. *Upper Triassic (Norian)*: Italy. —FIG. 5. **G. macrochela*, holotype, MSNB 4202, scale bar, 1 cm (new; photo by A. Paganoni).

Superfamily GLYPHEOIDEA
Winkler, 1881

[*nom. transl.* GLAESSNER, 1969, p. 463, *pro les glyphés* WINKLER, 1881, p. 74]

Subcylindrical carapace; short or long rostrum usually without spines (except Litogastroidae); cephalic carinae present; gastro-orbital, hepatic, and inferior grooves present; cervical groove well developed; postcervical and branchiocardiac grooves present, variously developed with post-



Glaessnericaris

FIG. 5. Glaessnericarididae (p. 7).

cervical groove generally parallel to branchiocardiac groove; pleonal somites with triangular or rectangular pleural terminations; sharp demarcation between pleura and terga; exopod of uropods with diaeresis; subrectangular telson; third maxillipeds long, pediform; pereopod 1 pseudo-chelate or chelate, pereopods 2–4 pseudo- or achelate, pereopod 5 with terminal dactylus (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 105). *upper Permian–Holocene*.

Family CHIMAERASTACIDAE
Amati, Feldmann, & Zonneveld, 2004

[Chimaerastacidae AMATI, FELDMANN, & ZONNEVELD, 2004, p. 159]

Carapace subcylindrical, with distinct longitudinal cephalic ridges including antennal, suborbital, and median carinae; median suture present posteriorly; cervical, postcervical, and branchiocardiac grooves well defined, subparallel; cervical groove long, extending to dorsomedian, steeply inclined at 65–70 degrees to dorsal surface; postcervical parallel to branchiocardiac groove, originating near dorsomedian, not reaching cervical groove or hepatic groove; intercervical groove absent; branchiocardiac groove at less than 30 degree angle to dorsal surface, joining median suture; urogastric and supplementary grooves absent; gastro-orbital, inferior, and hepatic grooves present; antennal spine absent; long and prominent rostrum; chi swelling (attachment site of adductor testis muscle) well defined by

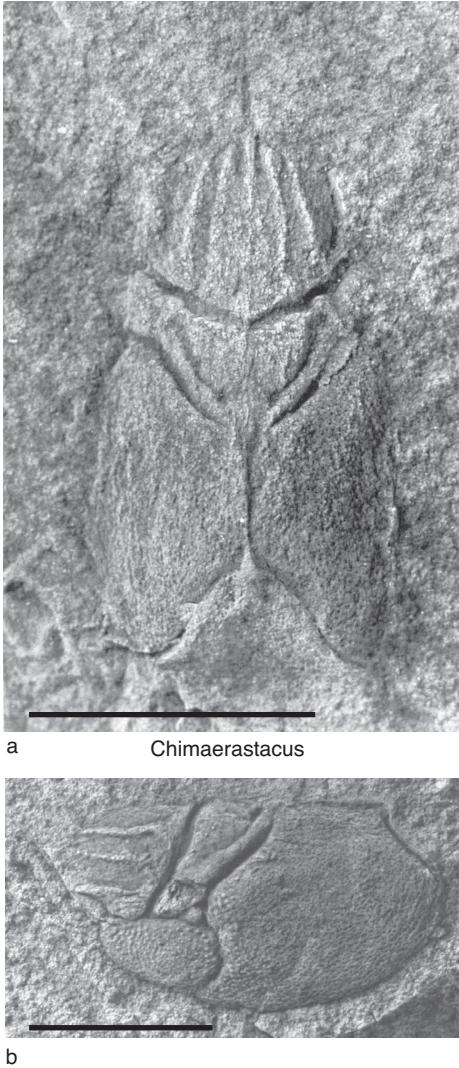


FIG. 6. Chimaerastacidae (p. 8).

grooves; sharp demarcation between pleura and terga; exopodite of uropod with diaeresis; pereopods 1–3 chelate; pereopods 4 and 5 with terminal dactyli (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 105). *Middle Triassic (Ladinian)*.

Chimaerastacus AMATI, FELDMANN, & ZONNEVELD, 2004, p. 159 [*C. paciflualis*; OD]. Carapace cylindrical, with median suture, cephalic ridges, and long rostrum. Branchiocardiac groove arises at hepatic region; postcervical groove arises at height of gastro-orbital groove; region at attachment site

of adductor testis muscle defined by ventral bifurcation of branchiocardiac groove. *Middle Triassic (Ladinian)*: Canada (British Columbia).—

FIG. 6a–b. **C. paciflualis*; a, paratype, RTM 97.121.535; b, paratype, RTM 97.121.15, scale bars, 1 cm (Amati, Feldmann, & Zonneveld, 2004, fig. 9.1, 9.5).

Family CLYTIOPSIDAE Beurlen, 1927

[*nom. transl.* FELDMANN & others, 2012, p. 426, *pro* Clytiopsinae BEURLEN, 1927, p. 100]

Carapace with antennal and suborbital carinae; cervical, postcervical, and branchiocardiac grooves well defined, subparallel, cervical groove long, extending to dorsomedian; postcervical parallel to branchiocardiac groove, originating near dorsomedian, not reaching cervical groove or hepatic groove; intercervical groove and chi swelling absent; branchiocardiac groove at less than 30 degree angle to dorsal surface, joining median suture; urogastric and supplementary grooves absent; gastro-orbital, inferior, and hepatic grooves present; antennal spine absent; short rostrum well developed, without supra- and subrostral spines; sharp demarcation between pleura and terga, exopod of uropods with diaeresis; pereopods 1–3 chelate, pereopods 4 and 5 achelate (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 105). *upper Permian–Upper Triassic (Carnian)*.

Clytiopsis BILL, 1914, p. 294 [*C. argentoratense*; SD GLAESSNER, 1929, p. 119; =*C. elegans* BILL, 1914, p. 300, pl. 10,3, pl. 11,2]. Cylindrical carapace with thin median suture, intercalated plate absent, antennal and supraborbital carina present, antennal groove present; cervical groove long, extending to dorsomedian; postcervical parallel to branchiocardiac groove, originating near dorsomedian, not reaching cervical groove; intercervical groove absent; branchiocardiac groove at less than 30 degree angle to dorsal surface, joining median suture; urogastric and supplementary grooves absent; inferior and hepatic grooves present; antennal spine present; short rostrum well developed, without supra- and subrostral spines; pereopod 1 with short and stout chelae, pereopods 2 and 3 chelate, pereopods 4 and 5 achelate; pleura rectangular, sharp demarcation between terga and pleura; telson rectangular; uropods without diaeresis; antennae long, flagellate, scaphocerite present; sternum narrow. *Lower Triassic–Upper Triassic (Carnian)*: France, *Lower Triassic–Middle Triassic*; Germany, *Carnian*.—FIG. 7,2a–b. **C. argentoratense*; a, *C. ?argentoratense*, no number, scale bar, 1 cm (Bill, 1914, pl. 10,2); b, drawing; a1, anten-

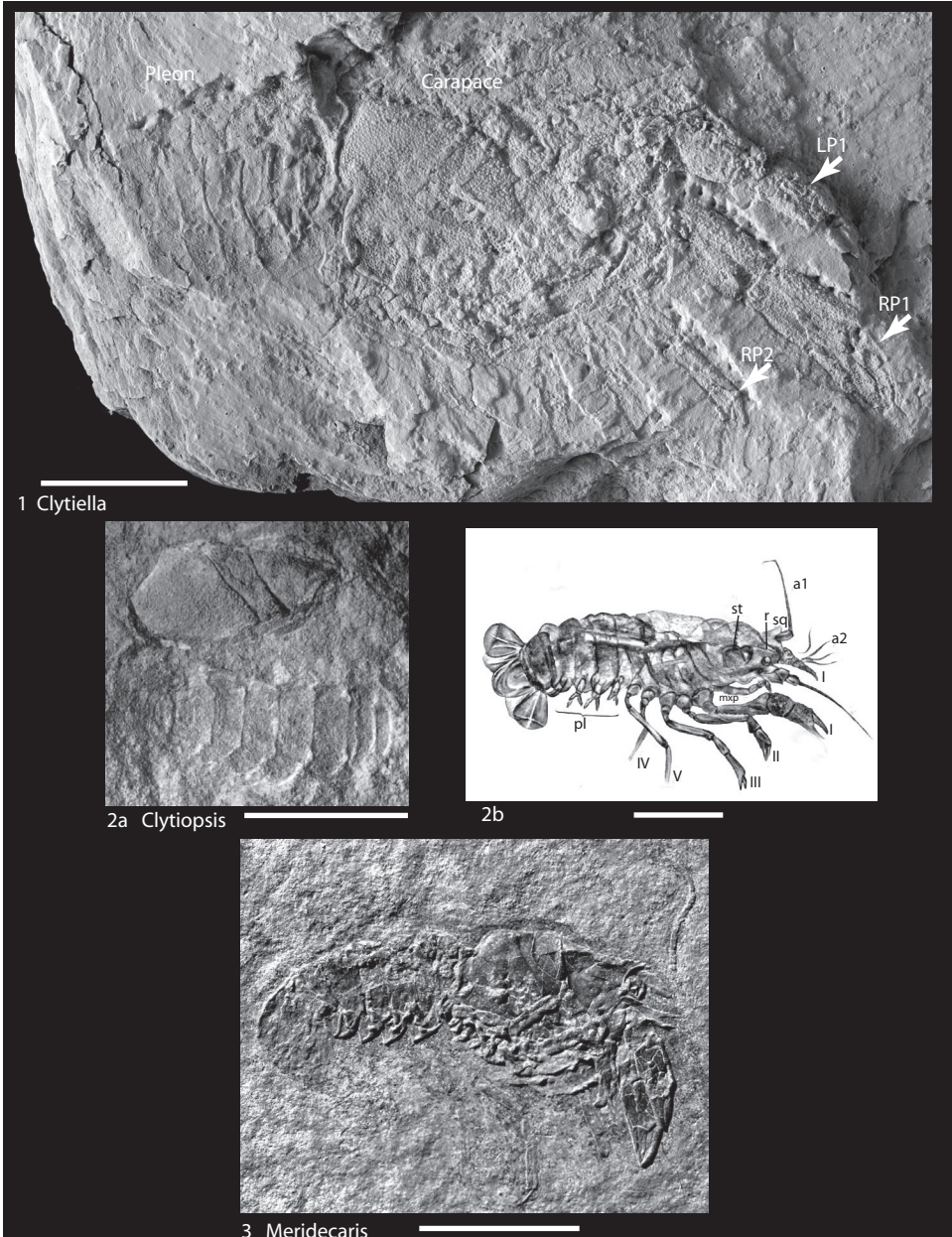


FIG. 7. Clytiopsidae (p. 8–10).

nule; *a2*, antenna; *mcp*, maxilliped; *oth*, auditory organ; *pl*, pleopods; *r*, rostrum; *sq*, antennal scale; *st*, stomach; *I, II, III, IV, V*, pereiopods; scale bar, 1 cm (Bill, 1914, pl. 11, I).

Clytiella GLAESSNER, 1931, p. 474 [**C. spinifera*; OD].
Cylindrical carapace with densely granulate surface

and with a median keel bearing a row of curved, sharp spines; rostrum short; pereiopod 1 with short and massive chelae, heterochelous; pereiopods 2 and 3 with smaller chelae. *Lower Triassic–Middle Triassic*: Austria.—FIG. 7, I. **C. spinifera*, GBA 1931/003/0001; *LPI*, left pereiopod 1; *RPI*, right

pereiopod 1; *RP2*, right pereiopod 2; scale bar, 1 cm (new; photo by Irene Zorn).

