



A catalogue of the type and figured fossil decapod crustaceans in the collections of the Geological Survey of Austria in Vienna

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17 Plates

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Crustacea

Decapoda

Triassic

Jurassic

Neogene

Paleogene

Palaeontological Collection

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Abstract

The present catalogue lists and figures the type and figured material of fossil decapod crustaceans housed in the collections of the Geological Survey of Austria in Vienna. Specimens previously believed to be lost were relocated. Lectotypes and paralectotypes are chosen herein for 11 species. Taxonomic affinity of taxa originally described in open nomenclature is discussed.

Katalog der Typen und Abbildungsoriginale von fossilen dekapoden Krebsen in den Sammlungen der Geologischen Bundesanstalt in Wien

Zusammenfassung

Im vorliegenden Katalog werden Typen und Abbildungsoriginale von fossilen dekapoden Krebsen aufgelistet und abgebildet, die in den Sammlungen der Geologischen Bundesanstalt in Wien aufbewahrt werden. Einige Exemplare, die als verschollen galten, konnten identifiziert werden. Es werden in diesem Katalog Lectotypen und Paralectotypen für 11 Arten ausgewählt. Die taxonomische Zugehörigkeit in offener Nomenklatur beschriebener Taxa wird diskutiert.

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Introduction

The Geological Survey of Austria in Vienna (GBA) houses several important palaeocarcinological collections. First, the type material of several monotypic Triassic genera described by GLAESSNER (1931) from the Reingraben Beds (“Reingrabener Schiefer”) is deposited here. Secondly, a large collection of the Eocene brachyurans from Italy reported by BITTNER (1875, 1883, 1895) is also stored here, as well as a part of the material of REUSS (1858a) including type specimens from the famous Czech locality Štramberk. Decapods deposited at the GBA were treated also by REUSS (1858b), GLAESSNER (1924, 1930), LÖRENTHEY & BEURLEN (1929), MÜLLER (1998a), SCHWEITZER & FELDMANN (2008, 2009), HYŽNÝ (2014), HYŽNÝ & GAŠPARIČ (2014), and HYŽNÝ et al. (2015, 2016).

Interestingly, the plates of BITTNER (1875, 1877, 1884) contain mirror images of all specimens (as far as can be deduced from the specimens deposited at the GBA), whereas other works (BITTNER, 1883, 1895) contain “normal” images. This issue may be of minor importance if the animals are symmetrical. However, numerous brachyurous crabs are heterochelous. Thus, when evaluating handedness of certain taxa, one should bear in mind various techniques used for depiction of fossils in and before the 19th century. It is a well-known fact that not enough attention was paid to this when working with fossil decapods (see HYŽNÝ, 2014 and references therein). Therefore, the opportunity is taken here to provide photos of all figured specimens deposited at the GBA.

Many type specimens of Alexander Bittner deposited at the GBA were considered to be lost or their repository was stated as unknown (e.g. DE ANGELI & GARASSINO, 2006). Actually, the material is well curated and accessible for scientists. This catalogue provides all relevant data concerning this material. Since numerous taxa of Alexander Bittner had no fixed lectotype, if possible we have selected herein lectotypes from the series of syntypes; lectotypes and paralectotypes were chosen for 11 taxa.

Alexander Bittner described numerous new genera. Since their first description, several have remained monotypic (e.g. DE GRAVE et al., 2009; SCHWEITZER et al., 2010), and therefore it is important to re-evaluate this material. Detailed systematic revision of the collection of Bittner deposited at the GBA is beyond the scope of the catalogue, however, we feel appropriate to document the material, at least photographically, with additional notes on preservation. This may serve as a basis for future studies.

Some decapods deposited at the GBA were mentioned by STOJASPAL (1975). Later, MÜLLER (1998a) in his “Fossilium Catalogus Austriae” reported the type material coming from Austria, including the specimens deposited at the GBA. However, numerous type and figured decapod specimens reported by BITTNER (1875, 1883, 1884, 1893, 1895) are from other countries, therefore they escaped the attention of the scholars of the 20th century working on Austrian material. The aim of the catalogue is to fix this gap in our knowledge and present all type and figured specimens of fossil decapod crustaceans deposited at the GBA irrespective of their provenance.

List of the type and figured material

The material is ordered chronologically according to the year of publication. Within a publication genera and species names are ordered alphabetically. The index at the end of the paper helps finding these names.

Abbreviations used in the catalogue

GBA = Geologische Bundesanstalt (Geological Survey), Vienna, Austria.

NHMW = Naturhistorisches Museum Wien (Natural History Museum Vienna), Vienna, Austria.

REUSS, A.E. (1858a): Zur Kenntniss fossiler Krabben.

Cancer brachychelus REUSS, 1858a

(Pl. 1, Figs. 1a–g)

Coll. No.: GBA 2007/096/0002.

Material: Lectotype (chosen herein).

Type level: Upper Eocene (Priabonian).

Type locality: San Michele at Bassano, Marostica near Vicenza, Veneto, Italy.

Type reference and figure: REUSS, A.E., 1858a: Zur Kenntniss fossiler Krabben. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **17**: 29, Pl. 13, Fig. 5.

Remarks: REUSS (1858a) based his description on more than 20 specimens, four of them were figured. No holotype has been chosen, thus, all figured specimens are syntypes. Since only a single specimen in the collections of the GBA can be matched with the published figure (REUSS, 1858a: Pl. 13, Fig. 5), we designate this specimen to be the lectotype. Other specimens have to be considered lost. The remaining specimen shows also the sternum with two vulvae, hence, it represents a female. All cuticular surfaces are well preserved.

Cancer brachychelus REUSS, 1858a, is a junior subjective synonym of *Harpactocarcinus punctulatus* (DESMAREST, 1822); for exhaustive synonymics a reference is made to DE ANGELI & GARASSINO (2006).

Current name: *Harpactocarcinus punctulatus* (DESMAREST, 1822).

Goniodromites bidentatus REUSS, 1858a

(Pl. 2, Figs. 3a–d)

Coll. No.: GBA 2007/096/0006 (former coll. no. 2363).

Material: Lectotype (chosen herein).

Type level: Kimmeridgian–Lower Berriasian, Štramberk Limestone.

Type locality: Ignáce (Ignaziberg) near Nový Jičín (Neu Titschein), Czech Republic.

Type reference and figure: REUSS, A.E., 1858a: Zur Kenntniss fossiler Krabben. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **17**: 72, Pl. 24, Figs. 5–6.

Refigured by: GLAESSNER, M.F., 1969: Decapoda. In: MOORE, R.C. (Ed.): Treatise on invertebrate paleontology, Part R, Arthropoda 4, **2**: R486, Fig. 293.3.

Remarks: The species was revised by FELDMANN et al. (2006) and SCHWEITZER & FELDMANN (2008), however, without examination of the type material. The English translation of the original description was provided by FELDMANN et al. (2006: 9). SCHWEITZER & FELDMANN (2008: 126) noted that “*the present location of the type specimen described by Reuss has not been determined*”. Since, *Goniodromites bidentatus* is the type species of *Goniodromites* REUSS, 1858a, the information on the repository of the type material is more than adequate. The sample deposited at the GBA includes two carapaces on a single piece of rock, however, only the figured specimen (REUSS, 1858a: Pl. 24, Fig. 5) belongs to *G. bidentatus*.

REUSS (1858a) mentioned at least two specimens of *G. bidentatus*; hence, the specimen GBA 2007/096/0006 is selected herein as the lectotype. The cuticle is well-preserved.

The stratigraphic level of the type material is unknown. Traditionally, the limestones at Štramberg have been assumed to be of Tithonian age (HOUŠA, 1975), which may be correct for the main interval of reef development. More recent age estimates, however, indicate a much longer time span, i.e., from the uppermost Kimmeridgian to the lower Berriasian for the deposition of the Štramberg Limestone (FRAAIJE et al., 2013; GAŠPARIČ et al., 2015). The same applies to all specimens from Štramberg described and/or reported by REUSS (1858a).

Current name: *Goniodromites bidentatus* REUSS, 1858a.

Goniodromites complanatus REUSS, 1858a

(Pl. 2, Figs. 6a–b)

Coll. No.: GBA 2007/096/0008 (former coll. no. 2362).

Material: Lectotype (chosen herein).

Type level: Kimmeridgian–Lower Berriasian, Štramberg Limestone.

Type locality: Ignáce (Ignaziberg) near Nový Jičín (Neu Titschein), Czech Republic.

Type reference and figure: REUSS, A.E., 1858a: Zur Kenntniss fossiler Krabben. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **17**: 74, Pl. 24, Fig. 7.

Remarks: Although more specimens are mentioned by REUSS (1858a), only the figured specimen is within the collections at the GBA. This specimen is chosen herein as the lectotype.

VAN STRAELEN (1925) recognised that *Goniodromites complanatus* is an internal mould of *Goniodromites polyodon* REUSS, 1858a, and synonymised both taxa, which was followed also by SCHWEITZER & FELDMANN (2008: 124). Therefore, the current name of the species is *Goniodromites polyodon* REUSS, 1858a.

Current name: *Goniodromites polyodon* REUSS, 1858a.

Goniodromites polyodon REUSS, 1858a

(Pl. 2, Figs. 1, 2a–b)

Coll. No.: GBA 2007/096/0007/01–02 (former coll. no. 2359).

Material: Lectotype (GBA 2007/096/0007/01) and paralectotype (GBA 2007/096/0007/02) (selected herein).

Type level: Kimmeridgian–Lower Berriasian, Štramberg Limestone.

Type locality: Ignáce (Ignaziberg), Nový Jičín (Neu Titschein), Czech Republic.

Type reference and figure: REUSS, A.E., 1858a: Zur Kenntniss fossiler Krabben. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **17**: 73, Pl. 24, Fig. 4.

Remarks: The English translation of the original description was published by SCHWEITZER & FELDMANN (2008: 127). It must be, however, noted that the last paragraph of their translation begins with: “*On the studied specimen sit only...*”, whereas the original reads: “*An den untersuchten Exemplaren sitzen nur...*”. Thus, REUSS (1858a) clearly stated that there were more specimens at his disposal. In fact, two specimens are present in the collections of the GBA. The figured specimen (REUSS, 1858a: Pl. 24, Fig. 4) is selected herein as the lectotype (Pl. 2, Figs. 2a–b), whereas the other specimen as the paralectotype (Pl. 2, Fig. 1). Both specimens retain the cuticle.

SCHWEITZER & FELDMANN (2008: 123, Pl. 2C) stated that the holotype and paratype of *Goniodromites polyodon* were studied and that both “*are currently housed at the Natural History Museum in Vienna*”. They figured the cast of one of the specimens with the caption: “*cast of best specimen in Geologische Landesanstalt Wien, Sammlung Reuss, number 2359, composed of two cotypes*”. REUSS (1858a) did not select the holotype, therefore, both specimens must be considered syntypes, from which the lectotype and paralectotype are selected herein. The figure of SCHWEITZER & FELDMANN (2008: Pl. 2C) corresponds to the lectotype as recognised herein.

Current name: *Goniodromites polyodon* REUSS, 1858a.

Oxythyreus gibbus REUSS, 1858a

(Pl. 1, Figs. 4, 5a–d)

Coll. No.: GBA 2007/096/0009 (former coll. no. 2358).

Material: Lectotype (chosen herein).

Type level: Kimmeridgian–Lower Berriasian, Štramberg Limestone.

Type locality: Ignáce (Ignaziberg) near Nový Jičín (Neu Titschein), Czech Republic.

Type reference and figure: REUSS, A.E., 1858a: Zur Kenntniss fossiler Krabben. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **17**: 75, Pl. 24, Figs. 8–9.

Refigured by: GLAESSNER, M.F. (1969): Decapoda. In: MOORE, R.C. (Ed.): Treatise on invertebrate paleontology, Part R, Arthropoda 4, **2**: R489, Fig. 301.2 and by SCHWEITZER, C.E. & FELDMANN, R.M. (2010): A new family of Mesozoic Brachyura (Glaessneropsodea) and re-evaluation of *Distefania* CHECCHIA-RISPOLI, 1917 (Homolodromi-

oidea: Goniidromitidae), Neues Jahrbuch für Mineralogie, Geologie, und Paläontologie, Abhandlungen, **256/3**: 365, Fig. 1/7.

Remarks: REUSS (1858a) did not mention the number of examined specimens of *Oxythyreus gibbus* (as he did not for all the species he described), however, two of them were figured (REUSS, 1858a: Pl. 23, Fig. 6, Pl. 24, Fig. 8). The specimen deposited at the GBA has the cuticle preserved and conforms to the latter figure. Since it represents the only known specimen of *O. gibbus* in the Reuss collection at the GBA, it is selected herein as the lectotype. SCHWEITZER & FELDMANN (2010) re-evaluated the species, and because *Oxythyreus* was a pre-occupied name, they proposed a new generic name *Konidromites*. They also provided a photo of the specimen deposited at the GBA and claimed it was a holotype of *Oxythyreus gibbus*. We opine that its lectotype status is more appropriate. *Oxythyreus gibbus* REUSS, 1858 is the type species of *Konidromites* SCHWEITZER & FELDMANN, 2010.

Current name: *Konidromites gibbus* (REUSS, 1858a).

***Pithonoton angustum* REUSS, 1858a**

(Pl. 2, Figs. 8a–b)

Coll. No.: GBA 2007/096/0005 (former coll. no. 2357).

Material: Holotype.

Type level: Kimmeridgian–Lower Berriasian, Štramberk Limestone.

Type locality: Ignáce (Ignaziberg) near Nový Jičín (Neu Titschein), Czech Republic.

Type reference and figure: REUSS, A.E., 1858a: Zur Kenntniss fossiler Krabben. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **17**: 72, Pl. 24, Fig. 3.

Remarks: The specimen figured by REUSS (1858a: Pl. 24, Fig. 3) shows the posterior margin slightly narrower than it is in the actual specimen (Pl. 2, Fig. 8a). The cuticular surfaces of the specimen are poorly preserved. SCHWEITZER & FELDMANN (2009: 101, Fig. 7.4) revised the species and figured the cast of the holotype. *Longodromites angustus* (REUSS, 1858a) is the type species of *Longodromites* PATRULIUS, 1959.

Current name: *Longodromites angustus* (REUSS, 1858a).

***Pithonoton rostratum* H. v. MEYER, 1840**

(Pl. 2, Figs. 4, 5a–c)

Coll. No.: GBA 2007/096/0004/01–02 (former coll. no. 2361).

Material: Figured specimen (GBA 2007/096/0004/01).

Stratigraphic level: Kimmeridgian–Lower Berriasian, Štramberk Limestone.

Locality: Ignáce (Ignaziberg) near Nový Jičín (Neu Titschein), Czech Republic.

Reference and figure: REUSS, A.E., 1858a: Zur Kenntniss fossiler Krabben. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **17**: 71, Pl. 24, Fig. 2.

Remarks: The lot contains two specimens (with preserved cuticle), however, only one was figured by REUSS (1858a: Pl. 24, Fig. 2). The opportunity is taken herein to figure also the second specimen (Pl. 2, Fig. 4). The species was re-assigned to *Eodromites* SCHWEITZER & FELDMANN, 2008 by SCHWEITZER & FELDMANN (2008: 135).

Current name: *Eodromites rostratus* (MEYER, 1840).

***Prosopon verrucosum* REUSS, 1858a**

(Pl. 2, Figs. 7a–b)

Coll. No.: GBA 2007/096/0003 (former coll. no. 2360).

Material: Holotype.

Type level: Kimmeridgian–Lower Berriasian, Štramberk Limestone.

Type locality: Štramberk (Stramberg), Czech Republic.

Type reference and figure: REUSS, A.E., 1858a: Zur Kenntniss fossiler Krabben. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **17**: 70, Pl. 24, Fig. 1.

Remarks: The species was revised and the cast of the holotype figured by SCHWEITZER & FELDMANN (2009: 71, Fig. 2.7), which repository was stated as GSA 2360 (old acquisition number). The cuticle of the holotype is well-preserved.

Current name: *Prosopon verrucosum* REUSS, 1858a.

***Ranina* sp.**

(Pl. 1, Figs. 2a–c)

Coll. No.: GBA 2007/096/0001.

Material: Figured specimen.

Stratigraphic level: Eocene.

Locality: San Pietro in Cariano, Verona, Veneto, Italy.

Reference and figure: REUSS, A.E., 1858a: Zur Kenntniss fossiler Krabben. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **17**: 21, Pl. 5, Figs. 3–4.

Remarks: The specimen clearly is a representative of *Lophoranina* FABIANI, 1910. Because it does not possess frontal and posterior margins, its identification on the species level is difficult. However, the morphology and orientation of the terraces on the dorsal side of the carapace suggests close affinities to *Lophoranina reussi* (WOODWARD, 1866) as depicted by BESCHIN et al. (2011: 47, Fig. 10). In fact, one of the old labels associated with the specimen identifies it as “*Ranina Reuss?*”. The locality of the specimen is not certain; at least REUSS (1858a) and FABIANI (1910) expressed some doubts about it.

Current name: *Lophoranina* cf. *reussi* (WOODWARD, 1866).

***Xanthopsis bispinosa* M’COY, 1849**

(Pl. 1, Figs. 3a–c)

Coll. No.: GBA 2007/096/0010.

Material: Figured specimen.

Stratigraphic level: Eocene.

