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What ever happened to *Selenisca* (Decapoda)?

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Abstract

Selenisca gratiosa Von Meyer, 1847, from the Late Jurassic of Germany, previously has only been illustrated by the original line drawing, and the whereabouts of the holotype and sole specimen has been obscure. Discovery that the specimen is in the collections of the Museum of Comparative Zoology, Harvard University, has permitted redescription and illustration of the material as well as confirmation of placement in the superfamily Glypheoidea and family Mecochiridae.

Key words: Decapoda, Glypheoidea, Mecochiridae, Late Jurassic, Germany

Introduction

In 1847, Hermann Von Meyer named a new genus and species of Jurassic lobster, *Selenisca gratiosa*, which he considered to be closely related to *Glyphea* Von Meyer, 1835. The sole specimen upon which the taxon was based was collected from the "mittleren weissen Juraabtheilung" (=middle white Jurassic) which is generally equivalent to the Late Jurassic. The specimen was collected from Wurmlingen near Tuttlingen in Würtemberg. He illustrated the species by a single lithograph (1847, pl. 19, fig. 1). Subsequently the only illustrations of the taxon, except variations of Von Meyer's illustration, were drawings of three pereiopods by Winkler (1883, figs. 1–3). Since naming of the species, the generic identity and placement have been contentious subjects. The purposes of this work are to illustrate the original specimen, to provide a redescription of the taxon, and to comment on its placement.

The fate of *Selenisca gratiosa*

Von Meyer (1847, p. 141) noted that the specimen was in the collection of Finanzraths [sic] Eser. Alpheus Hyatt visited Europe to obtain specimens to be used as comparative materials in his personal research. Supported financially by Mr. John Cummings, Hyatt managed to purchase Finanzrath Eser's collection of fossils, including *Selenisca gratiosa*, for the Boston Society of Natural History in 1873, just prior to Eser's death (Jessica Cundiff, personal commun. 2011). The transaction was recorded in the Proceedings of the Boston Society of Natural History (Hyatt, 1874), and the inventory of the collection of the Society, including Eser's material, was published by Cushman (1907). According to Cundiff, the invertebrate fossils were acquired by Harvard's Museum of Comparative Zoology in 1917–18, 1933, and 1934. The precise timing of receipt of the specimen of S. *gratiosa* in question is not known.

We have found no reference to the specimen of *Selenisca gratiosa* having been noted as being deposited in the collection of the Museum of Comparative Zoology, nor has there been any record of its having been studied since being deposited in the collections of the Boston Society of Natural History. Indeed, the specimen seems to have passed into obscurity. That this is likely was observed by Cushman (1907, p. 250) when he noted, "The listing of the types of this part of the collection [Eser's European material] is especially important as one would hardly look for the types of European species in an American museum."

Evolution of illustrations of *Selenisca gratiosa*

The current concept of *Selenisca* and its systematic placement seems to be based upon the illustration of S. *gratiosa* in the *Treatise on Invertebrate Paleontology* (Glaessner, 1969, fig. 270.4) (Fig.1.4). However, comparison of Von Meyer's illustration (1847, pl. 19, fig. 1) (Fig. 1.2) with that in the *Treatise* reveals that several important differences are evident. One of the most striking differences is in regard to the dactylus on the first pereiopods. No dactyli are evident on Von