Koryncheiros FELDMANN, SCHWEITZER, & ZHANG in FELDMANN & others, 2012, p. 426 [**K. luopingensis*; OD]. Rostrum triangular, with elevated, beaded rim; rims extend onto dorsal carapace in diverging pattern. Cervical groove distinct, straight, extending anteroventrally at about 70 degrees from long axis, bounded posteriorly by row of anteriorly directed fine spines. Postcervical groove and branchiocardiac groove diverge posteriorly. Exopod of uropod with arcuate, convex-forward diaeresis. Chelipeds heterochelous; manus quadrate; slightly higher distally; fixed finger short, triangular, weakly downturned; dactylus longer than fixed finger, articulates near, but not at, upper distal corner of propodus, lying at nearly 90 degrees to long axis of propodus, upper surface strongly convex so that when occluded against distal margin of manus, entire chela is round-tipped; right chelipeds smaller than left and bearing different termination. Pereiopods 2–4 terminating in subchelate closure with relatively long dactylus closing against distal margin of propodus and triangular fixed finger which is about half the length of movable finger; pereiopod 5 shorter and narrower, termination not known. *Middle Triassic (Anisian)*: China.—FIG. 8, 1a–b. **K. luopingensis*; a, holotype, left lateral view, LPI-41793, scale bar, 1 cm (Feldmann, Schweitzer, & Zhang in Feldmann & others, 2012); b, paratype, LPI-40503a, dorsal view, scale bar, 1 cm (Karasawa, Schweitzer, & Feldmann, 2013).

Meridecaris STOCKAR & GARASSINO, 2013, p. 352 [**M. ladinica*; OD]. Carapace short; rostrum with 8–10 dorsal spines, edentulous ventrally; cervical groove straight, positioned at about half the distance posteriorly on cephalothorax, at about 75 degree angle to dorsal surface, intersecting dorsal surface; postcervical and branchiocardiac grooves closely spaced, deep, with postcervical intersecting dorsal surface at almost 90 degree angle, branchiocardiac intersecting at about 80 degree angle; cephalothorax high posteriorly; antennal and pterygostomial spines present; first pereiopods short, stout, chelate; pereiopods 2 and 3 with more slender chelae. *Middle Triassic (Ladinian)*: Switzerland.—FIG. 7, 3. **M. ladinica*, holotype, MCSN 8443, Ladinian, Switzerland, scale bar, 1 cm (new; photo by Alessandro Garassino).

Paraclytiopsis ORAVECZ, 1962, p. 324 [**P. hungaricus*; OD]. Cylindrical carapace apparently lacking anterior axial intercalated plate; deep cervical groove, weaker postcervical groove; branchiocardiac groove strong; postcervical groove does not reach cervical or hepatic groove, parallel to branchiocardiac groove; anteriormost portion and ventralmost portion of cephalothorax, pleon, and pereiopods unknown. *Upper Triassic (Carnian)*: Hungary.—FIG. 8, 2a–b. **P. hungaricus*, holotype, Geological Survey of Hungary FI T.2040; a, right lateral; b, dorsal view, scale bars, 1 cm (new; photos by Zoltan Lantos).

Protoclytiopsis BIRSHEIN, 1958, p. 477 [**P. antiqua*; OD]. Cervical groove, postcervical groove, and branchiocardiac grooves all deep, crossing midline, nearly parallel to one another; postcervical and branchiocardiac grooves closely spaced, postcervical groove does not reach cervical or hepatic groove; inferior groove deep, inscribing a very large area; chi and omega swellings well defined; hepatic and antennar grooves moderately deep; carapace surface appearing to be coarsely granular overall; no evidence of axial anterior intercalated plate. *Upper Permian*: Russia (Western Siberia).—FIG. 8, 3. **P. antiqua*, holotype, PIN 1453, left lateral view, scale bar, 1 cm (new; photo by Frederick Schram).

Family GLYPHEIDAE Winkler, 1881

[*nom. correct.* VAN STRAELEN, 1925, p. 157, *pro* les glyphées WINKLER, 1881, p. 74]

Subcylindrical carapace, slightly compressed laterally, with longitudinal cephalic carinae; short or long rostrum; cervical groove well developed, oriented at over 70 degree angle to dorsal surface of carapace, extending from dorsal surface to position beyond half-height of cephalothorax; postcervical groove variable, converging with branchiocardiac groove either dorsally and ventrally or only ventrally; branchiocardiac groove at less than 30 degree angle to dorsal carapace; laterocardiac groove present and parapostcervical groove sometimes present (terminology of KARASAWA, SCHWEITZER, & FELDMANN, 2013, fig. 1); musculus adductor testis (following HOLTHUIS, 1974) region inflated, variously circumscribed by grooves; pleonal somites generally smooth, rarely with transverse keels, with triangular pleonal terminations in males, more rounded in females; subrectangular telson; sharp demarcation between pleura and terga; exopodite of uropods with diaeresis; third maxillipeds long, pediform; pereiopods 1 and 2 pseudo-chelate, pereiopod 3 pseudo- or achelate, pereiopods 4 and 5 with terminal dactylus (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 107). *Upper Triassic (Norian)–Eocene*.

Glyphea VON MEYER, 1835, p. 328 [**Palinurus regleyanus* DESMAREST, 1822, p. 132, pl. XI, fig. 3; SD GLAESSNER, 1969, p. 463] [= *Orphnea* MÜNSTER, 1839, p. 39 (type, *Macrourites pseudoscyllarus* SCHLOTHEIM, 1822, p. 36, SD GLAESSNER, 1969, p. 463); = *Brisa* MÜNSTER, 1839, p. 45 (type, *B. lucida*, SD GLAESSNER, 1969, p. 463); = *Gigacerina* CHAR-

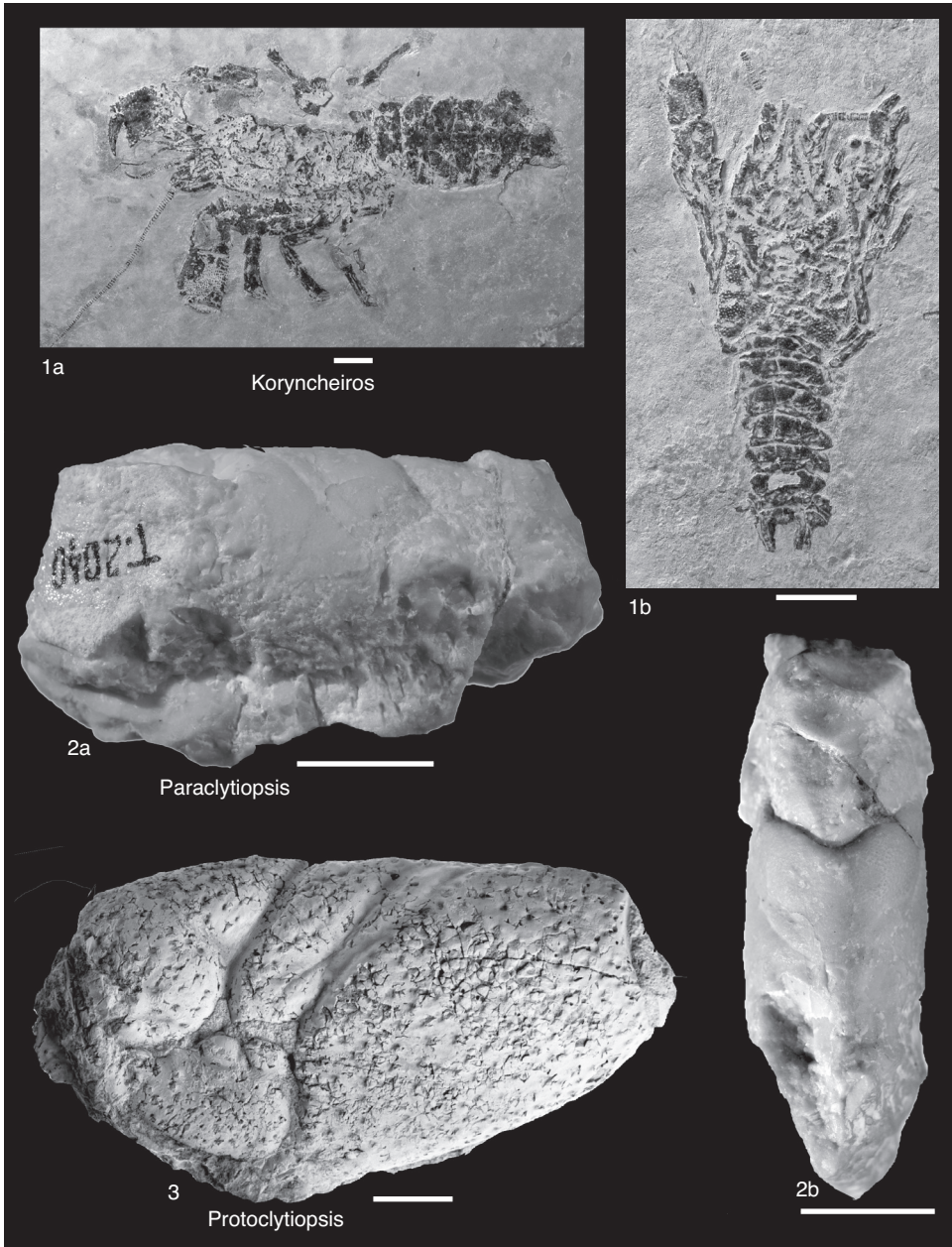


FIG. 8. Clytiopsidae (p. 10).

BONNIER, GARASSINO, SCHWEIGERT, & SIMPSON, 2013, p. 194 (type, *Glyphea saemanni* OPPEL, 1861, p. 110, OD)]. Punctate or strongly tuberculate subcylindrical carapace, with median suture; short rostrum lacking both supra- and subrostral spines; two or three tuberculate, longitudinal cephalic carinae, gastro-orbital groove extending into gastric region

from cervical groove, bifurcating into two convex forward arcs; deep and sinuous cervical groove, about 65–80 degrees to dorsal surface, joining hepatic and antennal grooves in pterygostomial region at steep angle to dorsal surface of carapace; branchiocardiac groove and postcervical groove distinct, branchiocardiac groove deeper, converging