Locality: Kressenberg, Bavaria, Germany.

Reference and figure: REUSS, A.E., 1858a: Zur Kenntniss fossiler Krabben. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **17**: 52, Pl. 14, Fig. 5.

Remarks: REUSS (1858a: Pl. 14, Fig. 5) depicted this specimen in a plate together with specimens of *Xanthopsis hispidiformis* and labelled the plate only with this name. This act apparently led to some confusion by curator(s), because the specimen has been treated in the collection as *Xanthopsis hispidiformis* (Pl. 1, Fig. 3c). The text of REUSS, however, is clear in separating the specimen GBA 2007/096/0010 from *X. hispidiformis* and classifying it as *X. bispinosa*. As noted by SCHWEITZER (2003: 1116), the original genus name *Zanthopsis* M'COY, 1849 was misspelled by subsequent authors as *Xanthopsis*, including REUSS (1858a).

Current name: *Zanthopsis bispinosa* M'COY, 1849.

REUSS, A.E., 1858b: Ueber fossile Krebse aus den Raibler Schichten in Kaernten.

Tetrachela raiblana (BRONN, 1858)

(Pl. 3, Figs. 1a–d)

Coll. No.: GBA 1858/004/0002/01.

Material: Figured specimen.

Stratigraphic level: Upper Triassic (Carnian), Raibl Beds (Raibler Schichten).

Locality: Cave del Predil (Raibl), Friuli-Venezia-Giulia, Italy.

Reference and figure: REUSS, A.E., 1858b: Ueber fossile Krebse aus den Raibler Schichten in Kaernten. Beiträge zur Palaeontographie von Oesterreich, **1**: 5, Pl. 1, Fig. 2.

Remarks: The specimen is preserved in ventral aspect without any carapace remains; most specimens described and figured by REUSS (1858b) are preserved in the same way. This type of preservation may indicate the specimen was a moult. The cuticle is preserved as two-dimensional black film, a typical preservation of arthropods in finely laminated shales.

Current name: *Tetrachela raiblana* (BRONN, 1858).

Tetrachela raiblana (BRONN, 1858)

(Pl. 3, Figs. 2a–d)

Coll. No.: GBA 1858/004/0002/02.

Material: Figured specimen.

Stratigraphic level: Upper Triassic (Carnian), Raibl Beds (Raibler Schichten).

Locality: Cave del Predil (Raibl), Friuli-Venezia-Giulia, Italy.

Reference and figure: REUSS, A.E., 1858b: Ueber fossile Krebse aus den Raibler Schichten in Kaernten. Beiträge zur Palaeontographie von Oesterreich, **1**: 5, Pl. 1, Fig. 7.

Current name: *Tetrachela raiblana* (BRONN, 1858).

BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges.

Calappa spec.

(Pl. 4, Figs. 1a–e)

Coll. No.: GBA 1875/005/0006 (former coll. no. 2328).

Material: Figured specimen.

Stratigraphic level: Middle Eocene (Lutetian).

Locality: Rivo di Mel, Val Ciuppio, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **34**: 74, Pl. 1, Figs. 7a–b.

Remarks: The material is very similar to a claw of *Bittnerilia eocaena* (BITTNER, 1883) as described and depicted by DE ANGELI & GARASSINO (2006: Figs. 2.5, 4.3), which was reported from the same locality. The ornamentation of the upper margin of propodus, however, is slightly different exhibiting spines rather than tubercles as in *B. eocaena*. Since only one chela has been reported so far, the intra-specific variation cannot be evaluated. Therefore, *Calappa spec.* sensu BITTNER (1875) is treated as *?Bittnerilia sp.* The figure in BITTNER (1875: Pl. 1, Fig. 7) is a mirror image.

Current name: *?Bittnerilia sp.*

Coeloma vigil A. MILNE-EDWARDS, 1865

(Pl. 4, Figs. 2a–e)

Coll. No.: GBA 1875/005/0040.

Material: Figured specimen.

Stratigraphic level: Laverda Beds ("Schio-Schichten"), Lower Oligocene (Rupelian).

Locality: Bocca di Marsan, Valrovina, Vicenza, Veneto, Italy.

Reference and figure: BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **34**: 97, Pl. 5, Fig. 4.

Remarks: BITTNER (1875) in his plate 5 figured four specimens; however, only one has been identified in the collections of the GBA. The figure is a mirror image. The cuticle is well-preserved.

Current name: *Coeloma vigil* A. MILNE-EDWARDS, 1865.

Eumorphactaea sp.

(Pl. 4, Figs. 3a–e)

Coll. No.: GBA 1875/005/0034/a.

Material: Figured specimen.

Stratigraphic level: Middle Eocene (Lutetian).

Locality: San Giovanni Ilarione, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **34**: 93, Pl. 2, Fig. 13.

Remarks: BITTNER (1875: 93) attributed the isolated propodus to *Eumorphactaea* BITTNER, 1875 without closer identification. He noted: “*Sie könnte möglicherweise der oben beschriebenen (E. scissifrons BITTNER, 1875) oder einer verwandten Art angehören*”. Recently, the chela of *E. scissifrons* has been described and figured (BESCHIN et al., 2005: 24, Fig. 16; BESCHIN et al., 2012: 71, Fig. 63, Pl. 11, Fig. 4) and it differs distinctly from the isolated propodus of BITTNER (1875). In fact, it shows characteristics of paguroids rather than brachyurous crabs. Indeed, it is morphologically close to some species of *Calcinus* DANA, 1851; e.g. *Calcinus agnoensis* BESCHIN, DE ANGELI, CHECCHI & ZARANTONELLO, 2005, from the Middle Eocene of Italy, has similar spines on the upper margin of the propodus. Since the specimen does not fully conform to the description of the species discussed above we treat BITTNER’s propodus in open nomenclature. The figured specimen (BITTNER, 1875: Pl. 2, Fig. 13) is a mirror image.

Current name: *Calcinus* sp.

***Harpactocarcinus quadrilobatus* (DESMAREST, 1822)**

(Pl. 5, Figs. 2a–d)

Coll. No.: GBA 1875/005/0033/01.

Material: Figured specimen.

Stratigraphic level: Middle Eocene (Lutetian).

Locality: Monte di Malo, Priabona, Vicenza, Veneto, Italy.

Reference and figure: BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **34**: 89, Pl. 3, Fig. 1.

Refigured by: HYŽNÝ, M., 2014: *Harpactoxanthopsis quadrilobata* (DESMAREST, 1822) from the Eocene of Slovakia and Italy: the phenomenon of inverted images of fossil heterochelous crabs. Bulletin of the Mizunami Fossil Museum, **40**: 23–27, Fig. 1E.

Remarks: BITTNER (1875: 89) mentioned that four specimens (3 females, 1 male) were deposited at the “Geologische Reichsanstalt”, however, only two were identified (including GBA 1875/005/0033/02). As already noted by HYŽNÝ (2014: 24), both specimens are mirror images.

The specimen GBA 1875/005/0033/01 clearly represents a female. Interestingly, the right half of the pleon was chiselled away so the right vulva is visible. This was apparently done at the time of BITTNER (by himself?) as the half-pleon is clearly visible in the plate of BITTNER (1875: Pl. 3, Fig. 1).

Current name: *Harpactoxanthopsis quadrilobata* (DESMAREST, 1822).

***Harpactocarcinus quadrilobatus* (DESMAREST, 1822)**

(Pl. 5, Figs. 1a–e)

Coll. No.: GBA 1875/005/0033/02.

Material: Figured specimen.

Stratigraphic level: Middle Eocene (Lutetian).

Locality: Monte di Malo, Priabona, Vicenza, Veneto, Italy.

Reference and figure: BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges. Denkschriften der kai-

serlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **34**: 89, Pl. 2, Fig. 4.

Refigured by: HYŽNÝ, M., 2014: *Harpactoxanthopsis quadrilobata* (DESMAREST, 1822) from the Eocene of Slovakia and Italy: the phenomenon of inverted images of fossil heterochelous crabs. Bulletin of the Mizunami Fossil Museum, **40**: 23–27, Fig. 1F.

Remarks: The specimen is a male and represents a mirror image as already mentioned by HYŽNÝ (2014: 24).

Current name: *Harpactoxanthopsis quadrilobata* (DESMAREST, 1822).

***Hepaticus pulchellus* BITTNER, 1875**

(Pl. 4, Figs. 4a–c, 5a–c)

Coll. No.: GBA 1875/005/0008/01–02 (former coll. no. 2315).

Material: Lectotype (GBA 1875/005/0008/01) and paralectotype (GBA 1875/005/0008/02) (chosen herein).

Type level: Middle Eocene (Lutetian).

Type locality: Val Ciuppio, San Giovanni Ilarione, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **34**: 75, Pl. 1, Figs. 9–10.

Remarks: DE ANGELI & GARASSINO (2006: 44) noted that the repository of the type collection is unknown, although it is well curated at the GBA. BITTNER (1875: 75, Pl. 1, Figs. 9–10) described the species based on two specimens (both figured). The lectotype (Pl. 4, Figs. 4a–c) and paralectotype (Pl. 4, Figs. 5a–c) are selected herein.

Current name: *Hepaticus pulchellus* BITTNER, 1875.

***Micromaia tuberculata* BITTNER, 1875**

(Pl. 6, Figs. 1–8)

Coll. No.: GBA 1875/005/0009/01–07 (former coll. no. 2305).

Material: Lectotype (GBA 1875/005/0009/01) and six paralectotypes (GBA 1875/005/0009/02–07) (chosen herein).

Type level: Middle Eocene (Lutetian).

Type locality: Val Ciuppio, San Giovanni Ilarione, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **34**: 76, Pl. 2, Fig. 2.

Remarks: This is the type species of the genus *Micromaia* BITTNER, 1875, which is morphologically close to *Paramaja* KUBO, 1936 (NG & RICHER DE FORGES, 2015). There are differences in the development of the antorbital and pseudo-rostral spines and *Paramaja* is generally larger than *Micromaia*.

DE ANGELI & GARASSINO (2006: 48) noted that the repository of the holotype is unknown. BITTNER (1875: Pl. 2, Fig. 2) examined altogether eleven specimens and provided a composite figure only. In the collections of the GBA, seven

specimens are currently deposited. One of the best preserved specimens exhibiting also ventral aspects is selected as the lectotype (Pl. 6, Figs. 1a–b) herein; the rest represents the paralectotype collection.

Current name: *Micromaia tuberculata* BITTNER, 1875.

***Palaeograpsus inflatus* BITTNER, 1875**

(Pl. 5, Figs. 3a–c)

Coll. No.: GBA 1875/005/0041.

Material: Lectotype (chosen herein).

Type level: Middle Eocene (Lutetian)/Late Eocene (Priabonian). BITTNER (1875) did not indicate the stratigraphic position of the material.

Type locality: Fumane di Polesella, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **34**: 100, Pl. 2, Fig. 11.

Remarks: BITTNER (1875) examined two specimens of this species; however, only one is deposited at the GBA. The specimen is chosen herein as the lectotype. The figure in BITTNER (1875: Pl. 2, Fig. 11) is a mirror image.

SCHWEITZER & KARASAWA (2004: 80) revised the genus *Palaeograpsus*, however, without examination of the type material. They stated that: “the illustrations in Bittner (1875) are remarkably accurate for specimens that have been observed by the authors; thus we have every reason to believe that his illustrations of *P. inflatus* are similarly accurate”. This, however, is not always true (although it holds in the case of *Palaeograpsus inflatus*). BITTNER (1883: 313) acknowledged that the figure of *Eumorphactaea scissifrons* in BITTNER (1875: Pl. 2, Fig. 10) does not conform to the actual specimen and provided a new improved figure in his later publication (BITTNER, 1883: Pl. 1, Fig. 10). Although SCHWEITZER & KARASAWA (2004) provided a diagnosis of *Palaeograpsus* they also noted that a complete description of *Palaeograpsus* must await examination of the type material. Based on their revision, *Palaeograpsus inflatus* remained the only and therefore type species of the genus *Palaeograpsus* BITTNER, 1875, which affinities remain obscure. Unfortunately, the type material (lectotype chosen herein) does not preserve the ventral parts of the animal, i.e., characters that are important for assignment to the family level, in particular, the sternites and pleonal somites.

Current name: *Palaeograpsus inflatus* BITTNER, 1875.

***Periacanthus horridus* BITTNER, 1875**

(Pl. 5, Figs. 4a–b)

Coll. No.: GBA 1875/005/0010 (former coll. no. 2326).

Material: Lectotype (chosen herein).

Type level: Middle Eocene (Lutetian).

Type locality: San Giovanni Ilarione, Val Ciuppio, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **34**: 77, Pl. 2, Fig. 1.

Refigured by: BITTNER, A., 1895: Über zwei ungenügend bekannte brachyure Crustaceen des Vicentinischen Eocäns. Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Classe, I. Abtheilung, **104**: 250, Pl. 1, Fig. 1.

Remarks: BITTNER (1875) examined four specimens of this species. The GBA specimen has broken spines and one would assume that the specimen was complete at the time of Bittner. He, however, noted that not a single studied specimen was entire, although the one belonging to the collections of the “Geologische Reichsanstalt” is the best one, therefore, we select this specimen as the lectotype. His figure clearly depicts the reconstructed carapace, as it is the case for *Micromaia tuberculata* as well (Pl. 6, Fig. 8).

Current name: *Periacanthus horridus* BITTNER, 1875.

***Ranina laevifrons* BITTNER, 1875**

(Pl. 7, Figs. 1–5)

Coll. No.: GBA 1875/005/0003/01–05 [former coll. nos. 2312 (GBA 1875/005/0003/01–04) and 2327 (GBA 1875/005/0003/05)].

Material: Lectotype (GBA 1875/005/0003/01) and four paralectotypes (GBA 1875/005/0003/02–05) (chosen herein).

Type level: Middle Eocene (Lutetian).

Type locality: Gran Groce di San Giovanni Ilarione, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1875: Die Brachyuren des vicentinischen Tertiärgebirges. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **34**: 68, Pl. 1, Fig. 4.

Remarks: BITTNER (1875) examined more specimens of this species, but only one was depicted (BITTNER, 1875: Pl. 1, Fig. 4). At the GBA five specimens are deposited; one of them is marked with a red colour, apparently meaning that it is a depicted specimen (Pl. 7, Fig. 5). Its preservation, however, hinders its doubtless attribution to the figure. Apparently, the specimen is rather fragile and due to handling in the past, the frontal margin was broken off. Since there are better preserved specimens among syntypes than the figured one, the lectotype selected herein (Pl. 7, Fig. 1) does not correspond to the figured specimen.

Current name: *Lophoranina laevifrons* (BITTNER, 1875).

BITTNER, A., 1877: Über *Phymatocarcinus speciosus* REUSS.

***Phymatocarcinus speciosus* REUSS, 1871**

(Pl. 7, Figs. 6–9)

Coll. No.: GBA 1877/005/0001–0009.

Material: Figured specimens (9 specimens).

Stratigraphic level: Middle Miocene (Badenian), Leithakalk.

Locality: Gamlitz bei Ehrenhausen, Styria, Austria.

Reference and figure: BITTNER, A., 1877: Über *Phymatocarcinus speciosus* REUSS. Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Classe, I. Abtheilung, **75**: 435, Pl. 1, Figs. 1–10.

Refigured by: KLOMPMAKER, A., HYŽNÝ, M. & JAKOBSEN, S.L., 2015: Taphonomy of decapod crustacean cuticle and its effect on the appearance as exemplified by new and known taxa from the Cretaceous – Danian crab *Caloxanthus*. Cretaceous Research, **55**: 146, Figs. 6A, C, D.

Remarks: GBA 1877/005/0001 – near-complete carapace with preserved cuticular surface. The figure of BITTNER (1877: Pl. 1, Fig. 1; KLOMPMAKER et al., 2015: Fig. 6A) represents a reconstruction: posterior portion of the carapace is based on the counterpart.

GBA 1877/005/0002 – fragment of the cuticle (BITTNER, 1877: Pl. 1, Fig. 2).

GBA 1877/005/0003 – fragment of the cuticle.

GBA 1877/005/0004 – portion of right chela preserved as internal cast (“Steinkern”) (BITTNER, 1877: Pl. 1, Fig. 4).

GBA 1877/005/0005 – merus and carpus of left cheliped (BITTNER, 1877: Pl. 1, Fig. 5); only a mould is present in the collection, the original has been lost.

GBA 1877/005/0006 – left chela consisting of carpus, propodus and dactylus preserved as internal cast (“Steinkern”) (BITTNER, 1877: Pl. 1, Fig. 6; KLOMPMAKER et al., 2015: Fig. 6D); with artificial mould.

GBA 1877/005/0007 – left chela consisting of carpus, propodus and dactylus (BITTNER, 1877: Pl. 1, Fig. 7; KLOMPMAKER et al., 2015: Fig. 6C).

GBA 1877/005/0008 – carpus of left chela preserved as internal cast (“Steinkern”) (BITTNER, 1877: Pl. 1, Fig. 8).

GBA 1877/005/0009 – portion of walking leg (“Steinkern”) (BITTNER, 1877: Pl. 1, Fig. 9).

All figures published by BITTNER (1877) are mirror images.

Current name: *Daira speciosa* (REUSS, 1871).

BITTNER, A., 1883: Neue Beiträge zur Kenntniss der Brachyuren-Fauna des Alttertiärs von Vicenza und Verona.