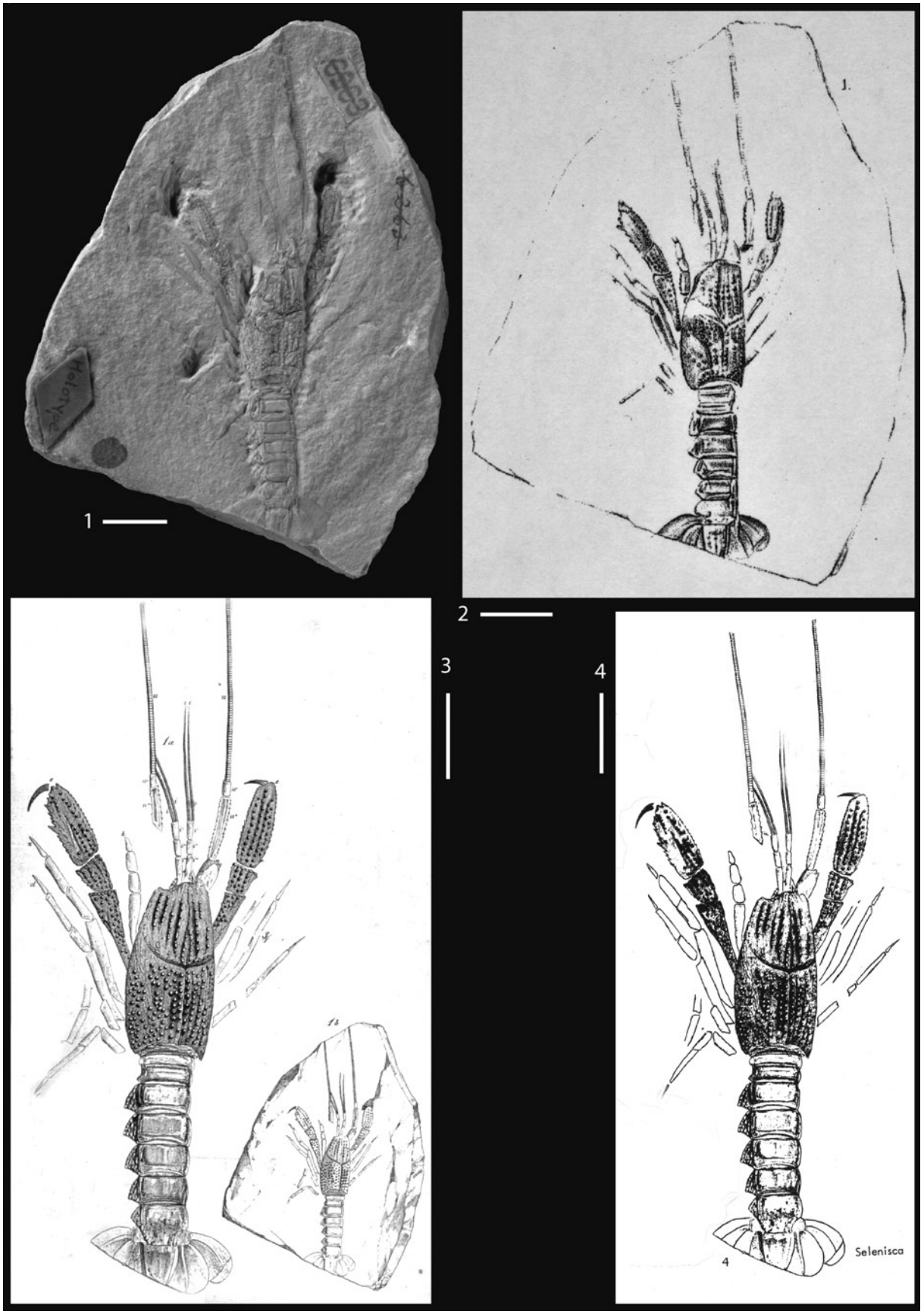

Fig. 1. *Selenisca gratiosa* Von Meyer, 1847, MCZ Invertebrate Paleontology 109949. 1, Holotype specimen, whitened with ammonium chloride; 2, original illustration reproduced from Von Meyer, 1847, pl. 19, fig. 1; 3, illustrations reproduced from Oppel, 1862, pl. 18, figs. 1a and 1b; 4, illustration reproduced from Glaessner, 1969, fig. 270.4. Scales bar = 1 cm.