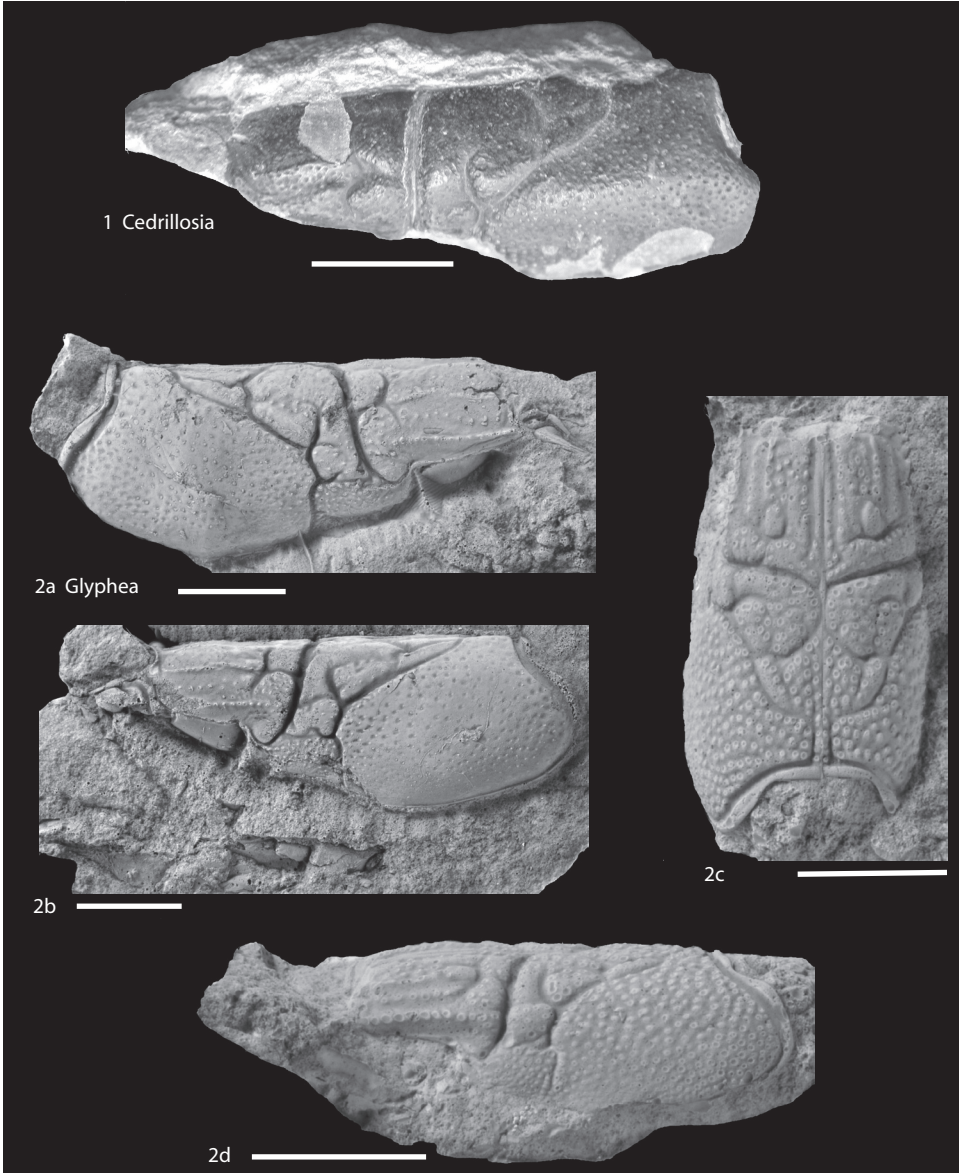


FIG. 9. Glypheidae (p. 10–14).

with one another both dorsally and ventrally; hepatic groove connects cervical and postcervical groove; both cardiac groove and laterocardiac groove present; grooves dividing area between cervical and branchiocardiac grooves into numerous polygonal regions; musculus adductor testis region inflated, completely circumscribed by grooves; pereiopod 1 isochelous, pseudochelate; pereiopods 2–4 may be pseudochelate or achelate; pereiopod 5 with terminal dactylus; telson rectangular. *Lower Jurassic (Hettan-*

gian)–*Eocene*: Austria, *Hettangian*; Germany, *Pliensbachian*–*Toarcian*; France, *Toarcian*; France, UK, *Bajocian*; ?France, *Bathonian*; France, Switzerland, UK, *Callovian*–*Oxfordian*; Germany, France, Japan, *Kimmeridgian*–*Tithonian*; ?Switzerland, Tanzania, *Berriasian*–*Hauterivian*; Japan, *Barremian*; Australia (Queensland), UK, *Aptian*–*Albian*; West Antarctica, *Lower Cretaceous (undifferentiated)*; Czech Republic, *Turonian*; New Zealand, *Paleocene*; New Zealand, *Eocene*. —FIG. 9, 2a–b, **G. regleyana*, Haute Saone,

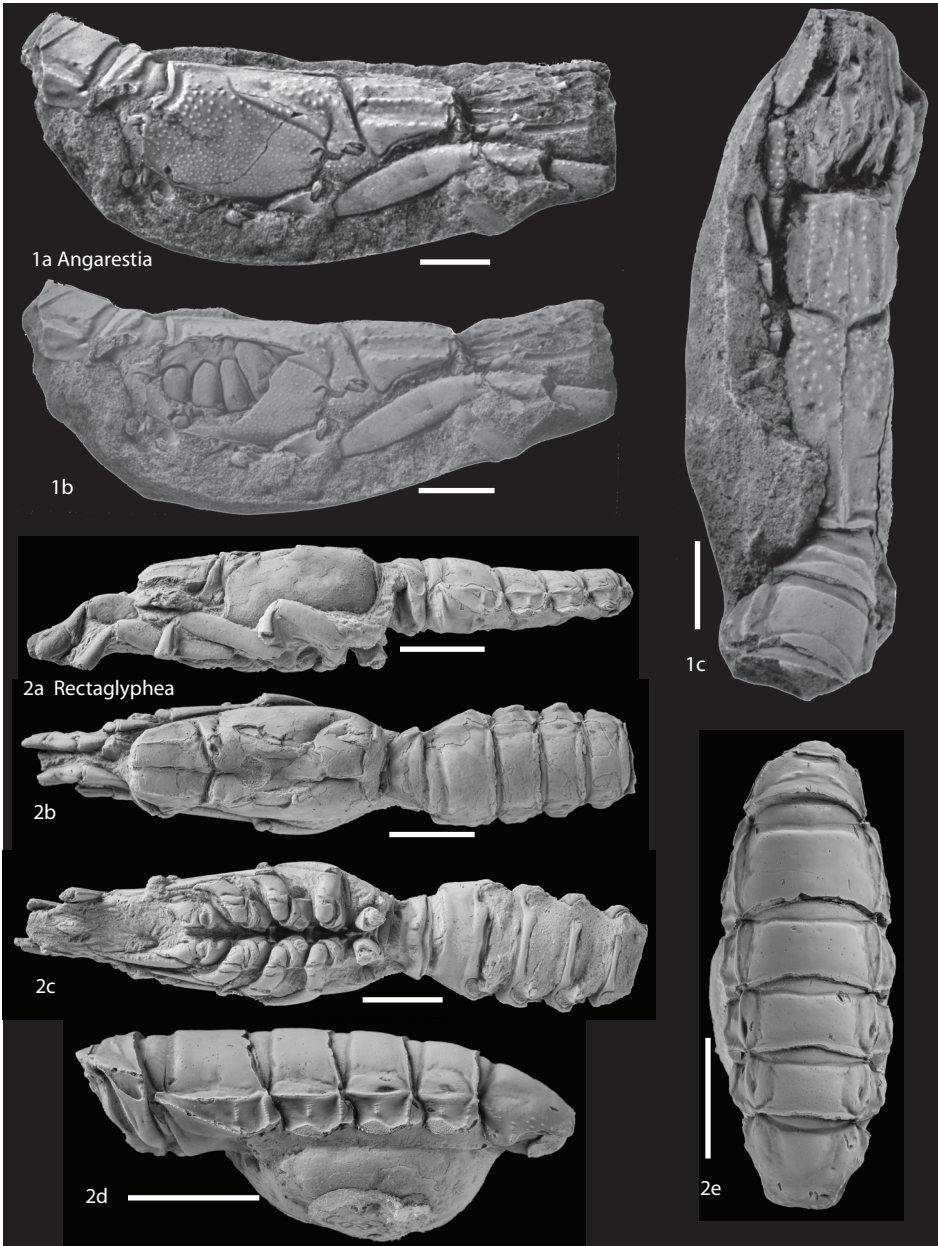


FIG. 10. Glypheidae (p. 13–16).

upper Oxfordian; *a*, KSU D 795, cast of MNHN VI no. 21, right lateral view; *b*, KSU D 797, cast of MNHN VI no. 30, left lateral view, scale bars, 1 cm (new).—FIG. 9, 2*c–d*, *G. muensteri* (VON MEYER, 1840a), KSU D 501, cast of holotype, NHMW 1847.LI.1130, Oxfordian, Germany; *c*, dorsal view, *d*, left lateral view, scale bars, 1 cm (new).

Angarestia CHARBONNIER, GARASSINO, SCHWEIGERT, & SIMPSON, 2013, p. 175 [**Glypheia australensis* FELDMANN, TSHUDY, & THOMPSON, 1993, p. 19, fig. 12–13; OD]. Cephalothorax elongate, with axial ridge posteriorly, which disappears anteriorly; cervical groove deep, straight, at about 65 degree angle to dorsal surface; gastric region with three,

well-developed gastric ridges and field of ridges around axis; ridges tubercular or spinose; area between ridges smooth or weakly granular; branchiocardiac groove moderately deep, turning abruptly near dorsal margin at nearly right angle and not quite intersecting with dorsal margin; intercervical groove weaker than and parallel to branchiocardiac, except near ventral margin where it curves nearly perpendicular to intersect with it, not intersecting dorsal margin or branchiocardiac groove dorsally; musculus adductor testis region weakly inflated, not circumscribed dorsally by grooves; cephalothorax ornamented dorsal to branchiocardiac groove by widely spaced tubercles and ventral to it by more closely spaced tubercles that become finer ventrally and anteriorly; posterior margin broadly rimmed; eyestalks long, widening anteriorly; pereopod 1 with pseudochele closure, long, anteriorly curved spine on lower margin of propodus, small spines on upper margin of merus; remaining pereopods very slender; pleonal somites smooth, with transverse ridge posteriorly and ventrally and longitudinal ridge between terga and pleura. *Lower Jurassic (Toarcian)–Upper Cretaceous*: Argentina, *Toarcian*; Kenya, *Callovian*; Antarctic Peninsula, *Campanian–Maastrichtian*.—FIG. 10, 1a–c. **A. australensis*, holotype, BAS.IN 2236, Campanian–Maastrichtian, Antarctic Peninsula; a, right lateral view; b, same view with branchiostegite removed to reveal endoskeleton; c, dorsal view, scale bars, 1 cm (adapted from FELDMANN, TSHUDY, & THOMSON, 1993, fig. 12.1,3,4).

Cedrillosia GARASSINO, ARTAL, & PASINI, 2009, p. 203 [**C. jurassica*; OD]. Carapace with two cephalic ridges, with short rostrum; distinct carapace swellings anterior to cervical groove; cervical groove nearly perpendicular to dorsal surface, extending nearly to ventral margin from dorsal surface, with convex, forward-curving gastroorbital grooves extending anteriorly from it; branchiocardiac groove oblique; postcervical groove merging with branchiocardiac groove ventrally, not extending to dorsal margin; laterocardiac groove present; inferior groove present; musculus adductor testis region inflated, another inflated region situated dorsal to it, bounded dorsally by postcervical groove, region between postcervical groove and laterocardiac groove rectangular, inflated; carapace uniformly punctate overall. *Upper Jurassic (Kimmeridgian–Tithonian)*: Spain.—FIG. 9, 1. **C. jurassica*, holotype, left lateral view, MGSB 24780, scale bar, 1 cm (new; photo by A. Garassino).