***Hepaticus neumayri* BITTNER, 1875**

(Pl. 8, Figs. 5a–b)

Coll. No.: GBA 1883/007/0016 (former coll. no. 2321).

Material: Figured specimen.

Stratigraphic level: Middle Eocene (Lutetian).

Locality: Val Ciuppio, San Giovanni Ilarione, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1883: Neue Beiträge zur Kenntniss der Brachyuren-Fauna des Alttertiärs von Vicenza und Verona. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **46**: 312, Pl. 1, Fig. 9.

Remarks: The figure of BITTNER (1883: Pl. 1, Fig. 9) represents only the anterior portion of the carapace in the front

view (“Fühlerregion”). Here, the opportunity is taken to figure the entire specimen.

Current name: *Hepaticus neumayri* (BITTNER, 1875).

***Lambrus eocaenus* BITTNER, 1883**

(Pl. 8, Figs. 4a–e)

Coll. No.: GBA 1883/007/0008 (former coll. no. 2322).

Material: Holotype.

Type level: Middle Eocene (Lutetian).

Type locality: Ciuppio, San Giovanni Ilarione, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1883: Neue Beiträge zur Kenntniss der Brachyuren-Fauna des Alttertiärs von Vicenza und Verona. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **46**: 309, Pl. 1, Fig. 7.

Remarks: Based on additional material showing more carapace features, DE ANGELI & GARASSINO (2003) recognised striking differences between *Parthenope* WEBER, 1795 (= *Lambrus* LEACH, 1815) and their material clearly conspecific with *Lambrus eocaenus*. As a result, they erected the new genus *Bittnerilia* DE ANGELI & GARASSINO, 2003 for this species. Although they did not study the holotype itself (which repository was considered unknown by DE ANGELI & GARASSINO, 2006), the well-crafted figure of BITTNER (1883: Pl. 1, Fig. 7) provided enough of comparison with their new and more complete material. Indeed, after re-examination of the holotype of *Lambrus eocaenus* herein, the material of DE ANGELI & GARASSINO (2003) does fully conform to Bittner’s species. The opportunity is taken here to provide photographs of the holotype for the first time.

Current name: *Bittnerilia eocaena* (BITTNER, 1883).

***Micromaia tuberculata* BITTNER, 1875**

(Pl. 8, Figs. 1–2)

Coll. No.: GBA 1883/007/0006/01–02. (former coll. no. 2324).

Material: Figured specimen (GBA 1883/007/0006/01).

Stratigraphic level: Middle Eocene (Lutetian).

Locality: San Giovanni Ilarione, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1883: Neue Beiträge zur Kenntniss der Brachyuren-Fauna des Alttertiärs von Vicenza und Verona. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **46**: 308, Pl. 1, Figs. 6a–d.

Remarks: Based on this material, BITTNER (1883) described in detail the mouth region (buccal cavern) of the species and figured one specimen (GBA 1883/007/0006/01, Pl. 8, Fig. 2); in the collections of the GBA there are two specimens with the same acquisition (the second one has number GBA 1883/007/0006/02; Pl. 8, Fig. 1).

Current name: *Micromaia tuberculata* BITTNER, 1875.

***Ranina marestiana* KÖNIG, 1825**

(Pl. 8, Figs. 3a–e)

Coll. No.: GBA 1883/007/0001/02 (former coll. no. 2323).

Material: Figured specimen.

Stratigraphic level: Middle Eocene (Lutetian).

Locality: San Giovanni Ilarione, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1883: Neue Beiträge zur Kenntniss der Brachyuren-Fauna des Alttertiärs von Vicenza und Verona. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **46**: 300, Pl. 1, Fig. 1.

Remarks: The terraces on the dorsal carapace of the actual specimen do not fit in detail with the figure; however, the depiction of the pterygostomial region (BITTNER, 1883: Pl. 1, Fig. 1b) fully conforms to the specimen.

Current name: *Lophoranina marestiana* (KÖNIG, 1825)

***Ranina cf. marestiana* KÖNIG, 1825**

(Pl. 9, Figs. 1a–g)

Coll. No.: GBA 1883/007/0001/01.

Material: Figured specimen.

Stratigraphic level: Middle Eocene (Lutetian).

Locality: Quarry “Scole” above Avesa, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1883: Neue Beiträge zur Kenntniss der Brachyuren-Fauna des Alttertiärs von Vicenza und Verona. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **46**: 300, Pl. 1, Fig. 2.

Remarks: The specimen fully conforms to the description of *Lophoranina marestiana* as reviewed by BESCHIN et al. (2011: 38).

Current name: *Lophoranina marestiana* (KÖNIG, 1825).

***Ranina notopoides* BITTNER, 1883**

(Pl. 9, Figs. 3–6)

Coll. No.: GBA 1883/007/0004/01–04.

Material: Lectotype (GBA 1883/007/0004/01: Pl. 9, Figs. 3a–c) and three paralectotypes (GBA 1883/007/0004/02–04) (chosen herein).

Type level: Middle Eocene (Lutetian).

Type locality: Monte Masua di Negrar northwest of Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1883: Neue Beiträge zur Kenntniss der Brachyuren-Fauna des Alttertiärs von Vicenza und Verona. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **46**: 304, Pl. 1, Figs. 3a–b.

Remarks: To our knowledge no other material of *R. notopoides* has been ever reported which makes this type collection of particular interest. DE ANGELI & GARASSINO (2006: 39) stated that “Bittner (1883) reported one specimen from Monte Masua of Negrar (Verona) (repository and catalogue number unknown)”. This is not correct. BITTNER

(1883: 305) clearly stated that there were four specimens at his disposal: “Die vorhandenen vier Exemplare gehören dem Museum der k. k. Reichsanstalt.” All four specimens are curated at the GBA.

TUCKER (1998) recognised the species as a representative of *Laeviranina* LÖRENTHEY in LÖRENTHEY & BEURLEN, 1929. She stated the occurrence of *L. notopoides* erroneously as “early Eocene of England” (TUCKER, 1998: Tab. 9). The genus *Laeviranina* is currently considered a junior synonym of *Raninoides* H. MILNE EDWARDS, 1837 (SCHWEITZER et al., 2010).

Current name: *Raninoides notopoides* (BITTNER, 1883).

BITTNER, A., 1884: Beiträge zur Kenntniss tertiärer Brachyuren-Faunen.

***Cancer carniolicus* BITTNER, 1884**

(Pl. 10, Figs. 1–2)

Coll. No.: GBA 1884/003/0006/01–02 (former coll. no. 2325).

Material: Lectotype (GBA 1884/003/0006/01) and paralectotype (GBA 1884/003/0006/02).

Type level: Middle Miocene (Badenian).

Type locality: Ulrichsberg, between Týnec (Teinitz) and Kamnik (Stein in Oberkrain), Slovenia.

Reference and figure: BITTNER, A., 1884: Beiträge zur Kenntniss tertiärer Brachyuren-Faunen. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **48**: 27, Pl. 1, Figs. 8–9.

Revised by: MÜLLER, P., 1984: Decapod Crustacea of the Badenian. Geologica Hungarica, Series Palaeontologica, **42**: 112.

Remarks: BITTNER (1884) described *Cancer carniolicus* based on several specimens from Kamnik, Slovenia. The species has been chosen as a basis for erection of the new genus *Tasadia* by MÜLLER in JANSSEN & MÜLLER (1984: 20). Interestingly, P. MÜLLER probably did not see the type material as can be deduced from the sentence in MÜLLER (1984: 112): “Study of the type-series of *Cancer carniolicus* BITTNER, 1884 (kept in the Naturhistorisches Museum, lectotype designated herein: pl. 1 fig. 8a in BITTNER, 1884, seen by the courtesy of dr. BACHMAYER) and that...”. The repository of the type material was stated erroneously by MÜLLER (1984); it is not kept at the NHMW but at the GBA. The specimen selected as the lectotype by MÜLLER (1984) represents the entire carapace (figured by BITTNER, 1884: Pl. 1, Fig. 8). The other figured specimen (BITTNER, 1884: Pl. 1, Fig. 9) is an incomplete carapace selected herein as the paralectotype.

Current name: *Tasadia carniolica* (BITTNER, 1884).

***Mioplax socialis* BITTNER, 1884**

(Pl. 11, Figs. 1–5)

Coll. No.: GBA 2009/014/0029/01–05.

Material: Lectotype (GBA 2009/014/0029/01: Pl. 11, Fig. 1) and four paralectotypes (GBA 2009/014/0029/02–05).

Type level: Middle Miocene (Badenian). The age has been estimated based on the list of co-occurring mollusc taxa. More details were given by HYŽNÝ et al. (2016: 172).

Type locality: Radoboj, Krapinsko-Zagorska, Croatia.

Reference and figure: BITTNER, A., 1884: Beiträge zur Kenntniss tertiärer Brachyuren-Faunen. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **48**: 23, Pl. 2, Figs. 3b, e.

Refigured by: LÖRENTHEY, E. & BEURLIN, K., 1929: Die fossilen Dekapoden der Länder der Ungarischen Krone. Geologica Hungarica, Series Palaeontologica, **3**: 258, Pl. 16, Fig. 10 and by GLAESSNER, M.F., 1969: Decapoda. In: MOORE, R.C. (Ed.): Treatise on invertebrate paleontology, Part R, Arthropoda 4, **2**: R524, Fig. 333.1.

Revised and refigured by: HYŽNÝ, M., MANDIĆ, O., HARZHAUSER, M. & LEDVÁK, P., 2016: Euryhaline preferences of the decapod crab *Mioplax socialis* enabled it to survive during the Badenian/Sarmatian extinction (Miocene) in the Central Paratethys. Geologica Carpathica, **67**: 169, Figs. 3a–b, 4a–c.

Remarks: BITTNER (1884: 23) described *Mioplax socialis* based on numerous specimens (“*Reste von mindestens zehn Individuen*”) from the Badenian strata at Radoboj, Croatia. KARASAWA & KATO (2003) assigned the species to the family Chasmocarcinidae, although they did not study the type material and stated the locality of *Mioplax socialis* erroneously as Austria. Recently, the species has been revised by HYŽNÝ et al. (2016); the syntype collection has been studied and the lectotype and paralectotypes have been selected.

The figures presented by BITTNER (1884: Pl. 2, Figs. 3a–f; figures of lectotype and paralectotype as selected by HYŽNÝ et al., 2016) are mirror images.

Current name: *Mioplax socialis* BITTNER, 1884.

***Neptunus radobojanus* BITTNER, 1884**

(Pl. 10, Figs. 3a–e)

Coll. No.: GBA 1884/003/0001.

Material: Holotype, with counterpart.

Type level: Middle Miocene (Badenian); based on accompanied mollusc fauna (for details see HYŽNÝ et al., 2016: 172).

Type locality: Radoboj, Krapinsko-Zagorska, Croatia.

Reference and figure: BITTNER, A., 1884: Beiträge zur Kenntniss tertiärer Brachyuren-Faunen. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **48**: 20, Pl. 2, Fig. 1.

Refigured by: LÖRENTHEY, E. & BEURLIN, K., 1929: Die fossilen Dekapoden der Länder der Ungarischen Krone. Geologica Hungarica, Series Palaeontologica, **3**: 183, Pl. 14, Fig. 3.

Remarks: BITTNER (1884) based the description on a single specimen with preserved sternum and abdomen, so it was possible to identify the specimen as a female individual. Portions of pereopods were present as well. Unfortunately, the original specimen (part and counterpart) was badly damaged, apparently through the weathering, and as a consequence the morphological details given by BITTNER (1884) are no longer discernible. The original preservation of the material is difficult to attain as it is fairly possible that the figure given by BITTNER (1884: Pl. 2, Fig. 1) is actually a reconstruction.

LÖRENTHEY & BEURLIN (1929: 183) treated the species as a representative of *Colneptunus* LÖRENTHEY in LÖRENTHEY & BEURLIN, 1929. This opinion was not supported by SCHWEITZER et al. (2010: 112), who treated the species as a representative of *Portunus* WEBER, 1795 (*Neptunus* DE HAAN, 1833 is a junior subjective synonym of *Portunus*).

Current name: *Portunus radobojanus* (BITTNER, 1884).

***Ranina marestiana* var. *avesana* BITTNER, 1884**

(Pl. 9, Figs. 2a–b)

Coll. No.: GBA 1884/003/0007.

Material: Cast of a figured specimen.

Stratigraphic level: Middle Eocene (Lutetian).

Locality: Quarry “Scole” at Avesa near Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1884: Beiträge zur Kenntniss tertiärer Brachyuren-Faunen. Denkschriften der kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, **48**: 16, Pl. 1, Fig. 2.

Remarks: The specimen represents the cast of the material (pterygostomial region + 3rd maxilliped) deposited in Museo di Storia Naturale in Verona.

Current name: *Lophoranina avesana* (BITTNER, 1884).

BITTNER, A., 1893: Decapoden des pannonischen Tertiärs.

***Ranidina rosaliae* BITTNER, 1893**

(Pl. 12, Figs. 1–3)

Coll. No.: GBA 1893/004/0001/01–12.

Material: Lectotype (GBA 1893/004/0001/01: Pl. 12, Figs. 1a–c) and 11 paralectotypes (GBA 1893/004/0001/02–12).

Type level: Middle Miocene (Badenian).

Type locality: Walbersdorf, Burgenland, Austria.

Reference and figure: BITTNER, A., 1893: Decapoden des pannonischen Tertiärs. Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Classe, **102**: 33, Pl. 2, Fig. 2.

Refigured by: GLAESSNER, M.F., 1969: Decapoda. In: MOORE, R.C. (Ed.): Treatise on invertebrate paleontology, Part R, Arthropoda 4, **2**: R501, Fig. 313.3 and by LÖRENTHEY, E. & BEURLIN, K., 1929: Die fossilen Deka-

poden der Länder der Ungarischen Krone. *Geologica Hungarica*, Series Palaeontologica, **3**: 121, Pl. 5, Fig. 8.

Revised by: MÜLLER, P., 1984: Decapod Crustacea of the Badenian. *Geologica Hungarica*, Series Palaeontologica, **42**: 71, 112.

Remarks: The specimen figured by BITTNER (1893: Pl. 2, Fig. 2, non Fig. 2a) was chosen to be the lectotype by MÜLLER (1984: 112). *Ranidina rosaliae* is the type and only species of *Ranidina* BITTNER, 1893.

Current name: *Ranidina rosaliae* BITTNER, 1893.

BITTNER, A., 1895: Über zwei ungenügend bekannte brachyure Crustaceen des Vicentinischen Eocäns.

***Periacanthus horridus* BITTNER, 1875**

(Pl. 13, Figs. 2a–d)

Coll. No.: GBA 1895/003/0002 (former coll. no. 2329).

Material: Figured specimen.

Stratigraphic level: Middle Eocene (Lutetian).

Locality: San Giovanni Ilarione, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1895: Über zwei ungenügend bekannte brachyure Crustaceen des Vicentinischen Eocäns. *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Classe, I. Abtheilung*, **104**: 250, Pl. 1, Fig. 2.

Remarks: The specimen shows preserved buccal cavern and antennal region.

Current name: *Periacanthus horridus* BITTNER, 1875.

***Ranina laevifrons* BITTNER, 1875**

(Pl. 13, Figs. 1a–d)

Coll. No.: GBA 1895/003/0001 (former coll. no. 2330).

Material: Figured specimen.

Stratigraphic level: Middle Eocene (Lutetian).

Locality: San Giovanni Ilarione, Verona, Veneto, Italy.

Reference and figure: BITTNER, A., 1895: Über zwei ungenügend bekannte brachyure Crustaceen des Vicentinischen Eocäns. *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Classe, I. Abtheilung*, **104**: 247, Pl. 1, Figs. 3–4.

Current name: *Lophoranina laevifrons* (BITTNER, 1875).

GLAESSNER, M.F., 1924: Über eine neue miozäne Krabbe und die Brachyurenfauna des Wiener Beckens.

***Macrophthalmus vindobonensis* GLAESSNER, 1924**

(Pl. 13, Figs. 3–5)

Coll. No.: GBA 1925/001/0001/01–03.

Material: Paralectotypes.

Type level: Lower Miocene (Karpatian), Korneuburg Formation.

Tyúe locality: Teiritzberg, Landesziegelei Stetten, Lower Austria, Austria.

Reference: GLAESSNER, M.F., 1924: Über eine neue miozäne Krabbe und die Brachyurenfauna des Wiener Beckens. *Verhandlungen der Geologischen Bundesanstalt*, **1924/6**: 109–118 (whole volume printed in 1925).

Remarks: GLAESSNER (1924) described *Macrophthalmus vindobonensis* based on numerous specimens recovered at Teiritzberg and other localities (see also MÜLLER, 1998b). No holotype was selected at that time; therefore, all specimens included by GLAESSNER (1924) and referred to in his paper are syntypes. Although he selected the holotype (NHMW 1927/0001/0003) in his later work (GLAESSNER, 1928), this designation is not valid, since a holotype cannot be designated in a subsequent paper (ICZN art. 73.1). This designation, however, must be considered a valid lectotype designation. This means that all original syntypes mentioned by GLAESSNER (1924) are paralectotypes (ICZN art. 74.1.3). Fortunately, all specimens examined by Glaessner are labelled and numbered. Three of them are deposited at the GBA (and figured herein), whereas the rest is deposited at the NHMW.