Glypheopsis BEURLEN, 1928, p. 125 [**Orphnea ornata* QUENSTEDT, 1858 in 1856–1858, p. 521, pl. 69, fig. 12–13; SD GLAESSNER, 1929, p. 196]. Cephalothorax much longer than high, with strong axial groove; three, strongly granular, straight, longitudinal carinae in cephalic region, another weaker pair converging on axial groove, area between ridges appearing to be smooth; cervical groove deep, sinuous, at about 65 degree angle to dorsal surface; rostrum appearing to be rather long, simple; branchiocardiac groove oblique,

relatively deep; postcervical groove appearing to be shallower, intersecting branchiocardiac groove just dorsal to musculus adductor testis region, then extending obliquely dorsally, appearing to intersect branchiocardiac groove just before axial groove; short cardiac groove directed anteriorly when viewed dorsally; musculus adductor testis region completely circumscribed by intercervical groove, hepatic groove, branchiocardiac groove, and cervical groove; an additional circular region, positioned dorsal to it, lies along cervical groove; region enclosed by branchiocardiac groove and postcervical groove inflated ventrally; posterior portion of cephalothorax either granular or punctate; pleonal somites with smooth terga, separated from pleura by longitudinal ridge directed postero-ventrally; pereopods apparently unknown. ?*Lower Jurassic (Hettangian–Sinemurian)*; *Middle Jurassic (Oxfordian)–Upper Jurassic (Callovian)*; ?*Lower Cretaceous (Cenomanian)*: ?UK, *Hettangian–Sinemurian*; Germany, *Callovian*; France, Germany, UK, *Oxfordian*; ?UK, *Cenomanian*.—FIG. 11, 2a–c. **G. ornata*, holotype, GPIT/43/69/12–13, left lateral (a), dorsal (b), and right lateral (c) views, Callovian–Oxfordian, Germany, scale bars, 1 cm (new; photos by W. Gerber).

Heteroglyphea COLOSI, 1921, p. 81 (47) [**H. paronae*; M]. Cephalothorax short and high for family; cervical groove deep, at about 75 degree angle to dorsal surface; with at least three cephalic ridges, one extending around dorsal edge of orbit and one extending around ventral edge of orbit, resulting in very well defined orbits for infraorder; a third cephalic ridge extends obliquely from orbit to ventral surface; branchiocardiac groove deep ventrally, diminishing dorsally and not appearing to intersect dorsal surface; postcervical groove parallel to branchiocardiac groove, obscured ventrally by pereopod, not intersecting branchiocardiac groove dorsally; surface of carapace appearing to be finely scabrous; what appear to be first pereopods long and achelate, with spinose lower margins of proximal elements; second? pereopod pseudochele. *Lower Jurassic (Sinemurian)*: Italy.—FIG 12, 1a–b. **H. paronae*, holotype, MRSN PU36868, Sinemurian, Italy; a, left lateral view; b, close up showing cephalic ridges and orbit, scale bars, 1 cm (new; photo by Daniele Ormezzano).

Paraglyphea BEURLEN, 1928, p. 136 [**Glyphea ambigua?* VON FRITSCH, 1870, p. 402; SD GLAESSNER, 1929, p. 305]. Strongly subcylindrical, punctate carapace, with deep median suture; short needlelike rostrum lacking both supra- and subrostral spines; three smooth or weakly granular, sinuous longitudinal carinae in cephalic region, gastro-orbital groove absent or perhaps very weakly developed; deep and sinuous cervical groove, at about 65 degrees to dorsal surface, joining hepatic and antennal grooves in pterygostomial region; branchiocardiac groove and postcervical groove distinct, with branchiocardiac groove deeper, merging with dorsal surface; and postcervical appearing to be discontinuous in some specimens, not merging with branchiocardiac groove

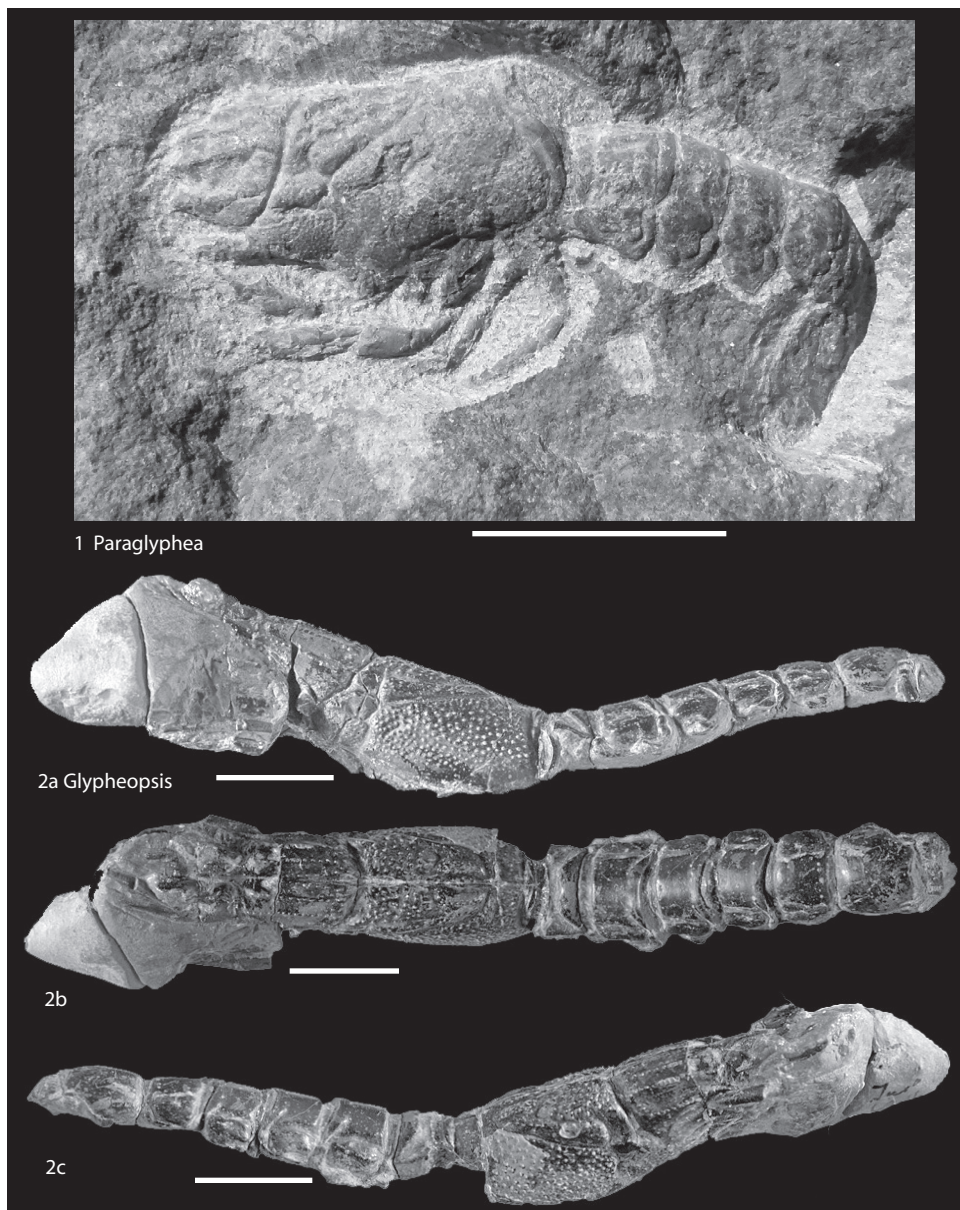


FIG. 11. Glypheidae (p. 14–15).

or dorsal surface; cardiac groove present; hepatic groove connects cervical and postcervical grooves; musculus adductor testis region weakly inflated, only strongly circumscribed by groove ventrally and very weakly dorsally or not at all dorsally; carapace surface punctate but not known if on cuticle or mold of interior; only proximal portions of appendages known, chelae and closures unknown. *Lower Jurassic (Hettangian–Pliensbachian)*: Germany, Luxembourg,

Hettangian; Germany, *Pliensbachian*.—FIG. 11, *I. *P. ambigua*, SMNS 70266, left lateral view, Hettangian, Germany, scale bar, 1 cm (new; photo by Guenter Schweigert).

Rectaglyphea CHARBONNIER, GARASSINO, SCHWEIGERT, & SIMPSON, 2013, p. 201, fig. 451–454 [**Rectaglyphea howardae*; OD]. Carapace elongate, displaying smooth ornamentation unusual for family, axially grooved; cervical groove deep,

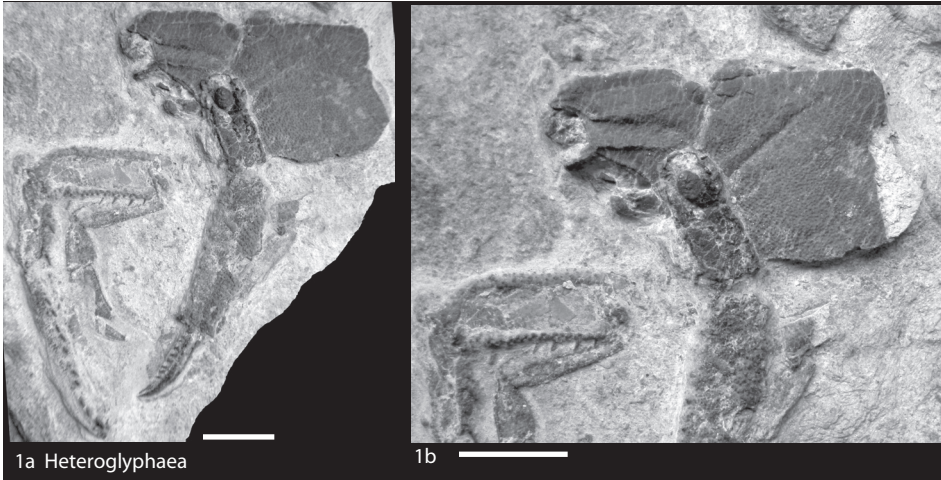


FIG. 12. Glypheidae (p. 14).

at about 70 degree angle to dorsal surface; two cephalic ridges; branchiocardiac and postcervical groove appearing to be more weakly developed than cervical groove, possibly discontinuous; proximal elements of pereopods smooth, appearing to lack spines on upper or lower surfaces; terga and pleura of pleon smooth, a longitudinal groove or ridge separating terga from pleura. *Lower Cretaceous (Aptian–Albian)*: UK.—FIG. 10, 2a–e. **R. howardae*, holotype (BM) In. 60585; left lateral (a), dorsal (b), ventral (c) views; left lateral (d) and dorsal (e) views of pleon only, Aptian–Albian, UK, scale bars, 1 cm (new; photos by Andrew Lewis).

Squamosoglyphea BEURLEN, 1930, p. 372 [**Glyphea dressieri* VON MEYER, 1840a, p. 14, pl. 4, 28; OD]. Carapace cylindrical in cross section, usually with three nodose longitudinal carina and cephalic ridges but may have more or fewer; cephalic region with groove parallel to cervical groove; entire cephalothorax surface covered with imbricate, forward-directed scales, musculus adductor testis (omega) region swelling between postcervical and branchiocardiac grooves nearly entirely deeply circumscribed, less deeply at upper anterior corner; rostrum short, sharp; cervical groove extending from dorsal surface nearly to ventral surface, at steep angle to dorsal surface, about 70 degrees; branchiocardiac groove and postcervical grooves distinct, converging dorsally and ventrally, branchiocardiac groove at low angle to dorsal surface; cardiac groove and laterocardiac grooves present, appearing to be continuous; ventral region (subhepatic?) high; chelipeds with imbricate scales, isochelous; pereopods 1 pseudochelelate, pereopods 2 pseudochelelate or achelate, pereopods 3–5 with terminal dactyls; third maxillipeds long, pediform; telson rectangular; exopod of uropod with diaeresis; pleonal somites with transverse ridges. *Upper Jurassic (Oxfordian–Tithonian)*: France, Germany, *Oxfordian*;

Germany, *Tithonian*.—FIG. 13, I. **S. dressieri*, holotype, NHMW 1847 1.1.1133, right lateral view, *Oxfordian*, France, scale bar, 1 cm (new; photo by Alice Schumacher).