MÜLLER (1993: 25) stated that “*there is no observable difference*” between *M. vindobonensis* and the topotypes of *M. aquensis* A. MILNE-EDWARDS & BROCCHI, 1879 from Aix-en-Provence (France). As a result, *M. vindobonensis* was synonymised with *Macrophthalmus aquensis*, an act which was accepted and followed thereafter (SCHWEITZER et al., 2010: 140).

Current name: *Macrophthalmus aquensis* A. MILNE-EDWARDS & BROCCHI, 1879.

GLAESSNER, M.F., 1930: Dekapodenstudien.

***Antrimpos crassipes* (BRONN, 1858)**

(Pl. 14, Figs. 1a–c)

Coll. No.: GBA 1930/002/0001.

Material: Figured specimen.

Stratigraphic level: Upper Triassic (Carnian), Raibl Beds (Raibler Schichten).

Locality: Cave del Predil (Raibl), Friuli-Venezia-Giulia, Italy.

Reference and figure: GLAESSNER, M.F., 1930: Dekapodenstudien. *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie, Beilage-Band 63* (B), 139, Pl. 6, Fig. 1.

Remarks: The original material of BRONN (1858) is considered lost. The specimen GBA 1930/002/0001 remains probably the best preserved specimen of the species.

Current name: *Antrimpos crassipes* (BRONN, 1858).

***Linuparus bigranulatus* GLAESSNER, 1930**

(Pl. 15, Figs. 1a–c)

Coll. No.: GBA 1930/002/0003 (former coll. no. 3457).

Material: Holotype.

Stratigraphic level: Upper Eocene (Priabonian), Reingrubener Formation.

Locality: Hollingstein at Niederhollabrunn, Lower Austria, Austria.

Reference and figure: GLAESSNER, M.F., 1930: Dekapodenstudien. Neues Jahrbuch für Mineralogie, Geologie und Paläontologie, Beilage-Band 63 (B), 165, Pl. 8, Fig. 3.

Remarks: The holotype does not preserve the anterior portion of the carapace. GLAESSNER (1930: 165, Pl. 8, Figs. 1–2) reported and figured two additional specimens. MÜLLER (1998a: 9, Pl. 1, Fig. 3) mentioned and figured one of them (paratype) as deposited at the NHMW under the repository number R473. The number is apparently incorrect, since it refers only to the page in the Treatise by GLAESSNER (1969), which was once a template for the organization of the NHMW decapod collections.

Current name: *Linuparus bigranulatus* GLAESSNER, 1930.

***Tetrachela raiblana* (BRONN, 1858)**

(Pl. 15, Figs. 2a–b)

Coll. No.: GBA 1930/002/0002/01.

Material: Figured specimen.

Stratigraphic level: Triassic (Carnian), Raibl Beds.

Locality: Cave del Predil (Raibl), Friuli-Venezia-Giulia, Italy.

Reference and figure: GLAESSNER, M.F., 1930: Dekapodenstudien. Neues Jahrbuch für Mineralogie, Geologie und Paläontologie, Beilage-Band 63 (B), 143, Pl. 6, Fig. 3.

Remarks: The specimen is rather complete and shows the dorsal carapace. A second not figured specimen is available (GBA 1930/002/0002/02).

Current name: *Tetrachela raiblana* (BRONN, 1858).

GLAESSNER, M.F., 1931: Eine Crustaceenfauna aus den Lunzer Schichten Niederösterreichs.

***Clytiella spinifera* GLAESSNER, 1931**

(Pl. 16, Fig. 1a)

Coll. No.: GBA 1931/003/0001.

Material: Holotype.

Type level: Triassic (Carnian, Julian), Reingrubener Beds.

Type locality: Lunz am See, Polzberg, Lower Austria, Austria.

Reference and figure: GLAESSNER, M.F., 1931: Eine Crustaceenfauna aus den Lunzer Schichten Niederösterreichs. Jahrbuch der Geologischen Bundesanstalt, 81: 474, Text-Fig. 2, Pl. 15, Fig. 1.

Refigured by: GLAESSNER, M.F., 1969: Decapoda. In: MOORE, R.C. (Ed.): Treatise on invertebrate paleontology, Part R, Arthropoda 4, 2: R456, Fig. 261.1 and by MÜLLER, P., 1998a: Crustacea Decapoda. In: FLÜGEL, H.W. (Ed.): Catalogus Fossilium Austriae. Verlag der Österreichischen Akademie der Wissenschaften, Wien: 8, Pl. 1, Fig. 1 (as *Clytiella spinigera*).

Remarks: The specimen is rather poorly preserved and its affinities are obscured (suggested already by FÖRSTER, 1966: 159). All figures are largely skewed by drawings on the fossil. Here the opportunity is taken to refigure the original material and to bring into attention that the specimen may actually belong to some polychelid lobster rather than erymid (GLAESSNER, 1969; MÜLLER, 1998a; SCHWEITZER et al., 2010). Detailed revision of the material with comparison of relevant polychelid taxa is needed. *Clytiella spinifera* is the type species of *Clytiella* GLAESSNER, 1931.

Current name: *Clytiella spinifera* GLAESSNER, 1931.

***Platycheila trauthi* GLAESSNER, 1931**

(Pl. 16, Figs. 2–3)

Coll. No.: GBA 1931/003/0002 (Fig. 3), GBA 1931/003/0003/02 (counterpart of GBA 1931/003/0002), GBA 1931/003/0003/01 (Fig. 2).

Material: Paratypes.

Type level: Triassic (Carnian, Julian), Reingrubener Beds.

Type locality: Lunz am See, Polzberg, Lower Austria, Austria.

Reference and figure: GLAESSNER, M.F., 1931: Eine Crustaceenfauna aus den Lunzer Schichten Niederösterreichs. Jahrbuch der Geologischen Bundesanstalt, 81: 474, 478.

Remarks: The specimens are poorly preserved. The species is the type species of the genus *Platycheila* GLAESSNER 1931. The holotype is deposited at the NHMW (NHMW 1910/0015/0018).

Current name: *Platycheila trauthi* GLAESSNER, 1931.

HYŽNÝ, M. & GAŠPARIČ, R., 2014: Ghost shrimp *Calliax* DE SAINT LAURENT, 1973 (Decapoda: Axiidea: Callianassidae) in the fossil record: systematics, palaeoecology and palaeobiogeography.

***Calliax michelottii* (A. MILNE-EDWARDS, 1860)**

(Pl. 17, Figs. 1a–b)

Coll. No.: GBA 2009/014/0027 (former coll. no. 2314).

Material: Figured specimen.

Stratigraphic level: Middle Miocene (Badenian).

Locality: Kamnik (Stein in Oberkrain), Slovenia.

Reference and figure: HYŽNÝ, M. & GAŠPARIČ, R., 2014: Ghost shrimp *Calliax* DE SAINT LAURENT, 1973 (Decapoda:

Axiidea: Callianassidae) in the fossil record: systematics, palaeoecology and palaeobiogeography. *Zootaxa*, **3821**: 45, Fig. 9.l.

Remarks: *Callianassa michelottii* was revised and re-assigned to *Calliax* DE SAINT LAURENT, 1973 by HYŽNÝ & GAŠPARIČ (2014: 45). The material from Kamnik (isolated major right propodus, GBA 2009/014/0027) was a part of their study.

Current name: *Calliax michelottii* (A. MILNE-EDWARDS, 1860).

HYŽNÝ, M., HARZHAUSER, M. & DANNINGER, W. 2015: Decapod crustaceans of the Central Paratethyan Ottnangian Stage (middle Burdigalian): implications for systematics and biogeography.

***Jaxea kuemeli* BACHMAYER, 1954**

(Pl. 17, Figs. 3–5)

Coll. No.: GBA 2009/014/0023/01–19.

Material: Figured specimens.

Stratigraphic level: Early Miocene (Ottnangian).

Locality: Ottnang, Upper Austria, Austria.

Reference and figure: HYŽNÝ, M., HARZHAUSER, M. & DANNINGER, W., 2015: Decapod crustaceans of the Central Paratethyan Ottnangian Stage (middle Burdigalian): implications for systematics and biogeography. *Geologica Carpathica*, **66**: 220, Figs. 3b–d.

Remarks: The material includes 19 specimens, including some nearly complete individuals (Pl. 17, Fig. 5). HYŽNÝ et al. (2015) figured three specimens (refigured herein).

Current name: *Jaxea kuemeli* BACHMAYER, 1954.

***Gouretia* sp.**

(Pl. 17, Figs. 2a–b)

Coll. No.: GBA 2009/014/0024/01.

Material: Figured specimen.

Stratigraphic level: Early Miocene (Ottnangian).

Locality: Ottnang, Upper Austria, Austria.

Reference and figure: HYŽNÝ, M., HARZHAUSER, M. & DANNINGER, W., 2015: Decapod crustaceans of the Central Paratethyan Ottnangian Stage (middle Burdigalian): implications for systematics and biogeography. *Geologica Carpathica*, **66**: 221, Fig. 4.

Remarks: The specimen represents the major left propodus articulated with the dactylus.

Current name: *Gouretia* sp.

***Liocarcinus* sp.**

(Pl. 17, Figs. 6–8)

Coll. No.: GBA 2009/014/0025/01–03.

Material: Figured specimens.

Stratigraphic level: Early Miocene (Ottnangian).

Locality: Ottnang, Upper Austria, Austria.

Reference and figure: HYŽNÝ, M., HARZHAUSER, M. & DANNINGER, W., 2015: Decapod crustaceans of the Central Paratethyan Ottnangian Stage (middle Burdigalian): implications for systematics and biogeography. *Geologica Carpathica*, **66**: 221, Figs. 10c–e.

Remarks: Two fragmentary specimens represent cheliped dentition only (Pl. 17, Figs. 7–8). The third specimen retains also portions of cheliped fingers (Pl. 17, Fig. 6). Generic assignment is based on the work of SPIRIDONOV et al. (2014) who pointed out the taxonomic significance of the cheliped dentition on the genus level.

Current name: *Liocarcinus* sp.

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Plate 1

- Figs. 1a–g: *Harpactocarcinus punctulatus* (DESMAREST, 1822), lectotype of *Cancer brachychelus* REUSS, 1858a, a) dorsal view (in colour), b) dorsal view (whitened), c) ventral view (in colour), d) ventral view (whitened), e) frontal view, f) handwritten label by REUSS, g) original figure of REUSS (1858a: Pl. 13, Fig. 5).
Coll. No.: GBA 2007/096/0002.
- Figs. 2a–c: *Lophoranina* cf. *reussi* (WOODWARD, 1866), figured specimen of *Ranina* sp. sensu REUSS (1858a), a) whitened, b) unwhitened, c) original figure of REUSS (1858a: Pl. 5, Fig. 3).
Coll. No.: GBA 2007/096/0001.
- Figs. 3a–c: *Zanthopsis bispinosa* M'COY, 1849, figured specimen of *Xanthopsis bispinosa*, a) whitened, b) original figure of REUSS (1858a: Pl. 14, Fig. 5), c) handwritten label by REUSS (see the text for explaining discrepancy in the identification of the specimen).
Coll. No.: GBA 2007/096/0010.
- Fig. 4: *Konidromites gibbus* (REUSS, 1858a), original figure of REUSS (1858a: Pl. 23, Fig. 6).
- Figs. 5a–d: *Konidromites gibbus* (REUSS, 1858a), lectotype of *Oxythyreus gibbus* REUSS, 1858a, a) original figure of REUSS (1858a: Pl. 24, Fig. 8), b) lateral view (whitened), c) dorsal view (whitened), d) detail of rostrum (whitened).
Coll. No.: GBA 2007/096/0009.

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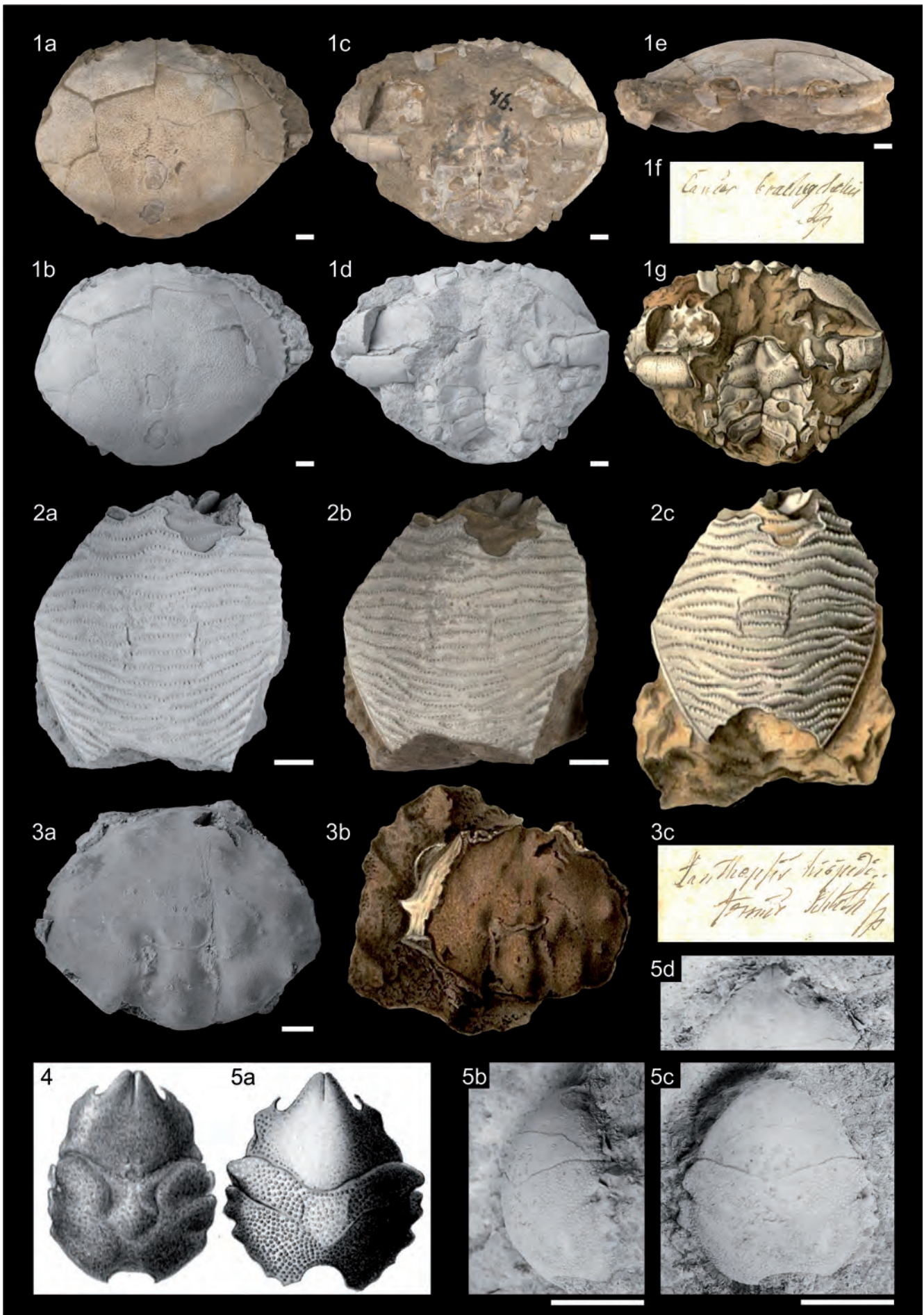


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- Fig. 1: Paralectotype of *Goniodromites polyodon* REUSS, 1858a, dorsal view (whitened).
Coll. No.: GBA 2007/096/0007/02.
- Figs. 2a–b: Lectotype of *Goniodromites polyodon* REUSS, 1858a,
a) dorsal view (whitened), b) original figure of REUSS (1858a: Pl. 24, Fig. 4).
Coll. No.: GBA 2007/096/0007/01.
- Figs. 3a–d: Lectotype of *Goniodromites bidentatus* REUSS, 1858a,
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Coll. No.: GBA 2007/096/0006.
- Fig. 4: *Eodromites rostratus* (MEYER, 1840), dorsal view (whitened).
Coll. No.: GBA 2007/096/0004/02.
- Figs. 5a–c: *Eodromites rostratus* (MEYER, 1840), figured specimen of *Pithonoton rostratum* MEYER, 1840,
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Coll. No.: GBA 2007/096/0008.
- Figs. 7a–b: Holotype of *Prosopon verrucosum* REUSS, 1858a,
a) dorsal view (whitened), b) original figure of REUSS (1858a: Pl. 24, Fig. 1).
Coll. No.: GBA 2007/096/0003.
- Figs. 8a–b: *Longodromites angustus* (REUSS, 1858a), holotype of *Pithonoton angustum* REUSS, 1858a,
a) dorsal view (whitened), b) original figure of REUSS (1858a: Pl. 24, Fig. 3).
Coll. No.: GBA 2007/096/0005.

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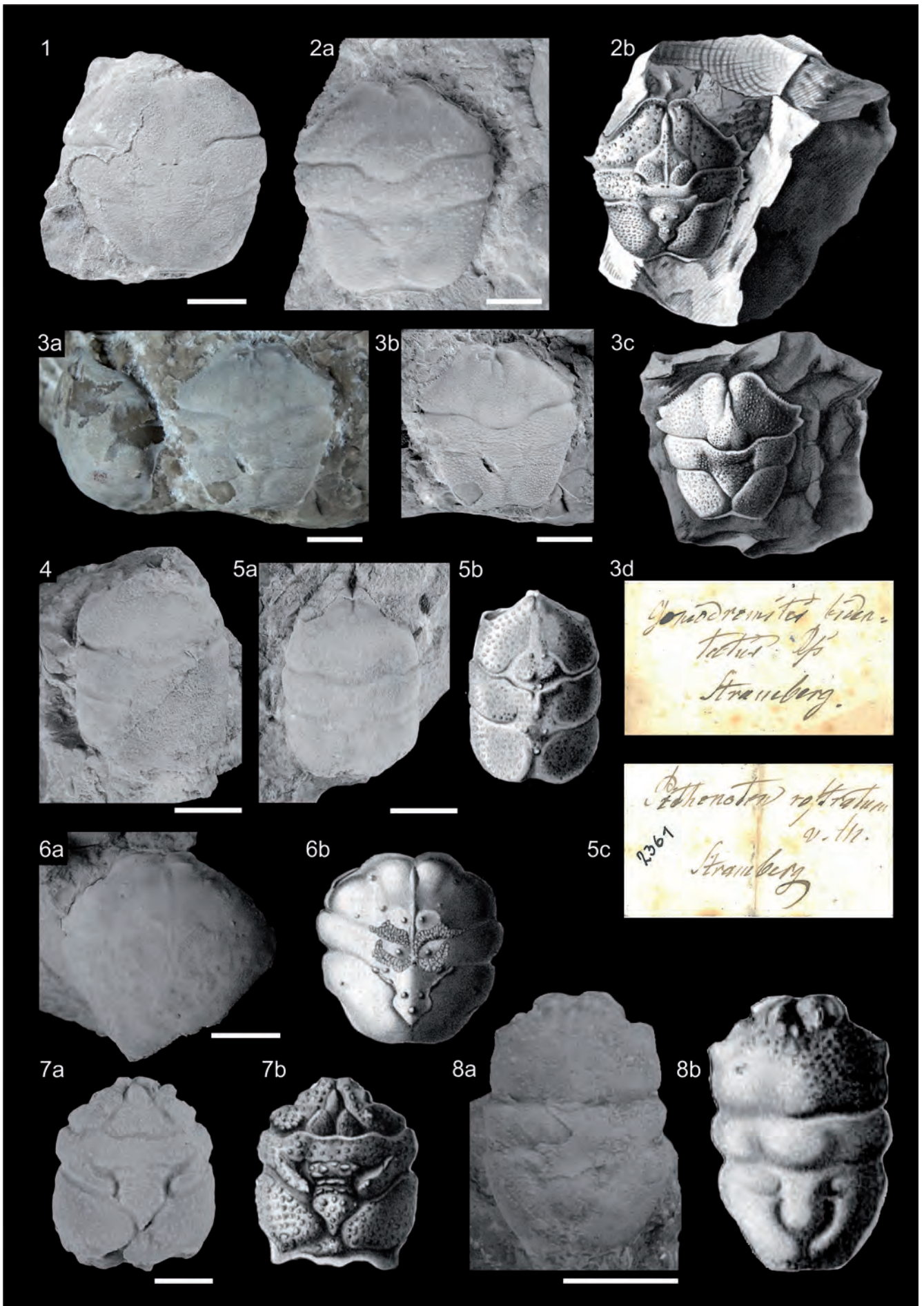


Plate 3

Figs. 1a–d: *Tetrachela raiblana* (BRONN, 1858),
a) whitened, b) unwhitened, c) unwhitened (P1–P5: pereopods 1–5), d) original figure of REUSS (1858b: Pl. 1, Fig. 2).
Coll. No.: GBA 1858/004/0002/01.

Figs. 2a–d: *Tetrachela raiblana* (BRONN, 1858),
a) whitened, b) unwhitened, c) unwhitened, d) original figure of REUSS (1858b: Pl. 1, Fig. 7).
Coll. No.: GBA 1858/004/0002/02.

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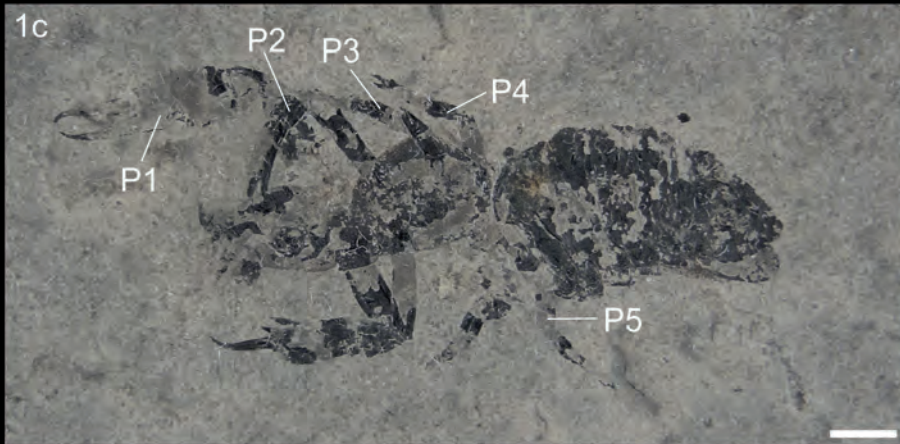
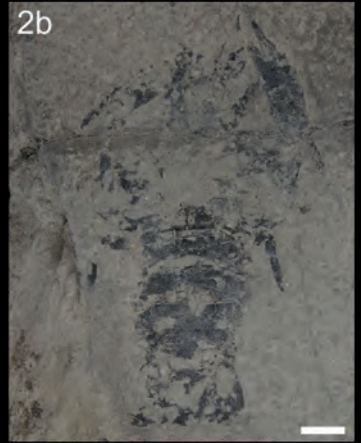


Plate 4

- Figs. 1a–e: ?*Bittnerilia* sp., figured specimen of *Calappa* spec. sensu BITTNER (1875),
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e) original figure of BITTNER (1875: Pl. 1, Fig. 7a).
Coll. No.: GBA 1875/005/0006.
- Figs. 2a–e: *Coeloma vigil* A. MILNE-EDWARDS, 1865,
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Coll. No.: GBA 1875/005/0040.
- Figs. 3a–e: *Calcinus* sp., figured specimen of *Eumorphactaea* sp. sensu BITTNER (1875),
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Coll. No.: GBA 1875/005/0034/a.
- Figs. 4a–c: Lectotype of *Hepaticiscus pulchellus* BITTNER, 1875,
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- Figs. 5a–c: Paralectotype of *Hepaticiscus pulchellus* BITTNER, 1875,
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Coll. No.: GBA 1875/005/0008/02.

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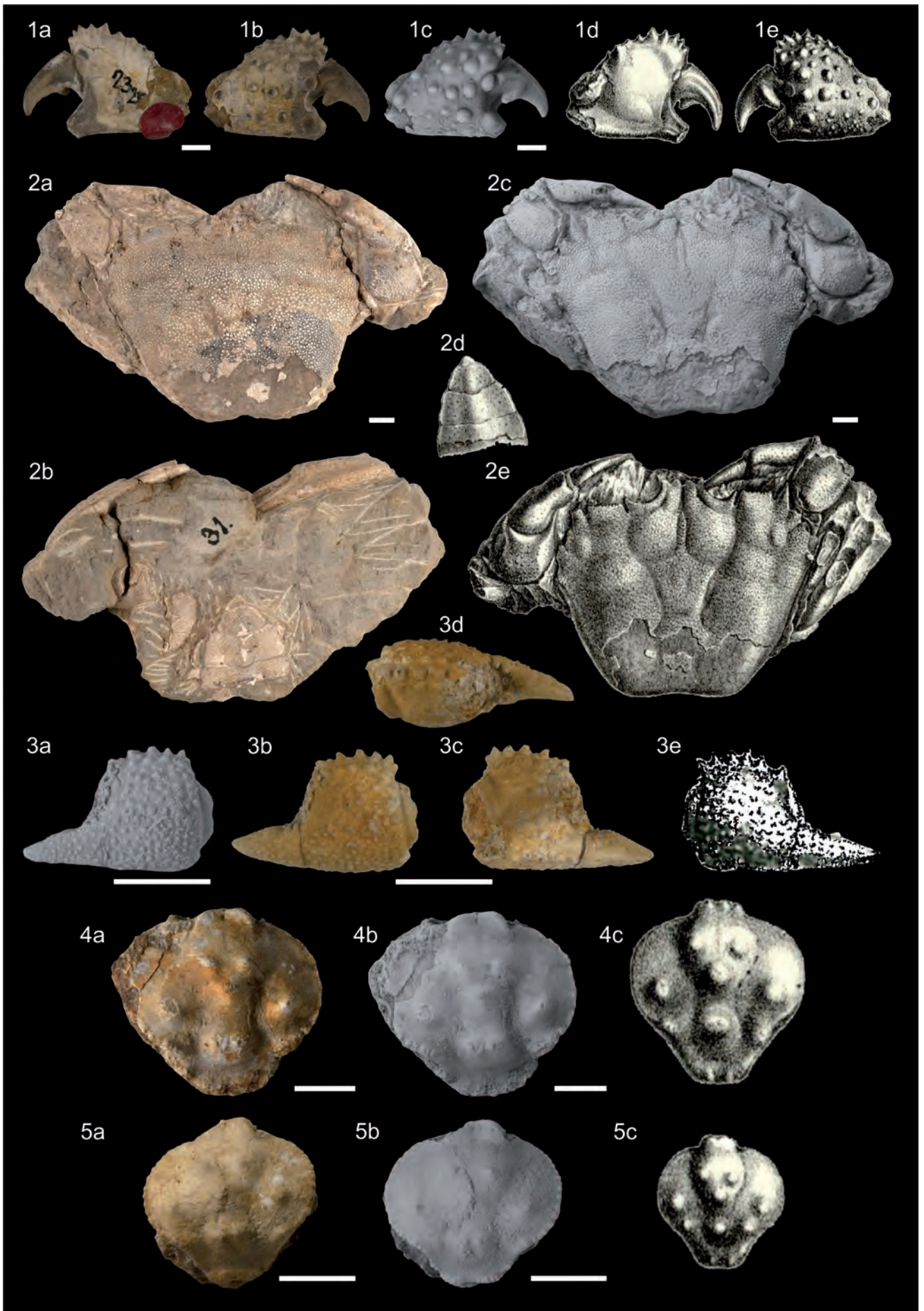


Plate 5

- Figs. 1a–e: *Harpactoxanthopsis quadrilobata* (DESMAREST, 1822), figured specimen of *Harpactocarcinus quadrilobatus* (DESMAREST, 1822) sensu BITTNER (1875),
a) dorsal view, b) ventral view, c) ventral view (whitened), d) original figure of BITTNER (1875: Pl. 2, Fig. 4a), e) original figure of BITTNER (1875: Pl. 2, Fig. 4b).
Coll. No.: GBA 1875/005/0033/02.
- Figs. 2a–d: *Harpactoxanthopsis quadrilobata* (DESMAREST, 1822), figured specimen of *Harpactocarcinus quadrilobatus* (DESMAREST, 1822) sensu BITTNER (1875),
a) dorsal view, b) ventral view, c) ventral view (whitened), d) original figure of BITTNER (1875: Pl. 3, Fig. 1).
Coll. No.: GBA 1875/005/0033/01.
- Figs. 3a–c: Lectotype of *Palaeograpsus inflatus* BITTNER, 1875,
a) dorsal view, b) dorsal view (whitened), c) original figure of BITTNER (1875: Pl. 2, Fig. 11a).
Coll. No.: GBA 1875/005/0041.
- Figs. 4a–b: Lectotype of *Periacanthus horridus* BITTNER, 1875,
a) unwhitened, b) whitened.
Coll. No.: GBA 1875/005/0010.

Scale bar = 5 mm.

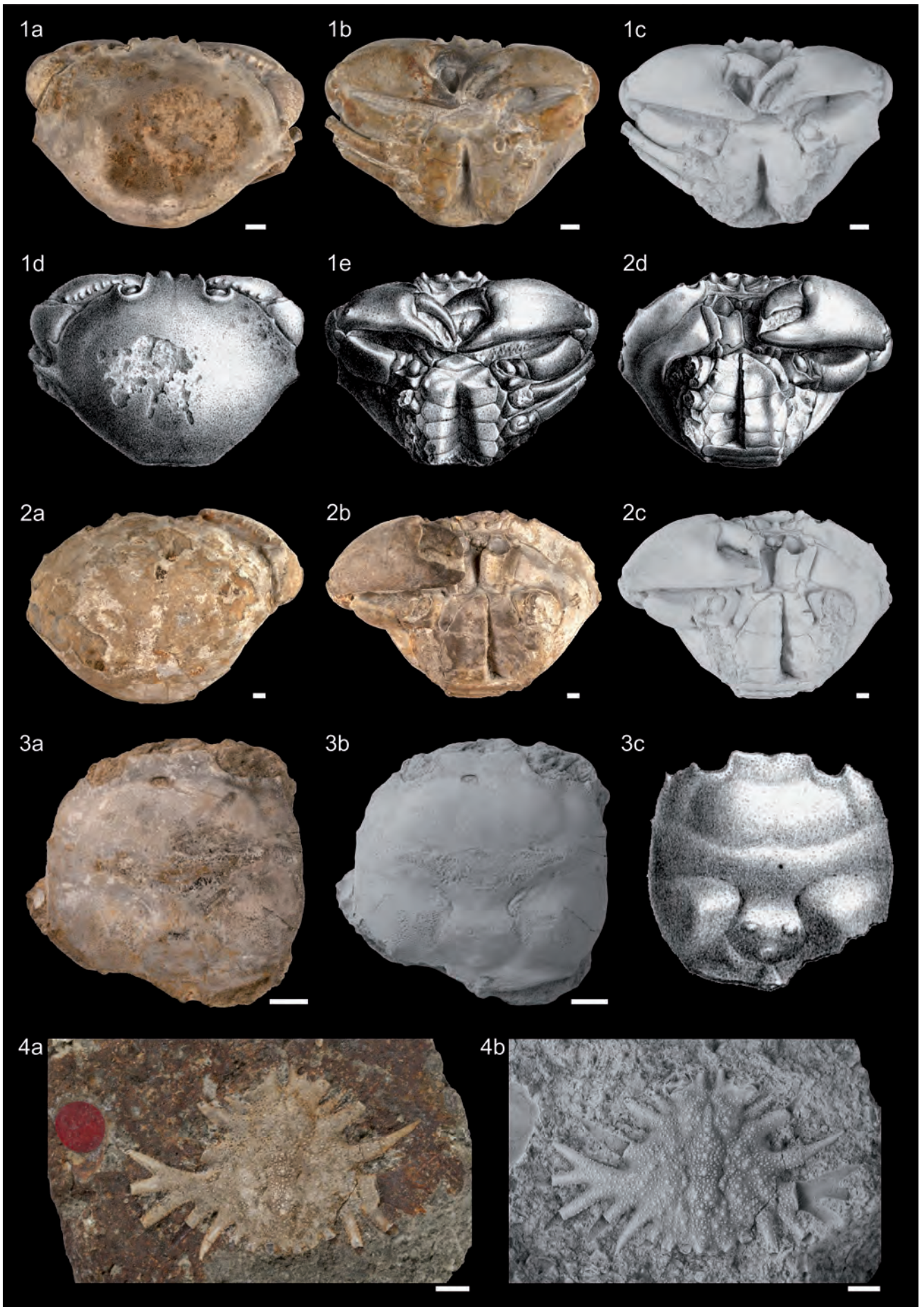


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- Figs. 1a–b: Lectotype of *Micromaia tuberculata* BITTNER, 1875,
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Coll. No.: GBA 1875/005/0009/01.
- Fig. 2: Paralectotype of *Micromaia tuberculata* BITTNER, 1875, dorsal view (whitened).
Coll. No.: GBA 1875/005/0009/02.
- Figs. 3a–b: Paralectotype of *Micromaia tuberculata* BITTNER, 1875,
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Coll. No.: GBA 1875/005/0009/03.
- Fig. 4: Paralectotype of *Micromaia tuberculata* BITTNER, 1875, dorsal view (whitened).
Coll. No.: GBA 1875/005/0009/04.
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- Fig. 8: *Micromaia tuberculata* BITTNER, 1875, original figure of BITTNER (1875: Pl. 2, Fig. 2).

Scale bar = 5 mm (all figures are to scale).