Trachysoma BELL, 1857, p. 41 [**T. scabrum*; M] [= *Glypheopsis* BEURLEN, 1928, p. 125 (type, *Orphnea ornata* QUENSTEDT, 1858 in 1856–1858, p. 521, pl. 69, 12–13, SD GLAESSNER, 1929, p. 194)]. Carapace cylindrical, with median suture and cephalic ridges; omega swelling between postcervical and branchiocardiac grooves; rostrum long, with spines; cervical groove nearly at right angles to dorsal surface of carapace; postcervical and branchiocardiac grooves converging dorsally and ventrally; branchiocardiac groove at low angle to dorsal surface; pereopods 1–4 pseudochelelate; pereopod 5 with terminal dactylus. *Lower Jurassic (Hettangian)–Eocene*: England, *Hettangian–Sinemurian*; Germany, *Pliensbachian–Toarcian*; Germany, New Zealand, Poland, Switzerland, *Lower Jurassic (undifferentiated)*; Germany, *Callovian*; Germany, *Oxfordian*; France, Germany, UK, *Upper Jurassic (undifferentiated)*; western Russia, *Jurassic*; Germany, UK, *Albian*; Poland, West Antarctica, *Lower Cretaceous (undifferentiated)*; Germany, UK, *Cenomanian*; Sweden, *Paleocene*; ?Russia, UK, *Eocene*.—FIG. 13, 2a, *T. robusta* (FELDMANN & MCPHERSON, 1980), holotype, GSC 61398, molted specimen in Salter's position, left lateral view, late Bajocian, Prince Patrick Island, Northwest Territories, Canada, scale bar, 1 cm (new).—FIG. 13, 2b–c, *T. rostrata* (PHILLIPS, 1829), KSU D 1695, cast of JSHC 3202 from private collection of Joe S. H. Collins, London, UK, Early Jurassic, UK; dorsal (b) and left lateral (c) views, scale bar, 1 cm (new).—FIG. 13, 2d–e. **T. scabra* BELL, holotype, (BM)NH 59146; d, left lateral view; e, dorsal view (new; photos by Andrew Lewis), scale bars, 1 cm).

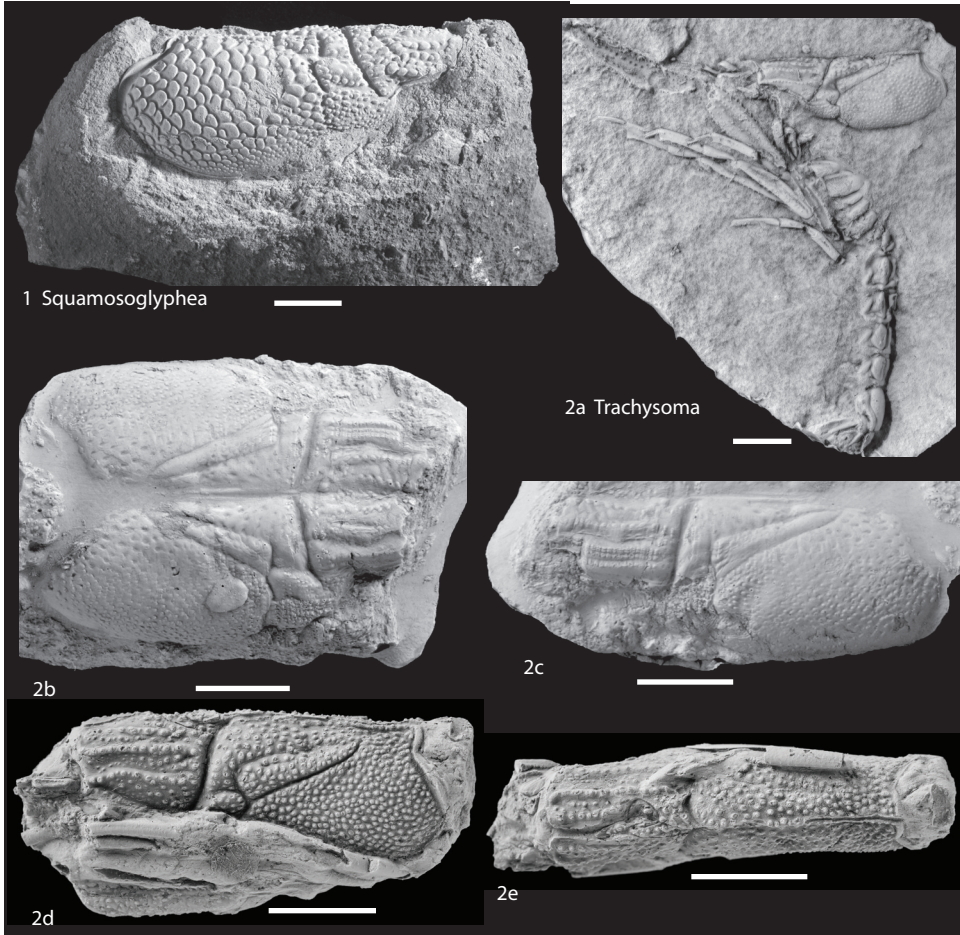


FIG. 13. Glypheidae (p. 16).

Family LITOGASTROIDAE
Karasawa, Schweitzer, & Feldmann, 2013

[Litogastroidae KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 107]

Carapace subcylindrical, with cephalic ridges and antennal spine; rostrum usually with marginal spines; cervical, postcervical, and branchiocardiac grooves all present and well developed; gastro-orbital, hepatic, and inferior grooves present; postcervical groove usually reaching hepatic groove by arcuate groove (except *Lissocardia*); cervical groove at or less than 70 degrees to dorsal surface; branchiocardiac groove at less than 30 degree angle to dorsal surface; sharp

demarcation between pleura and terga; exopod of uropods with diaeresis; pereiopods 1 chelate or pseudochelate; pereiopods 2 and 3 pseudochelate, except in *Lissocardia*, where they are chelate; pereiopod 4 pseudo- or achelate; pereiopod 5 achelate (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 107). *Lower Triassic (Induan)–Upper Jurassic (Oxfordian)*.

Litogaster VON MEYER, 1847a, p. 137, *nom. nov. pro Liogaster* VON MEYER, 1844, p. 567, *non* KRIECHBAUMER, 1890, p. 297 (hymenopteran) [**Liogaster obtusa* VON MEYER, 1844, p. 567; SD GLAESSNER, 1929, p. 236] [= *Aphthartus* VON MEYER, 1847c, p. 575 (type, *A. ornatus*, M); = *Myrtonius* VON MEYER, 1851, p. 258 (type, *M. serratus*, OD), *nom. nov.*

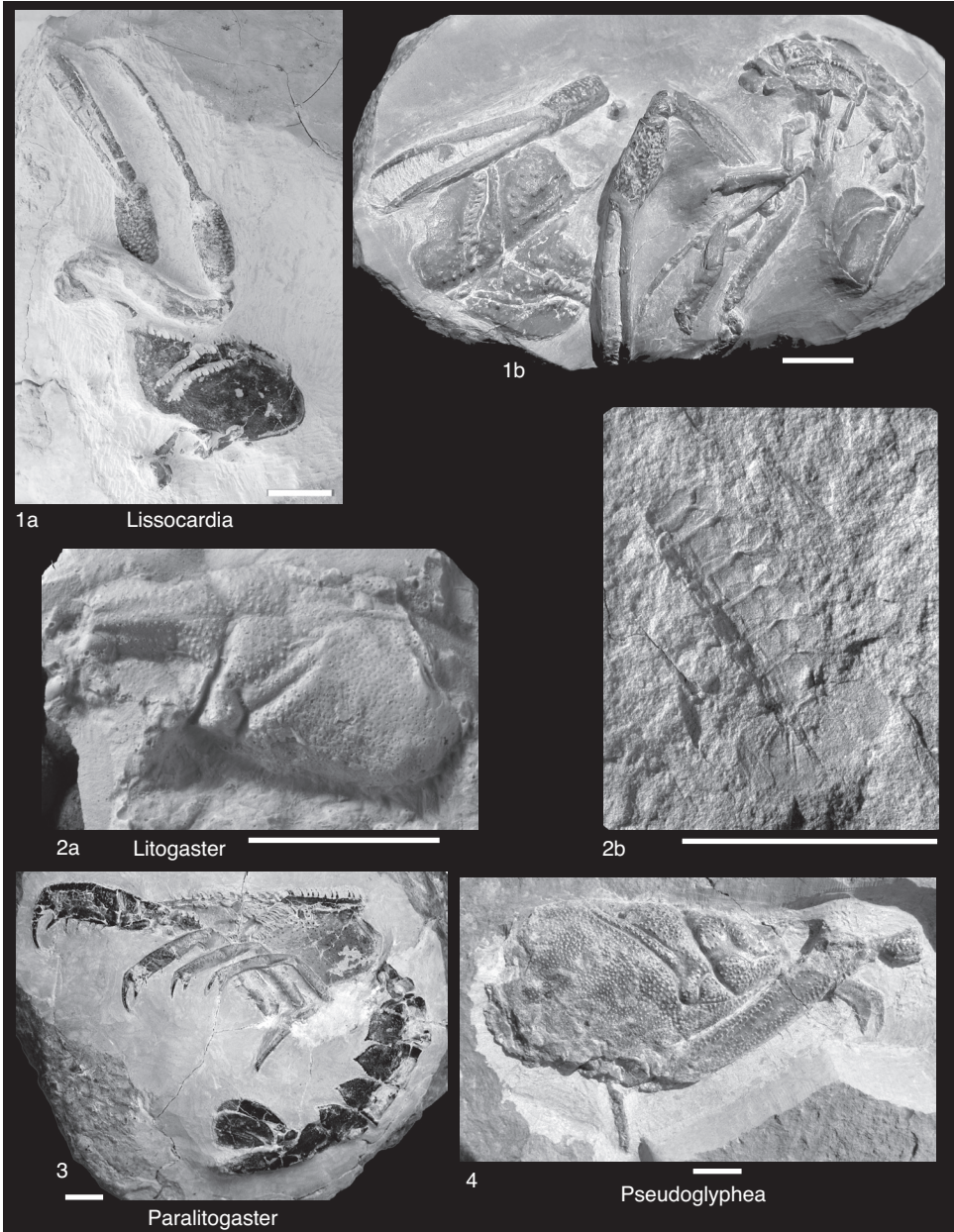


FIG. 14. Litagastroidea (p. 17–21).

pro Brachygaster VON MEYER, 1847c, p. 575, *non* LEACH, 1817 (wasp)]. Subcylindrical carapace; short rostrum lacking supra- and subrostral teeth; three longitudinal carinae in gastric region; deep and sinuous cervical groove, at low angle to dorsal surface, joining hepatic and antennal grooves in pterygostomial region; postcervical and bran-

chiocardiac grooves distinct for most of distance, converging ventrally; branchiocardiac groove at low angle to dorsal surface; pereiopod terminations unknown; telson rectangular; exopodite of uropod with diaeresis. *Lower Triassic (Olenekian)–Middle Triassic (Anisian)*: USA (Idaho), *Olenekian*; Germany, *Anisian*.—FIG. 14, 2a. **L. obtusa* (VON

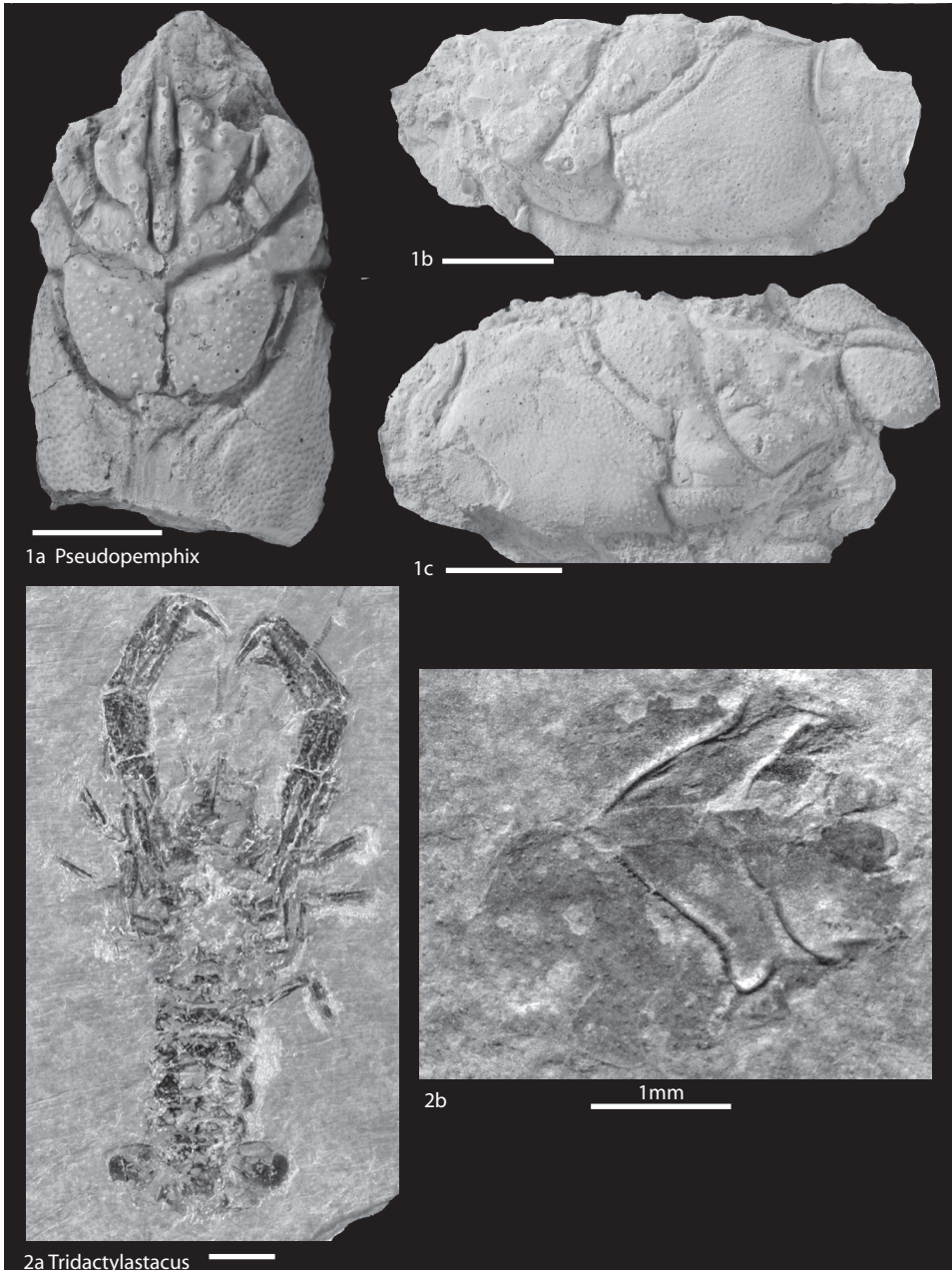


FIG. 15. Litogastroidae (p. 21).

MEYER), left lateral view, SMNS 4401/653, Alberti Collection, Anisian, Rottweil, Germany, scale bar, 1 cm (new; photo by G. Schweigert).—FIG. 14, 2*b*. *L. turnbullensis* SCHRAM, holotype (pleon only), FMNH PE 16215, Olenekian, Idaho, scale bar, 1 cm (new; photo by F. Schram).

Lissocardia VON MEYER, 1851, p. 254 [**L. silesiaca*; SD GLAESSNER, 1929, p. 235] [= *Lissocardia* VON MEYER, 1847c, p. 575 (*nom. nud.*); = *Piratella* ASSMANN, 1927, p. 337 (type, *P. badensis*, M)]. Cylindrical carapace, relatively high and compact; narrow rostrum; longitudinal dorsal keel with

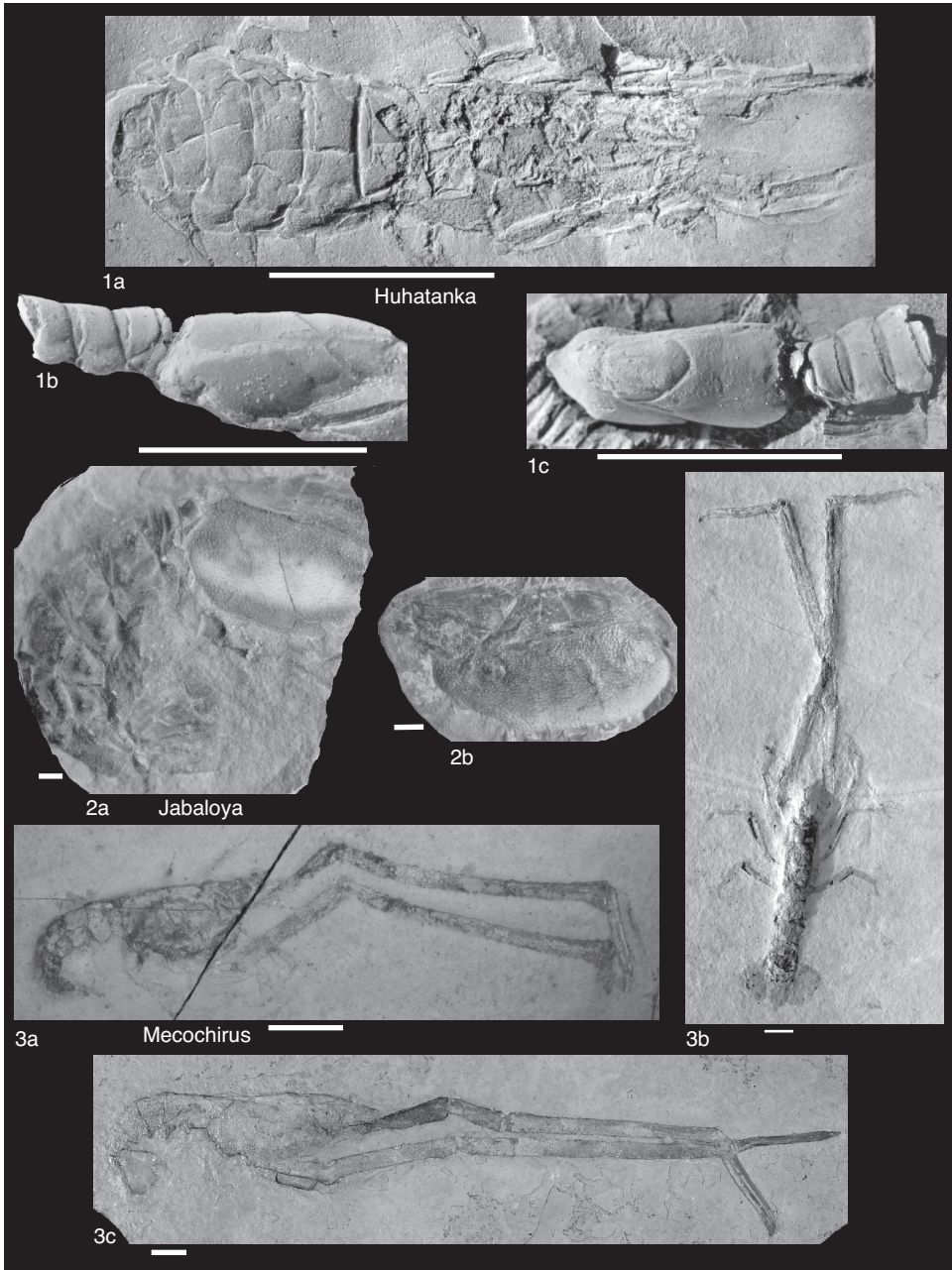


FIG. 16. Mecochiridae (p. 22–23).

spines from rostrum to the posterior margin; deep cervical groove and short gastro-orbital groove; postcervical groove weaker than branchiocardiac groove; anterior part of hepatic groove horizontal, appearing only in outlines; gastric region with two

longitudinal carinae; pereiopod 1 with elongate merus, short carpus and strong propodus, chelate, elongate index and dactylus with long, daggerlike spines on opposite internal edges. *Middle Triassic (Anisian–Ladinian)*: Germany.—FIG. 14, 1a–b.

**L. silesiaca*, Anisian, Hesse, Germany; *a*, left lateral view of carapace and chelipeds, Manfred Schulz Collection, scale bar, 1 cm (new; photo by G. Schweigert); *b*, dorsal view of carapace and oblique views of chelipeds and pleon, Ralf Hildner Collection, scale bar, 1 cm (new; photo by G. Schweigert).

Paralitogaster GLAESSNER, 1969, p. 626, *nom. nov. pro* *Aspidogaster* ASSMANN, 1927, p. 341, *non* VON BAER in FÉRUSAC, 1826, p. 124 (Trematoda) [*Litogaster limicola* KÖNIG, 1920, p. 13, 2–8; OD GLAESSNER, 1969, p. 626]. Subcylindrical carapace with cephalic ridges, longitudinal carina; deep cervical groove joining hepatic and antennal grooves in the pterygostomial region, cervical groove at high angle to dorsal surface; postcervical groove distinct from branchiocardiac groove for most of distance, converging with it ventrally; branchiocardiac groove at low angle to dorsal surface; three tuberculate carinae in the gastric region; short rostrum lacking supra- and subrostral teeth; subrectangular pleonal somites; pereopod 1 isochelous; pereopods 1–4 pseudochelate; pereopod 5 with terminal dactylus; third maxillipeds long, pereopod-like; telson rectangular; exopodite of uropod with diaeresis; pleonal somites with axial keel. *Lower Triassic (Induan)*—*Middle Triassic (Anisian)*: Germany.—FIG. 14, 3. **P. limicola* (KÖNIG), left lateral view, M. Henniger collection, Anisian, scale bar, 1 cm (new; photo by G. Schweigert).

Pseudoglyphe OPPEL, 1861, p. 111 [*Glyphe grandis* VON MEYER, 1837, p. 315; OD] [= *Scapheus* WOODWARD, 1863, p. 319 (type, *S. ancylochelis*, M); = *Heteroglyphaea* COLOSI, 1921, p. 47 (type, *H. paronae*, M); = *Triasiglyphe* VAN STRAELEN, 1936, p. 3 (type, *T. mulleri*, M); = *Audogaster* CHARBONNIER, GARASSINO, SCHWEIGERT, & SIMPSON, 2013, p. 263 (type, *Pseudopemphix spinosa* ASSMANN, 1927, p. 340–341, pl. 9, 1; OD)]. Subcylindrical carapace with denticulate dorsal margin; cephalic region with longitudinal ridges that may be reduced or absent; deep cervical groove joining curvilinear, weak antennal groove; postcervical and branchiocardiac grooves parallel from the posterior third of the carapace; well-developed hepatic groove extends in smooth arc defining posterior, ventral, and anterior margins of adductor testis muscle attachment; inferior groove absent or weakly defined; pereopods 1–3 subchelate; exopodite may lack diaeresis. *Middle Triassic (Anisian)*—*Upper Jurassic (Oxfordian)*: Germany, Anisian; Italy, USA (Nevada), Carnian; Italy, Norian; Austria, Rhaetian; France, Germany, UK, Hettangian–Pliensbachian; France, Germany, Italy, UK, Pliensbachian; France, Italy, UK, Sinemurian; France, Aalenian; France, Oxfordian.—FIG. 14, 4. **P. grandis* (VON MEYER), right lateral view, SMNS 678799, Sinemurian, Tübingen, Germany, scale bar, 1 cm (new; photo by G. Schweigert).