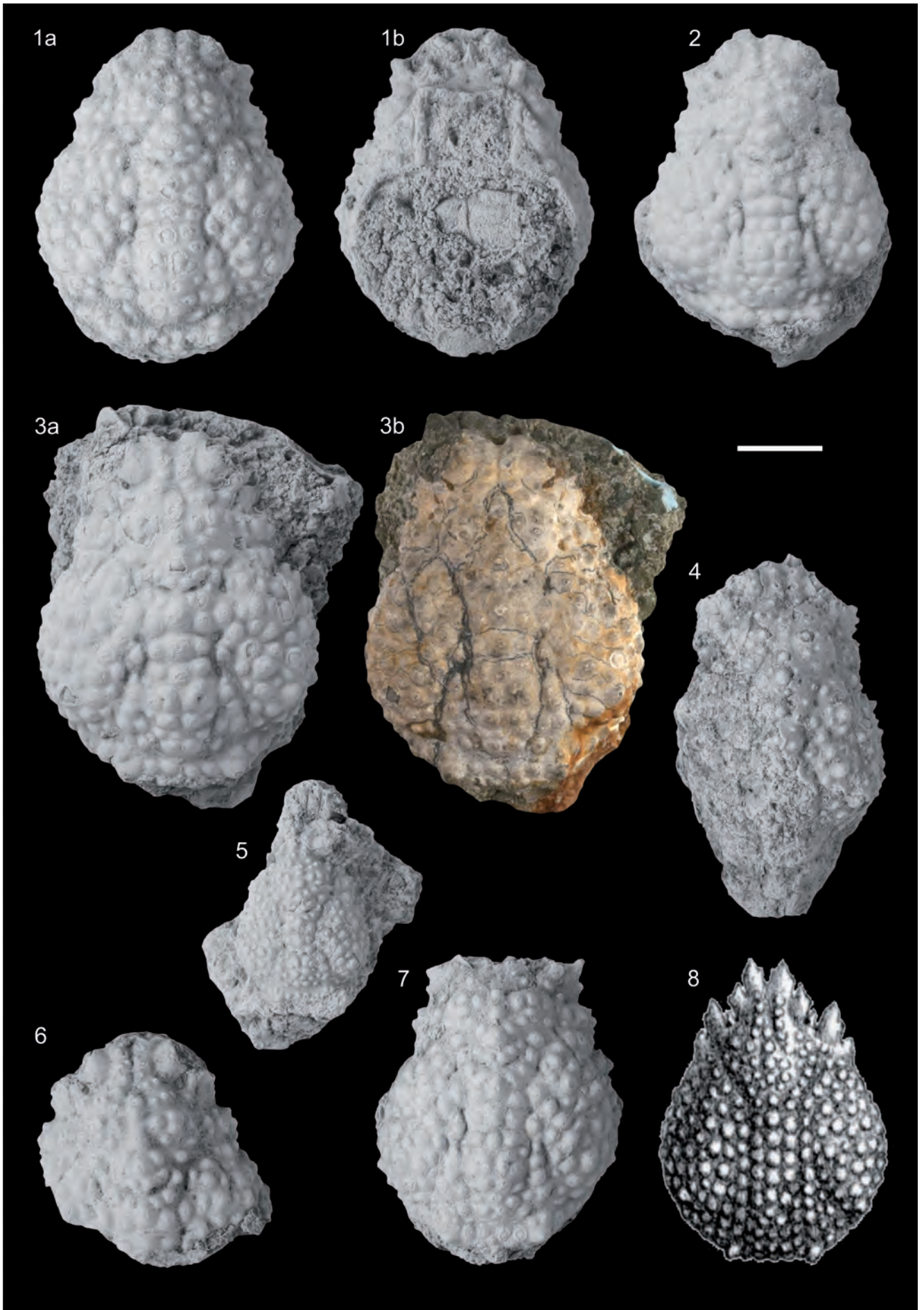


Plate 7

- Figs. 1a–b: *Lophoranina laevifrons* (BITTNER, 1875), lectotype of *Ranina laevifrons* BITTNER, 1875, a) dorsal view, b) dorsal view (whitened).
Coll. No.: GBA 1875/005/0003/01.
- Figs. 2a–b: *Lophoranina laevifrons* (BITTNER, 1875), paralectotype of *Ranina laevifrons* BITTNER, 1875, a) dorsal view, b) dorsal view (whitened).
Coll. No.: GBA 1875/005/0003/02.
- Figs. 3a–b: *Lophoranina laevifrons* (BITTNER, 1875), paralectotype of *Ranina laevifrons* BITTNER, 1875, a) dorsal view, b) dorsal view (whitened).
Coll. No.: GBA 1875/005/0003/03.
- Figs. 4a–b: *Lophoranina laevifrons* (BITTNER, 1875), paralectotype of *Ranina laevifrons* BITTNER, 1875, a) dorsal view, b) dorsal view (whitened).
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- Figs. 5a–b: *Lophoranina laevifrons* (BITTNER, 1875), paralectotype of *Ranina laevifrons* BITTNER, 1875, a) dorsal view, b) original figure of BITTNER (1875: Pl. 1, Fig. 4a).
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- Figs. 6a–c: *Daira speciosa* (REUSS, 1871), figured specimen of *Phymatocarcinus speciosus* REUSS, 1871 sensu BITTNER (1877), a–b) carapace (whitened) under different light angles, c) original figure of BITTNER (1877: Pl. 1, Fig. 1).
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- Figs. 7a–b: *Daira speciosa* (REUSS, 1871), figured specimen of *Phymatocarcinus speciosus* REUSS, 1871 sensu BITTNER (1877), a) portion of right chela preserved as internal cast (“Steinkern”), b) original figure of BITTNER (1877: Pl. 1, Fig. 4).
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- Figs. 8a–b: *Daira speciosa* (REUSS, 1871), figured specimen of *Phymatocarcinus speciosus* REUSS, 1871 sensu BITTNER (1877), a) left chela consisting of carpus, propodus and dactylus preserved as internal cast, b) original figure of BITTNER (1877: Pl. 1, Fig. 6).
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Coll. No.: GBA 1877/005/0007.

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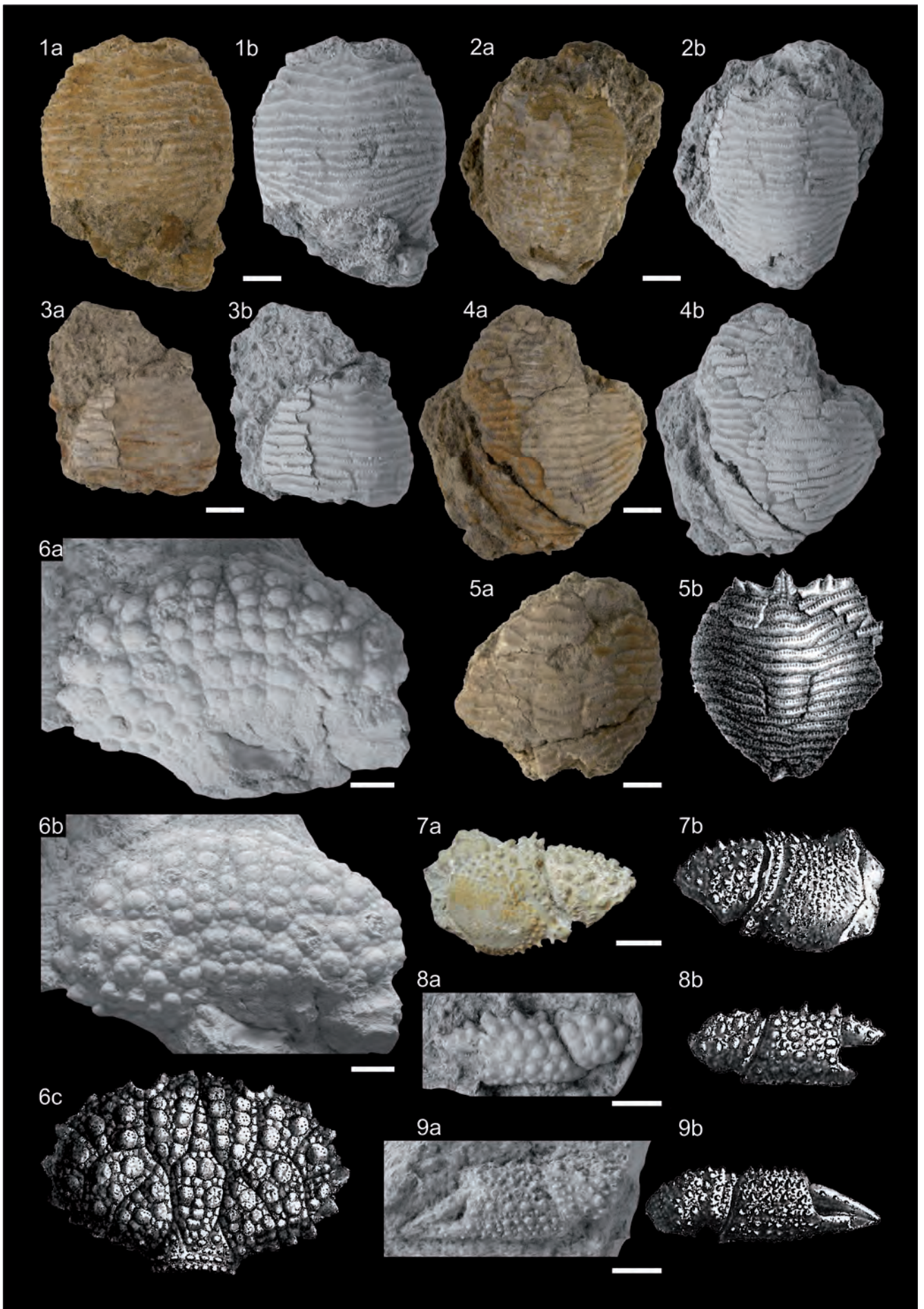


Plate 8

Fig. 1: *Micromaia tuberculata* BITTNER, 1875, dorsal view.
Coll. No.: GBA 1883/007/0006/02.

Figs. 2a–d: *Micromaia tuberculata* BITTNER, 1875,
a) dorsal view, b) original figure of BITTNER (1883: Pl. 1, Fig. 6a), c) ventral view of anterior portion of the carapace, d) original figure of BITTNER (1883: Pl. 1, Fig. 6d).
Coll. No.: GBA 1883/007/0006/01.

Figs. 3a–e: *Lophoranina marestiana* (KÖNIG, 1825), figured specimen of *Ranina marestiana* KÖNIG, 1825 sensu BITTNER (1883),
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Coll. No.: GBA 1883/007/0001/02.

Figs. 4a–e: *Bittnerilia eocaena* (BITTNER, 1883), holotype of *Ambrus eocaenus* BITTNER, 1883,
a) ventral view, b) dorsal view, c) dorsal view (whitened), d) original figure of BITTNER (1883: Pl. 1, Fig. 7a), e) original figure of BITTNER (1883: Pl. 1, Fig. 7d).
Coll. No.: GBA 1883/007/0008.

Figs. 5a–b: *Hepaticiscus neumayri* (BITTNER, 1875),
a) dorsal view, b) dorsal view (whitened).
Coll. No.: GBA 1883/007/0016.

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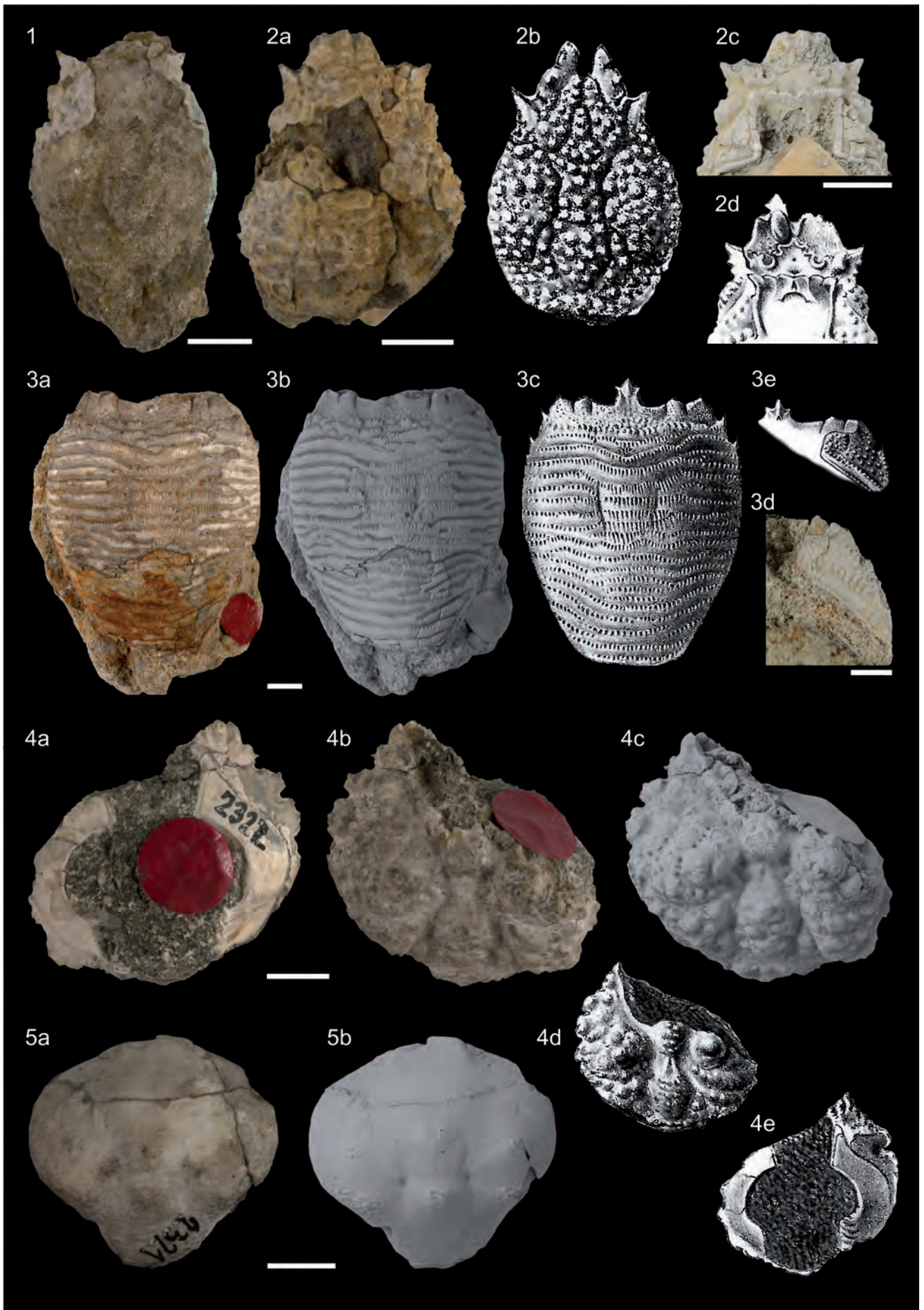


Plate 9

- Figs. 1a–g: *Lophoranina marestiana* (KÖNIG, 1825), figured specimen of *Ranina* cf. *marestiana* KÖNIG, 1825 sensu BITTNER (1883), a) dorsal view, b) dorsal view (whitened), c) original figure of BITTNER (1883: Pl. 1, Fig. 2a), d) ventral view (whitened), e) original figure of BITTNER (1883: Pl. 1, Fig. 2b), f) detail of P1 propodus (whitened), g) original figure of BITTNER (1883: Pl. 1, Fig. 2c).
Coll. No.: GBA 1883/007/0001/01.
- Figs. 2a–b: *Lophoranina avesana* (BITTNER, 1884), figured specimen of *Ranina marestiana* var. *avesana* BITTNER, 1884, a) cast of the pterygostomial region and Mxp 3, b) original figure of BITTNER (1884: Pl. 1, Fig. 2).
Coll. No.: GBA 1884/003/0007.
- Figs. 3a–c: *Raninoides notopoides* (BITTNER, 1883), lectotype of *Ranina notopoides* BITTNER, 1883, a) dorsal view, b) dorsal view (whitened), c) original figure of BITTNER (1883: Pl. 1, Fig. 3a).
Coll. No.: GBA 1883/007/0004/01.
- Figs. 4a–c: *Raninoides notopoides* (BITTNER, 1883), paralectotype of *Ranina notopoides* BITTNER, 1883, a) ventral view, b) dorsal view, c) dorsal view (whitened).
Coll. No.: GBA 1883/007/0004/03.
- Figs. 5a–c: *Raninoides notopoides* (BITTNER, 1883), paralectotype of *Ranina notopoides* BITTNER, 1883, a) dorsal view, b) ventral view, c) ventral view (whitened).
Coll. No.: GBA 1883/007/0004/04.
- Figs. 6a–d: *Raninoides notopoides* (BITTNER, 1883), paralectotype of *Ranina notopoides* BITTNER, 1883, a) ventral view, b) dorsal view, c) ventral view (whitened), d) original figure of BITTNER (1883: Pl. 1, Fig. 3b).
Coll. No.: GBA 1883/007/0004/02.

Scale bar = 5 mm.

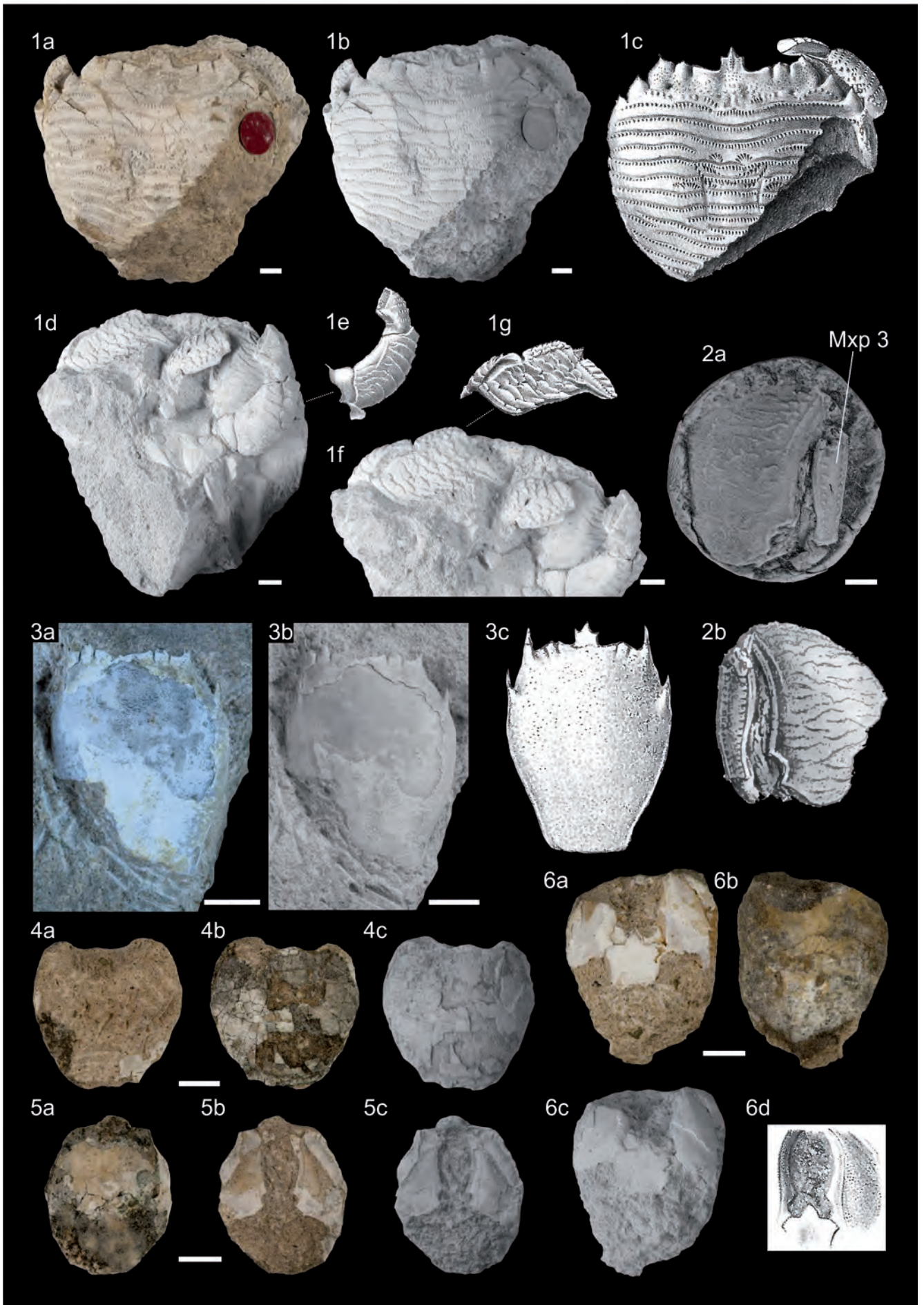


Plate 10

- Figs. 1a–e: *Tasadia carniolica* (BITTNER, 1884), lectotype of *Cancer carniolicus* BITTNER, 1884,
a) original figure of BITTNER (1884: Pl. 1, Fig. 8a), b) dorsal view. c) dorsal view (whitened), d) postero-dorsal view (whitened), e) ventral view (whitened).
Coll. No.: GBA 1884/003/0006/01.
- Figs. 2a–c: *Tasadia carniolica* (BITTNER, 1884), paralectotype of *Cancer carniolicus* BITTNER, 1884,
a) dorsal view, b) dorsal view (whitened), c) original figure of BITTNER (1884: Pl. 1, Fig. 9): detail of frontal margin.
Coll. No.: GBA 1884/003/0006/02.
- Figs. 3a–e: *Portunus radobojanus* (BITTNER, 1884), holotype of *Neptunus radobojanus* BITTNER, 1884,
a) dorsal view, b) ventral view, c) counterpart of ventral portion, d) original figure of BITTNER (1884: Pl. 2, Fig. 1a), e) original figure of BITTNER (1884: Pl. 2, Fig. 1b).
Coll. No.: GBA 1884/003/0001.

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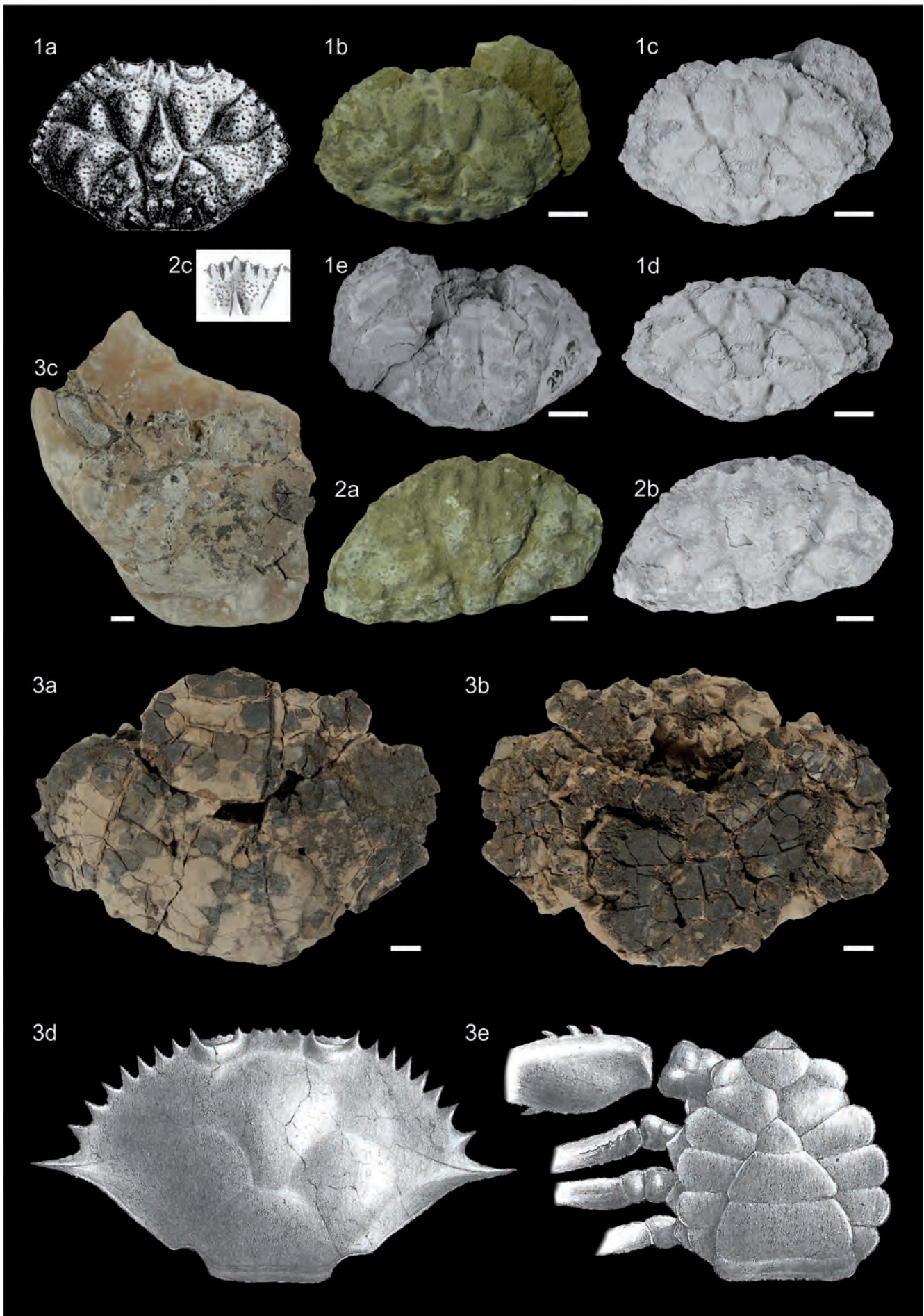


Plate 11

- Figs. 1a–e: Lectotype of *Mioplax socialis* BITTNER, 1884,
a) dorsal view, b) dorsal view (whitened), c) anterior view (whitened), d) posterior view (whitened), e) original figure of
BITTNER (1884: Pl. 2, Fig. 3b).
Coll. No.: GBA 2009/014/0029/01.
- Figs. 2a–d: Paralectotype of *Mioplax socialis* BITTNER, 1884,
a) female specimen in ventral aspect (whitened), b) detail of preserved sternum (whitened), c) detail of preserved Mxp 3,
d) original figure of BITTNER (1884: Pl. 2, Fig. 3e).
Coll. No.: GBA 2009/014/0029/02.
- Figs. 3a–b: Paralectotype of *Mioplax socialis* BITTNER, 1884,
a–b) carapace in dorsal aspect (whitened and unwhitened).
Coll. No.: GBA 2009/014/0029/03.
- Fig. 4: Paralectotype of *Mioplax socialis* BITTNER, 1884, carapace in dorsal aspect.
Coll. No.: GBA 2009/014/0029/04.
- Figs. 5a–c: Paralectotype of *Mioplax socialis* BITTNER, 1884,
a–b) counterpart of female preserved in ventral aspect (unwhitened and whitened), c) detail of sternum with inverted
shadows.
Coll. No.: GBA 2009/014/0029/05.

Scale bar = 5 mm.

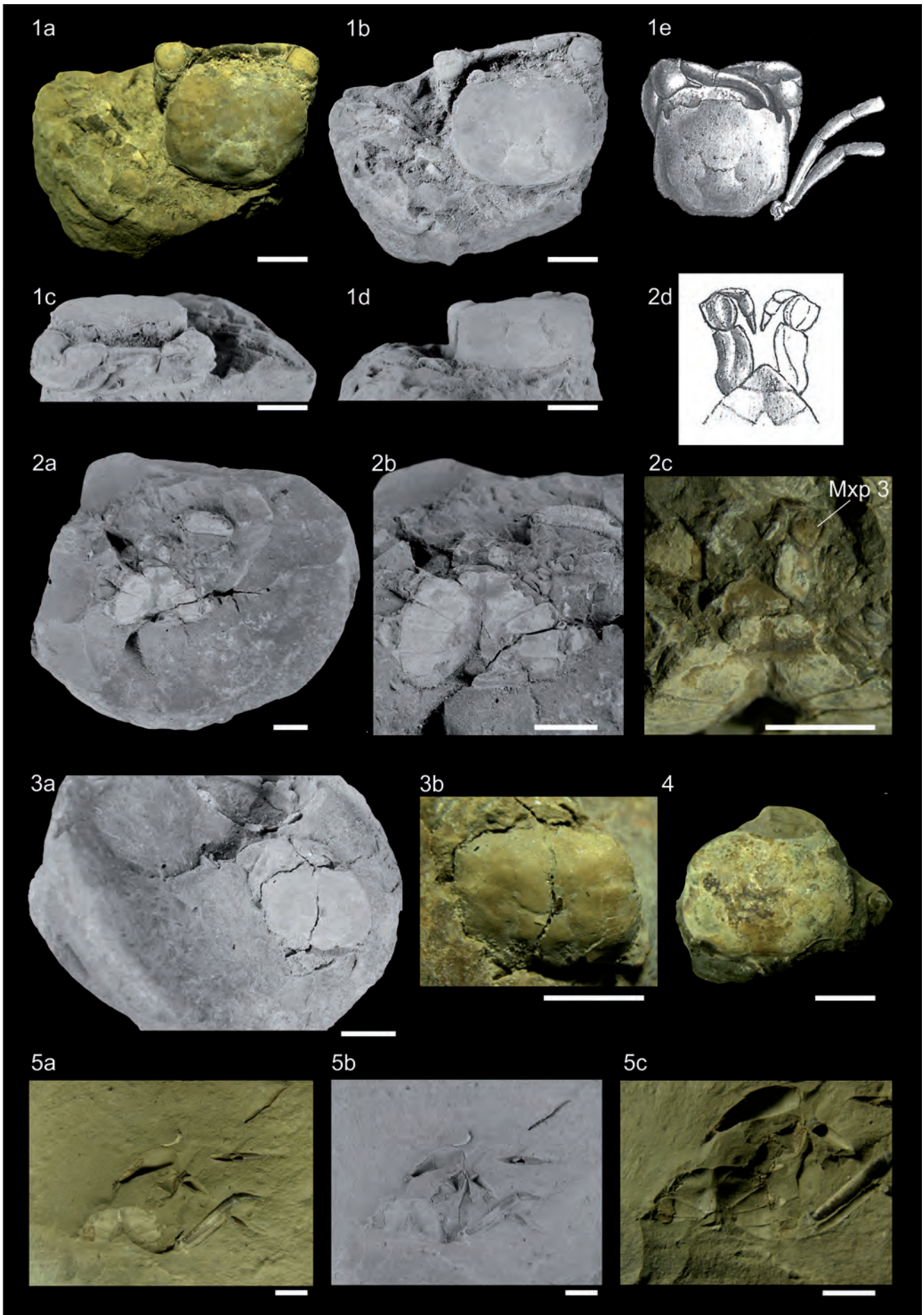


Plate 12

Figs. 1a–c: Lectotype of *Ranidina rosaliae* BITTNER, 1893,
a) dorsal view (whitened), b) dorso–lateral view (whitened), c) original figure of BITTNER (1893: Pl. 2, Fig. 2).
Coll. No.: GBA 1893/004/0001/01.

Figs. 2a–b: Paralectotype of *Ranidina rosaliae* BITTNER, 1893,
a) ventral view (whitened), b) original figure of BITTNER (1893: Pl. 2, Fig. 2a).
Coll. No.: GBA 1893/004/0001/02.

Fig. 3: Paralectotype of *Ranidina rosaliae* BITTNER, 1893, ventral view (whitened).
Coll. No.: GBA 1893/004/0001/03.

Scale bar = 5 mm.



Plate 13

- Figs. 1a–d: *Lophoranina laevifrons* (BITTNER, 1875), figured specimen of *Ranina laevifrons* BITTNER, 1875 sensu BITTNER (1895), a) dorsal view, b) dorsal view (whitened), c) original figure of BITTNER (1895: Pl. 1, Fig. 3), d) original figure of BITTNER (1895: Pl. 1, Fig. 4).
Coll. No.: GBA 1895/003/0001.
- Figs. 2a–d: *Periacanthus horridus* BITTNER, 1875, figured specimen sensu BITTNER (1895), a) ventral view, b) dorsal view, c) dorsal view (whitened), d) original figure of BITTNER (1895: Pl. 1, Fig. 2).
Coll. No.: GBA 1895/003/0002.
- Fig. 3: *Macrophthalmus aquensis* A. MILNE-EDWARDS & BROCCHI, 1879, paralectotype of *Macrophthalmus vindobonensis* GLAESSNER, 1924, specimen in dorsal aspect with preserved walking legs.
Coll. No.: GBA 1925/001/0001/01.
- Fig. 4: *Macrophthalmus aquensis* A. MILNE-EDWARDS & BROCCHI, 1879, paralectotype of *Macrophthalmus vindobonensis* GLAESSNER, 1924, female specimen in ventral aspect.
Coll. No.: GBA 1925/001/0001/02.
- Figs. 5a–c: *Macrophthalmus aquensis* A. MILNE-EDWARDS & BROCCHI, 1879, paralectotype of *Macrophthalmus vindobonensis* GLAESSNER, 1924, a–b) dorsal view under different light conditions, c) ventral view.
Coll. No.: GBA 1925/001/0001/03.

Scale bar = 5 mm.