Pseudopemphix WÜST, 1903, p. 9 [*P. fritschii*; OD] [= *Seebachia* WÜST, 1903, p. 11, *non* SOLUB & NEUMAYR, 1882, p. 274 (mollusc) (type, *Pemphix*

meyeri VON ALBERTI, 1864, p. 195, pl. 7, 7, M)]. This genus differs from *Pemphix* in shorter subcylindrical carapace; shorter rostrum lacking supra- and subrostral teeth; weaker sculpture of carapace; pereopod 1 almost chelate. *Middle Triassic*: Germany.—FIG. 15, 1a–c. *P. albertii* (VON MEYER); *a*, KSU D 399, cast of SMNS 22109, Anisian, scale bar, 1 cm (new); *b*, cast of SMNS 4401/650, KSU D 400, Middle Triassic, scale bar, 1 cm (new); *c*, cast of NHMW 1852 XIV 237, KSU D 494, Triassic, scale bar, 1 cm (new).

Tridactylastacus FELDMANN, SCHWEITZER, & ZHANG, in FELDMANN & others, 2012, p. 431 [*T. sinensis*; OD]. Rostrum with rounded tip and axial keel; cephalothorax longer than wide, narrowed anteriorly; antennae and antennules long, flagellate; cervical and branchiocardiac grooves deep and well developed, cervical groove intersecting dorsal surface at about 60 degree angle; hepatic groove arcuate; post-cervical groove absent or at best poorly defined; pleonal pleurae rounded; telson with straight termination; exopod of uropod with serrate diaeresis, exopod with spines anterior to diaeresis and serrate distal to diaeresis; pereopods 1 slightly heterochelous, subchelate, merus with spines on upper and lower margins, manus with spines on upper distal margin and with stout spine above position of fixed finger on distal margin yielding the appearance of possessing three fingers, movable finger with beaded occlusal surface; pereopods 2–4 subchelate, pereopod 5 termination unknown, shortest of all pereopods; pleopods apparently dimorphic, either ovate with lanceolate tip or styliform and axially keeled, extending well beyond pleura in either case. *Middle Triassic (Anisian)*: China (Yunnan Province).—FIG. 15, 2a–b. **T. sinensis*, Anisian, Yunnan Province; *a*, holotype, LPI-40546; *b*, oblique dorsal view of carapace, LPI-32308, scale bars, 1 cm (new).

Family MECOCHIRIDAE Van Straelen, 1925

[Mecochiridae VAN STRAELEN, 1925, p. 215]

Subcylindrical carapace slightly compressed laterally, median suture absent, with cephalic carinae usually ornamented with spines or tubercles but sometimes smooth; short rostrum lacking supra- and subrostral teeth; cervical, postcervical, and branchiocardiac grooves well developed; both cervical and branchiocardiac grooves steep, cervical groove at less than 70 degree angle to dorsal surface, branchiocardiac groove at over 30 degree angle to dorsal surface, expressed as concave arc; subrectangular pleonal somites; sharp demarcation between pleura and terga; exopod of uropods

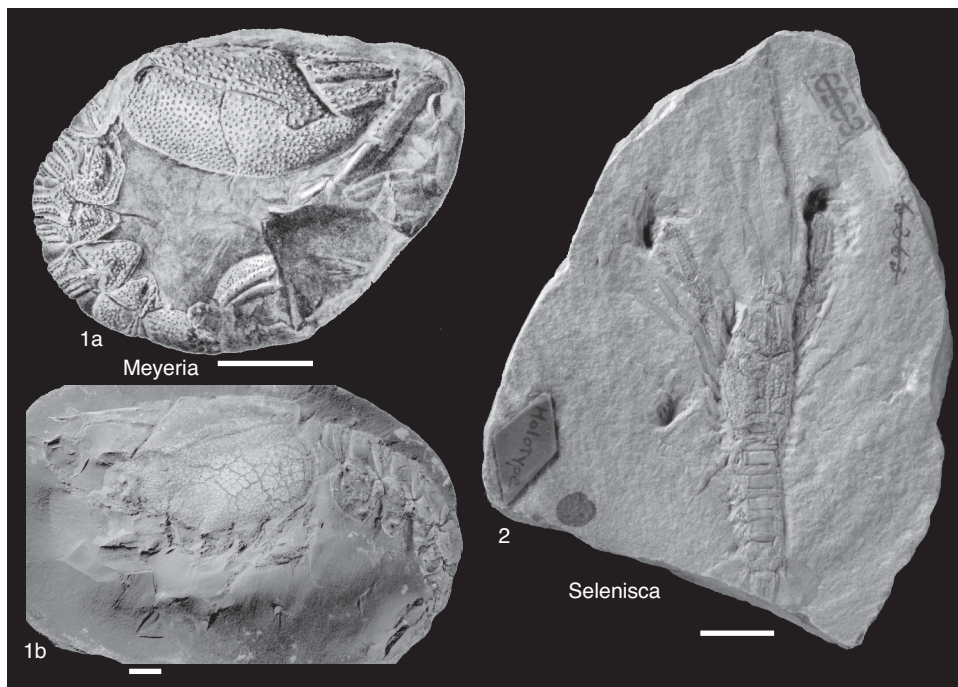


FIG. 17. Mecochiridae (p. 23).

with diaeresis; pereiopod 1 strongly elongate and pseudochelate or achelate; pereiopod 2 pseudochelate or achelate; pereiopods 3–5 always with terminal dactyli (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 108). *Lower Jurassic (Hettangian)–Upper Cretaceous (Maastrichtian)*.

Mecochirus GERMAR, 1827, p. 102 [**Macrourites longimanatus* SCHLOTHEIM, 1820, p. 38; SD WOODS, 1927 in 1925–1931, p. 64 (= *Mecochirus locusta* GERMAR, 1827, p. 102; = *Mecochirus baieri* GERMAR, 1827, p. 103; = *Megachirus brevimanus* MÜNSTER, 1839, p. 34, pl. 14b, 2; = *Pterochirus remimanus* MÜNSTER in BRONN, 1836 in 1835–1837, p. 477)] [= *Megachirus* BRONN, 1836 in 1835–1837, p. 475 (type, *Mecochirus locusta* GERMAR, 1827, p. 102, SD GLAESSNER, 1969, p. 464); = *Pterochirus* MÜNSTER, 1837 in BRONN, 1835–1837, p. 476 (type, *P. remimanus*, SD GLAESSNER, 1969, p. 464); = *Norna* MÜNSTER, 1840, p. 22 (type, *N. lithophila*, SD WOODS, 1927 in 1925–1931, p. 64); = *Carciniellum* STRAND, 1928, p. 41, *nom. nov. pro Carcinium* BANKS & SOLANDER in HAWKESWORTH, 1773, p. 3 (incertae sedis), *non* MEYEN, 1834, p. 155 (Crustacea) (type, *Carcinium sociale* VON MEYER, 1841, p. 96, SD WOODS, 1927 in 1925–1931, p. 64); = *Eumorphia* VON MEYER, 1847b, p. 144 (type,

Carcinium sociale VON MEYER, 1841, p. 96); = *Mecochiria* SECRETAN, 1968, p. 227 (type, *M. foresti*, M)]. Subcylindrical carapace with deep cervical groove extending into the antennal groove, strongly backward and parallel postcervical and branchiocardiac grooves, and weak hepatic groove; short rostrum lacking supra- and subrostral teeth; strongly elongate pereiopod 1 almost pseudochelate; pereiopod 2 pseudochelate; pereiopods 3–5 with terminal dactylus; subrectangular pleonal somites; exopodite with diaeresis. *Lower Jurassic (Hettangian)–Upper Cretaceous (Maastrichtian)*: Germany, *Hettangian–Pliensbachian*; Italy, *Sinemurian*; Argentina, *Toarcian*; UK, *Callovian–Bathonian*; Germany, Switzerland, *Callovian*; Germany, France, Switzerland, UK, *Oxfordian*; Chile, France, New Zealand, UK, *Kimmeridgian*; Germany, *Tithonian*; France, Switzerland, *Albian*; West Greenland, *Maastrichtian*.—FIG. 16, 3a–c. **M. longimanatus* (SCHLOTHEIM), *Tithonian*, Germany; a, right lateral view, CM 33361 (new); b, SMNS 65409, Wegscheid (new; photo by G. Schweigert); c, right lateral view, USNM 30861, scale bars, 1 cm (new).

Huhatanka FELDMANN & WEST, 1978, p. 1219 [**Squilla? kiowana* SCOTT, 1970, p. 85, pl. 7, 5; OD]. Subcylindrical carapace with subparallel cervical and branchiocardiac grooves; postcervical groove absent; subdorsal and suborbital pustulose carinae; short rostrum lacking supra- and subrostral teeth; pleonal somites 1–6 generally smooth;

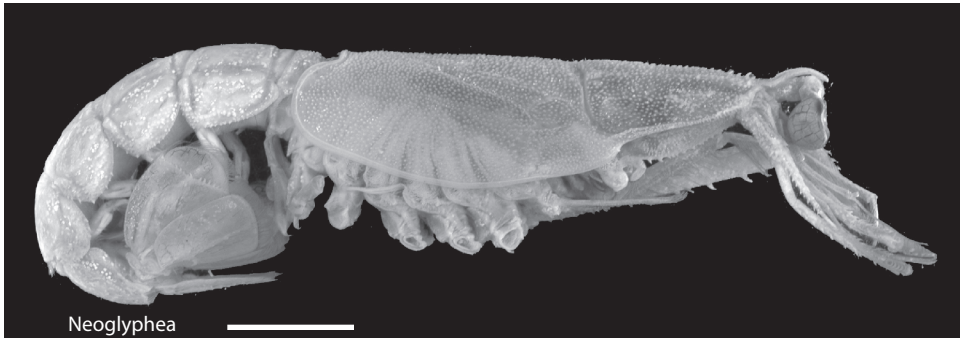


FIG. 18. Neoglypheidae (p. 24).

pereiopods 1–3 slender and pseudochelate; pereiopods 4–5 with terminal dactyli. *Lower Cretaceous (Albian)*: Iran, USA (Kansas).—FIG. 16, 1a–c. **H. kiowana* (SCOTT), Kiowa Shale, Albian, Kansas; a, dorsal surface, counterpart, KSU D 693; b–c, right lateral view and dorsal view, KSU D 1495, scale bars, 1 cm (new).

Jabaloya GARASSINO, ARTAL, & PASINI, 2009, p. 199 [**J. aragonensis*; OD]. Cervical groove deep, at about 70 degree angle to dorsal surface; postcervical and branchiocardiac grooves closely spaced, subparallel to dorsal surface, with pronounced inferior loop; branchiocardiac groove at very low angle to dorsal carapace; one longitudinal gastric ridge; pleurae with central swellings. *Upper Jurassic (Oxfordian–Tithonian)*: Spain, *Oxfordian*; Poland, *Tithonian*.—FIG. 16, 2a–b. **J. aragonensis*, *Oxfordian*, Aragon, Spain; a, paratype, right lateral view, MGSB 56554; b, holotype, left lateral view, MGSB 74517, scale bars, 1 cm (Garassino, Artal, & Passini, 2009, fig. 5–6).