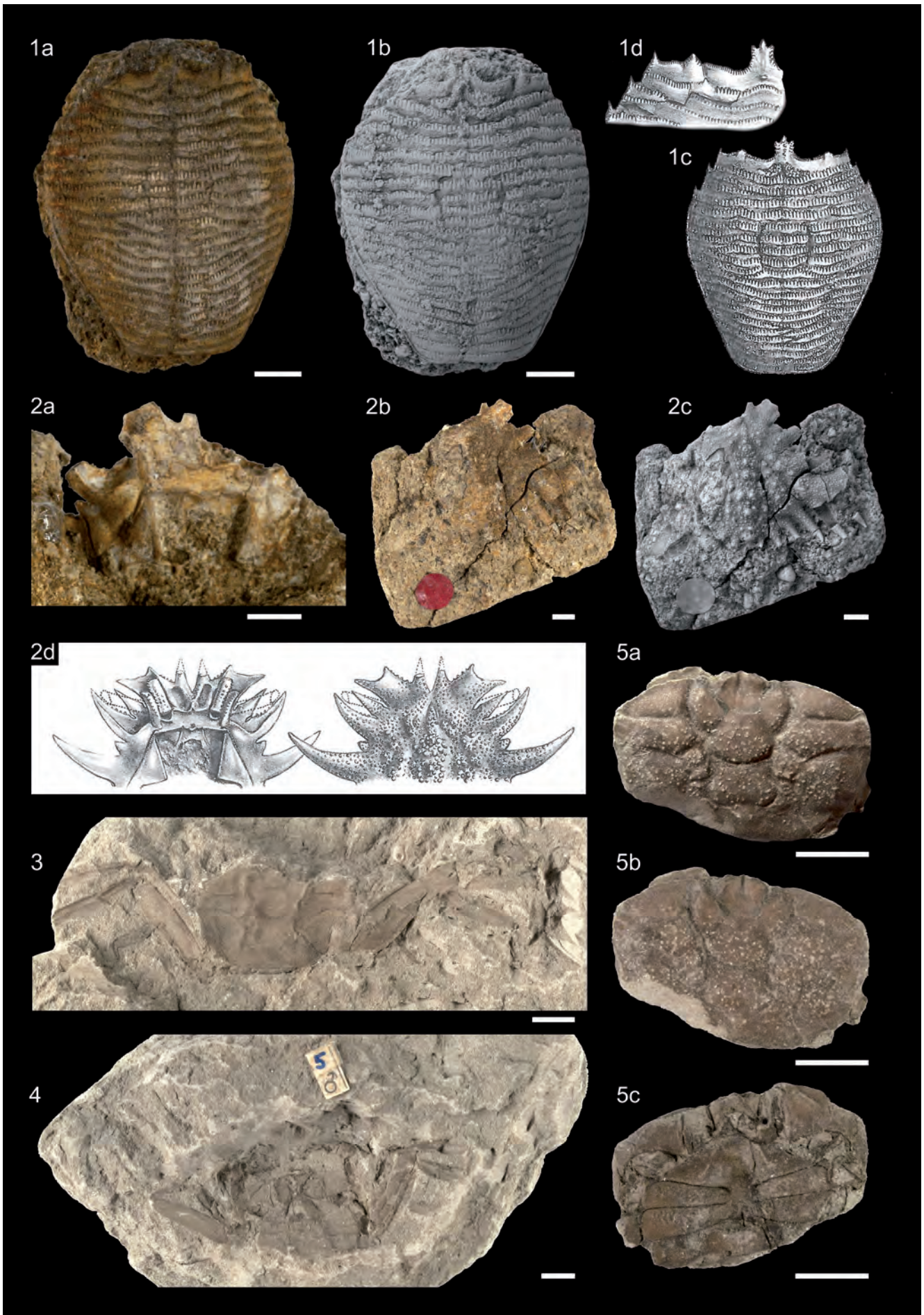
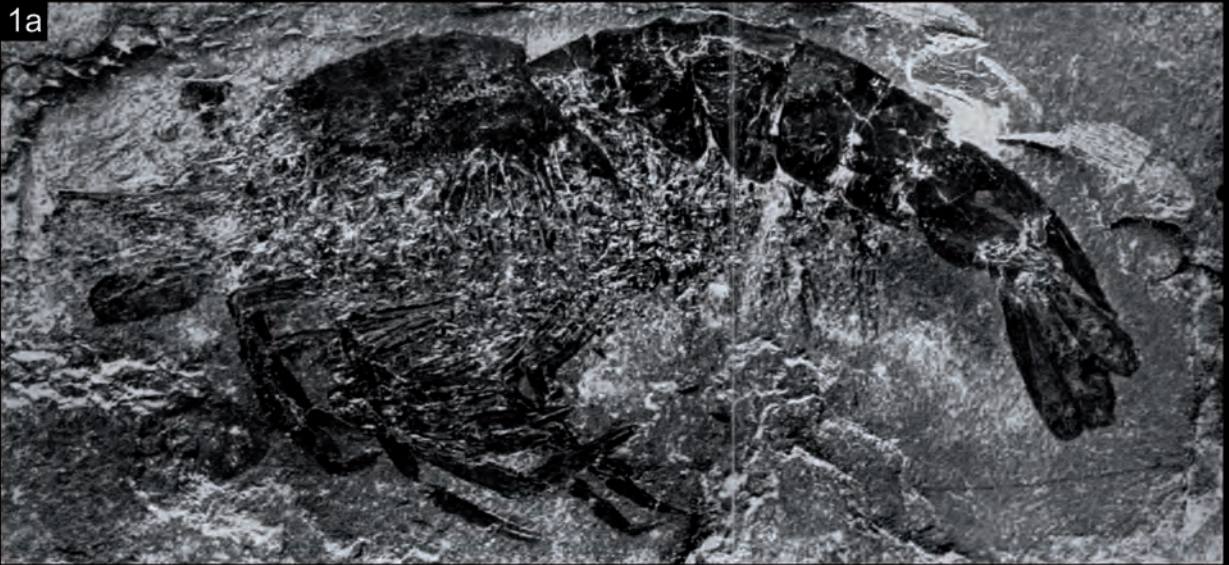


Plate 14

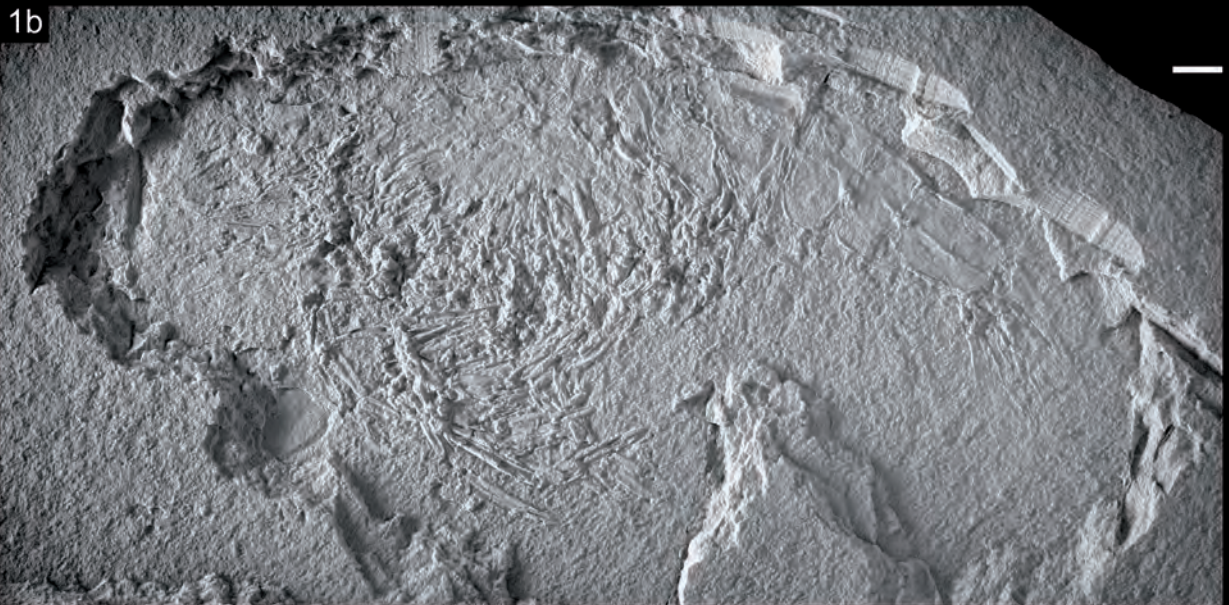
Figs. 1a–c: *Antrimpos crassipes* (BRONN, 1858),
a) original figure of GLAESSNER (1930: Pl. 6, Fig. 1), b) whitened, c) detail of pleon (s2–s6 = pleonal somites).
Coll. No.: GBA 1930/002/0001.

Scale bar = 5 mm.

1a



1b



1c

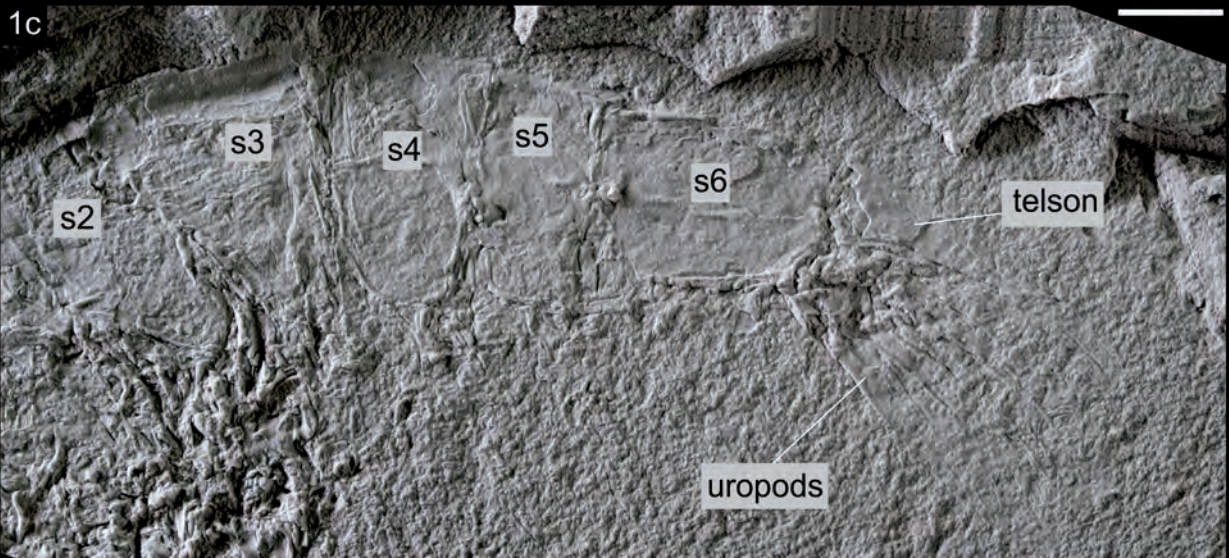


Plate 15

Figs. 1a–c: Holotype of *Linuparus bigranulatus* GLAESSNER, 1930,
a) right-lateral view (whitened), b) dorsal view (whitened), c) left-lateral view (whitened).
Coll. No.: GBA 1930/002/0003.

Figs. 2a–b: *Tetrachela raiblana* (BRONN, 1858),
a) whitened figured specimen of GLAESSNER (1930: Pl. 6, Fig. 3), b) idealised reconstruction of *Tetrachela raiblana* by GLAESSNER (1930: Pl. 9, Fig. 1).
Coll. No.: GBA 1930/002/0002/01.

Scale bar = 5 mm.

1a



1b



1c



2a



2b

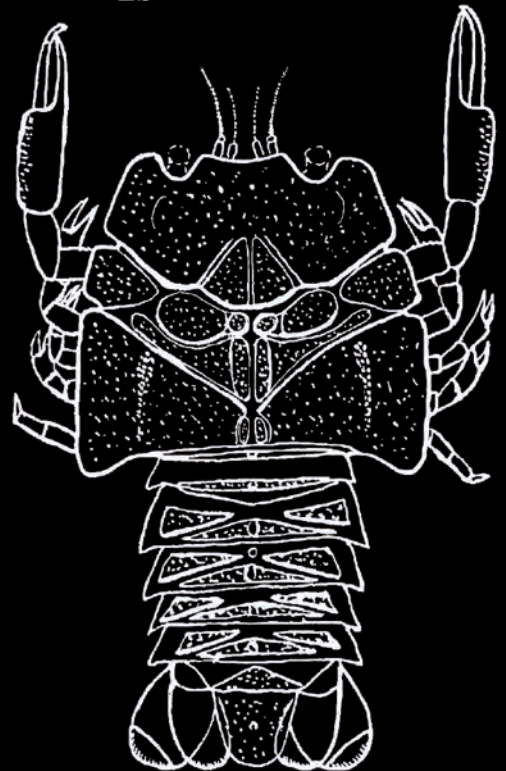


Plate 16

- Figs. 1a–b: Holotype of *Clytiella spinifera* GLAESSNER, 1931,
a) whitened specimen, b) idealised reconstruction of *Clytiella spinifera* by GLAESSNER (1931: Fig. 2).
Coll. No.: GBA 1931/003/0001.
- Fig. 2: Paratype of *Platychela trauthi* GLAESSNER, 1931, whitened.
Coll. No.: GBA 1931/003/0003/01.
- Fig. 3: Paratype of *Platychela trauthi* GLAESSNER, 1931, whitened.
Coll. No.: GBA 1931/003/0002 (counterpart of GBA 1931/003/0003/02).

Scale bar = 5 mm.

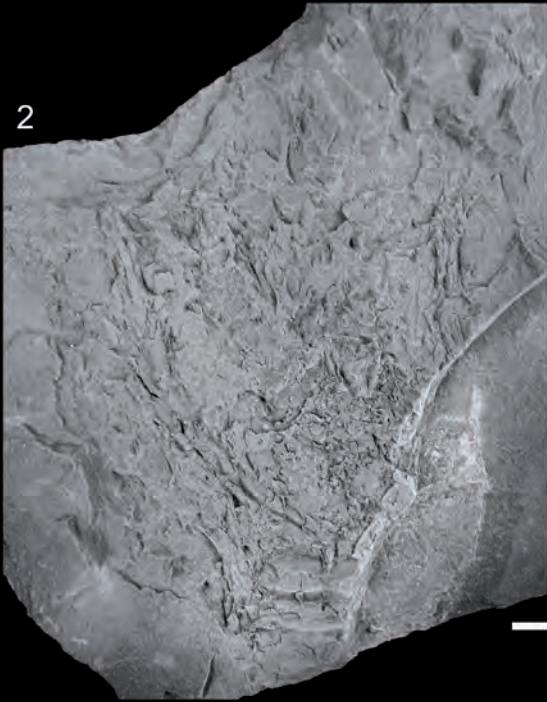
1a



1b



2



3

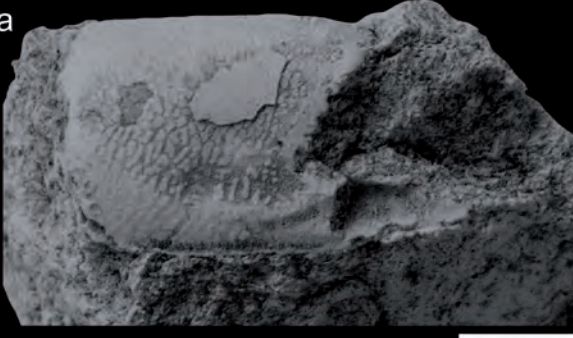


Plate 17

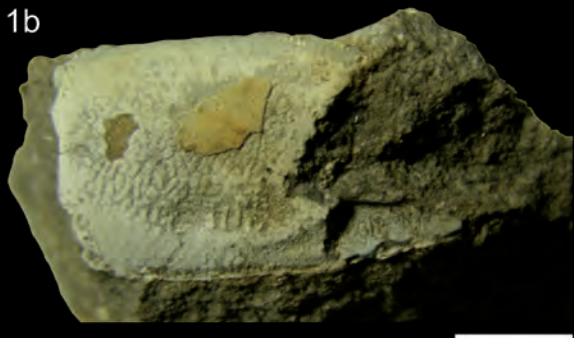
- Figs. 1a–b: *Calliax michelottii* (A. MILNE-EDWARDS, 1860),
a–b major right propodus in lateral view (whitened and unwhitened).
Coll. No.: GBA 2009/014/0027.
- Figs. 2a–b: *Gouretia* sp.,
a–b major left propodus in lateral view (whitened and unwhitened).
Coll. No.: GBA 2009/014/0024/01.
- Fig. 3: *Jaxea kuemeli* BACHMAYER, 1954, propodus articulated with dactylus (whitened).
Coll. No.: GBA 2009/014/0023/01.
- Fig. 4: *Jaxea kuemeli* BACHMAYER, 1954, entire cheliped (whitened).
Coll. No.: GBA 2009/014/0023/02.
- Fig. 5: *Jaxea kuemeli* BACHMAYER, 1954, near-complete individual (whitened).
Coll. No.: GBA 2009/014/0023/03.
- Fig. 6: *Liocarcinus* sp., cheliped fingers with preserved dentition.
Coll. No.: GBA 2009/014/0025/01.
- Fig. 7: *Liocarcinus* sp., cheliped dentition.
Coll. No.: GBA 2009/014/0025/02.
- Fig. 8: *Liocarcinus* sp., cheliped dentition.
Coll. No.: GBA 2009/014/0025/03.

Scale bar = 5 mm.

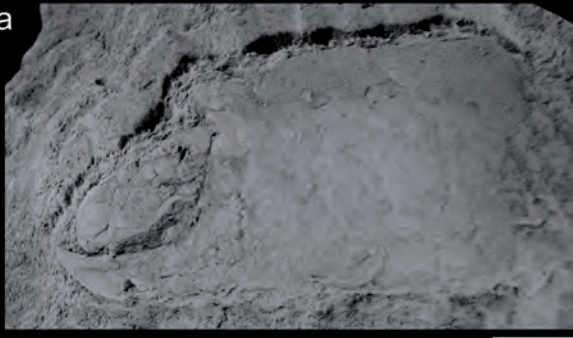
1a



1b



2a



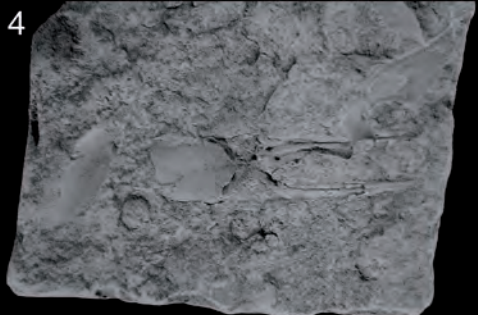
2b



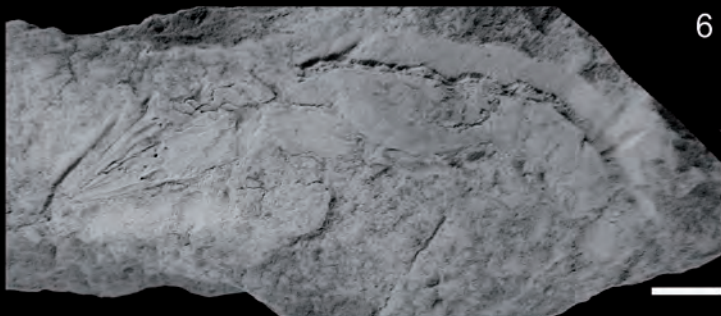
3



4



5



6



7



8