Meyeria M'COY, 1849, p. 333 [**Astacus ornatus* PHILLIPS, 1829, p. 95, pl. 3,2; OD]. Subcylindrical carapace with deep cervical groove extending into the antennal groove; strongly backward and parallel postcervical and branchiocardiac grooves and weak hepatic groove; three tuberculate carinae in the gastric region; dorsal margin of carapace denticulate in the anterior one-third; short rostrum lacking supra- and subrostral teeth; strongly elongate pereiopod 1 mostly pseudochelate; pereiopod 2 shorter than first, mostly pseudochelate; pereiopods 3–5 with terminal dactylus; subrectangular pleonal somites; subrectangular telson; exopodite with diaeresis. *Lower Cretaceous (Berriasian)–Upper Cretaceous*: UK, *Berriasian–Albian*; Germany, *Valanginian*; Mexico (Chihuahua, Puebla); Spain, *Aptian*; Germany, *Lower Cretaceous*; West Antarctica, *Campanian*; Canada (British Columbia), *Upper Cretaceous*; South Africa, *Unknown age*.—FIG. 17, 1a. **M. ornata* (PHILLIPS), CAMSM B.11433, Hauterivian, Speeton Clay, UK, scale bar, 1 cm (Woods, 1928 in 1925–1931, pl. 18, 1).—FIG. 17, 1b. *M. rapax* (HARBOURT), BM(NH) I.15118, Valanginian, Hanover, UK, scale bar, 1 cm (new).

Selenisca VON MEYER, 1847b, p. 141 [**S. gratiosa*; M]. Carapace granular, with longitudinal rows of granules on cephalic and dorsal part of thoracic regions; cervical groove steeply inclined, about 72 degrees to midline, deeply impressed; postcervical and branchiocardiac grooves weak, branchiocardiac groove inclined to midline at about 25 degrees over most of its length; pleon with smooth rectangular tergal surface bounded by transverse and longitudinal grooves and short, triangular, irregularly inflated pleura; antennules and antennae long; third maxilliped long, pediform; pereiopod 1 pseudochelate; exopod of uropods with diaeresis; telson quadrate, tapering slightly posteriorly. *Upper Jurassic (Kimmeridgian)*: Germany.—FIG. 17, 2. **S. gratiosa*, MCZ Invertebrate Paleontology 109949, Würmlingen, scale bar, 1 cm (Karasawa, Schweitzer, & Feldmann, 2013, fig. 12B).

Family NEOGLYPHEIDAE Karasawa, Schweitzer, & Feldmann, 2013

[Neoglypheidae KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 108]

Subcylindrical carapace slightly compressed laterally, median suture absent, with cephalic carinae usually ornamented with spines or tubercles but sometimes smooth; short rostrum lacking supra- and subrostral teeth; cervical, postcervical, and branchiocardiac grooves well developed, both cervical and branchiocardiac grooves steep, cervical groove at over 70 degree angle and branchiocardiac groove at over 30 degree angle to dorsal surface, expressed as concave arc; subrectangular pleonal somites; sharp demarcation between pleurae and tergae; exopodite of uropod with diaeresis; pereiopods 1–4 pseudochelate; pereiopod 5 with terminal dactylus (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 108). *Holocene*.

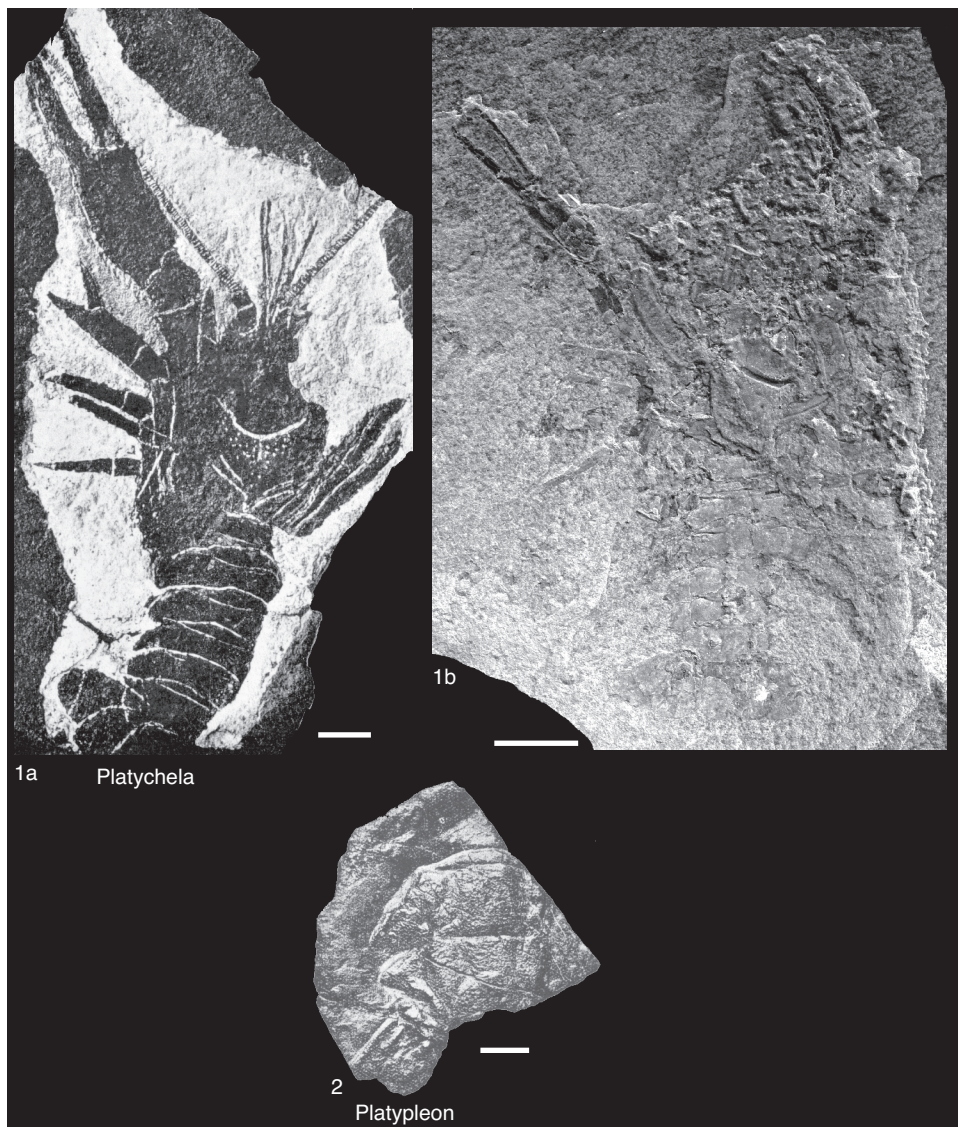


FIG. 19. Platychelidae (p. 25).

Neoglyphea FOREST & DE SAINT LAURENT, 1975, p. 155 [**N. inopinata*; OD]. Description as for family. *Holocene*: Philippines.—FIG. 18. **N. inopinata*, holotype, USNM 152650, scale bar, 1 cm (Karasawa, Schweitzer, & Feldmann, 2013, fig. 12A).

Family PLATYCHELIDAE
Glaessner, 1969

[Platychelidae GLAESSNER, 1969, p. 458]

Carapace dorsoventrally flattened, median suture absent; short rostrum with suprarostal

teeth; deep cervical groove and weak postcervical and branchiocardiac grooves, postcervical and hepatic grooves connected by arcuate groove; pereiopods 1–3 chelate; pereiopod 1 with long and slender chelae; chelae of pereiopods 2–3 smaller than those of pereiopod 1; pereiopods 2–5 shorter than pereiopod 1; pereiopods 4 and 5 with terminal dactyli; pleonal somites 1–6 smooth with well-developed pleura, subrectangular telson, subrectangular pleonal somites;

sharp demarcation between pleura and terga; exopod of uropods with diaeresis (KARASAWA, SCHWEITZER, & FELDMANN, 2013, p. 110). *Upper Triassic (Carnian)*.

Platychela GLAESSNER, 1931, p. 475 [**P. trauthi*; OD]. Carapace dorsoventrally flattened, median suture absent; short rostrum with suprarostal teeth; deep cervical groove and weak postcervical and branchiocardiac grooves, postcervical and hepatic grooves connected by arcuate groove; pereopod 1 with long and slender chelae; chelae of pereopods 2–3 smaller than those of pereopod 1, pereopods 2–5 shorter than pereopod 1; pereopods 4 and 5 with terminal dactyli; pleonal somites 1–6 smooth with pleura well developed; subrectangular telson. *Upper Triassic (Carnian)*: Austria.—FIG. 19, 1*a*. **P. trauthi*, holotype, NHMW 1910/0015/018, Lunz, scale bar, 1 cm (Glaessner, 1931, pl. 16).—FIG. 16, 1*b*. *P. kableri* GLAESSNER, 1931, NHMW 1887/0009/0105-0107, Raibl, scale bar, 1 cm (new).

Platyleon VAN STRAELEN, 1936, p. 1 [**P. nevadensis*; M]. Based on one single incomplete specimen (only some pleonal somites are preserved). *Upper Triassic (Carnian)*: USA (Nevada).—FIG. 19, 2. **P. nevadensis*, holotype, MRHN (Belgium) 10850, scale bar, 1 cm (Van Straelen, 1936, fig. 1).

ABBREVIATIONS FOR MUSEUM REPOSITORIES

- BAS, BAS.IN**: British Antarctic Survey, Invertebrate Type Collection, British Antarctic Survey, High Cross, Madingley Road, Cambridge, UK
BMNH, (BM) In.: The Natural History Museum, London, UK
BSP: Bayerische Staatsammlung für Paläontologie und Geologie München (Munich), Germany
CAMSM: Sedgwick Museum, Cambridge University, Cambridge, UK
CM: Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA
FI: Magyar Állami Földtani Intézet (Geological Survey of Hungary), Budapest, Hungary
FMNH: Field Museum of Natural History (formerly Walker Museum, University of Chicago), Chicago, Illinois, USA
GBA: Geologische Bundesanstalt, Vienna, Austria
GPIT: Department of Geosciences University of Tübingen, Germany
GSC: Geological Survey of Canada, Eastern Paleontology, Division, Ottawa, Ontario, Canada
KSGR: Department of Stratigraphy and Regional Geology, University of Mining and Metallurgy, Kraków, Poland
KSU: Decapod Comparative Collection, Department of Geology, Kent State University, Kent, Ohio, USA
LPI: Invertebrate Paleontology Collection, Chengdu Institute of Geology and Mineral Resources, Yunnan Province, China

- MAB k**: Oertijdmuseum De Groene Poort, Boxtel, the Netherlands
MB.A.: Museum für Naturkunde Berlin, Paläontologisches Museum, Berlin, Germany
MCSN: Museo Cantonale di Storia Naturale, Lugano, Switzerland
MCZ: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA
MGSB: Museo Geológico del Seminario de Barcelona, Spain
MNHN: Muséum National d'Histoire Naturelle, Paris, France
MRHN: Institut Royal des Sciences Naturelles de Belgique (formerly MRHN, Museum Royal d'Histoire Naturelle), Belgium
MRSN: Museo Regionale di Scienze Naturali, Torino, Italy
MSNB: Museo di Scienze Naturali di Bergamo, Italy
NHMW: Naturhistorisches Museum Wien (Natural History Museum of Vienna), Austria
PIN: Palaeontological Institute, Russian Academy of Sciences, Moscow, Russia
RTM: Royal Tyrrell Museum, Drumheller, Alberta, Canada
SMF: Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt, Germany
SMNS: Staatliches Museum für Naturkunde, Stuttgart, Germany
USNM: United States National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA

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