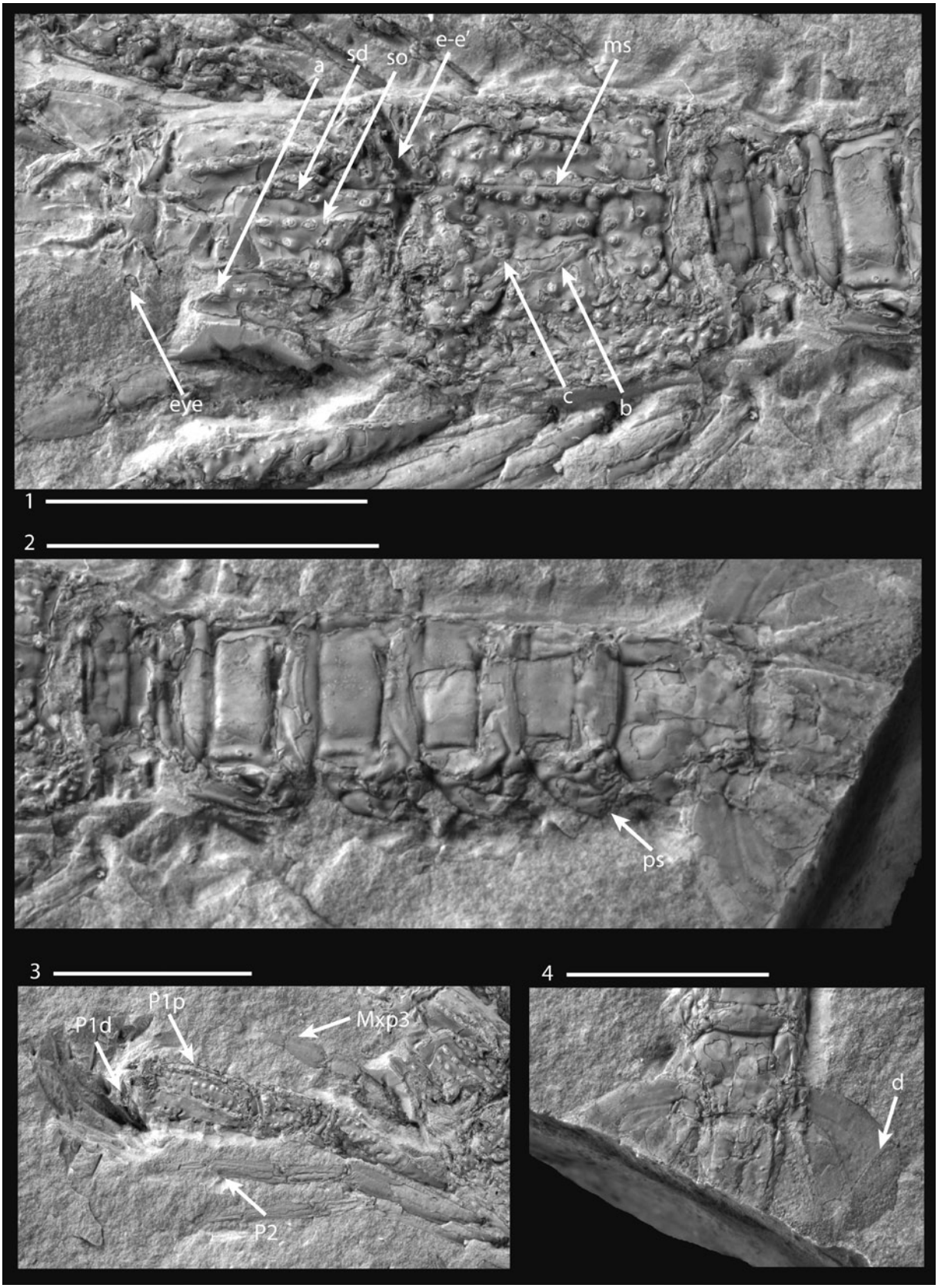

Fig. 2. *Selenisca gratiosa* Von Meyer, 1847, MCZ Invertebrate Paleontology 109949. 1, Cephalothorax of holotype showing some of the diagnostic features of the species; 2, pleon of holotype showing serrated posterior margin of pleura; 3, close-up of appendages of left side of holotype; 4, telson and uropods of holotype showing form of telson and diaeresis of uropod. a = antennal carina, b = branchiocardiac groove, c = postcervical groove, d = diaeresis, e-e' = cervical groove, eye = trace of eye, Mxp3 = third maxilliped, ms = midline suture, P1d = dactylus of first pereiopod, P1p = propodus of pereiopod 1, P2 = pereiopod 2, ps = pleural spines, sd = subdorsal carina, so = supraorbital carina. Scale bars = 1 cm..

Meyer's illustration whereas long, acicular dactyti are shown in the *Treatise* figure. Details of the carapace are also quite different. Von Meyer's illustration clearly shows a well developed branchiocardiac groove, whereas the groove is not seen in the *Treatise* illustration. The pattern of carapace granulation is also quite different between the two illustrations. Glaessner's illustration also shows a vague trace of an axial ridge on pleurae four and five: none is shown on the original illustration. Thus, the modern representation of the species is in some ways sufficiently misleading and probably accounts for the questionable placement of the genus by Glaessner (1969, p. R467) and the synonymy with *Glyphea* by Garassino (1996).

The differences between the two illustrations resulted from Glaessner's reliance upon an illustration of the species published by Oppel (1862, fig. 1a, ab) (Fig. 1.3). Oppel's illustration depicted the specimen as having the prominent dactyli on the first pereiopod, absence of the branchiocardiac groove, well developed granular ridges over nearly the entire carapace, and a clear axial structure on pleurae four and five.

Examination of the holotype, and sole specimen, of *Selenisca gratiosa* and comparison with the various illustrations certainly documents the importance of examining actual specimens, if at all possible. In this particular case, it also provides some insight into the history of the specimen. Apparently when Von Meyer studied and described the specimen, the dactyli on the first pereiopods were not exposed nor were some of the elements of pereiopods four and five on the left side. At some time prior to preparation of the illustration of Oppel (1862), deep, rather crude excavations exposed the features of the pereiopods added to the drawing. Differences in cephalothorax and pleon morphology can best be attributed to artistic license. Perhaps the most interesting variation in the various illustrations is the presentation of the branchiocardiac groove. That feature is very prominent on Von Meyer's rendition, but is absent on subsequent representations. Comparison of that feature with the actual specimen suggests that Von Meyer overemphasized the strength of the branchiocardiac groove and Oppel apparently considered it to be absent. The actual specimen shows a much subdued branchiocardiac groove (Fig. 2.1, b) and an even more subtle postcervical groove (Fig. 2.1, c). As will be discussed below, the presence and degree of development of these grooves is important in assigning the genus to Mecochiridae.

Systematics

Infraorder Glypheidea Winkler, 1883

Superfamily Glypheoidea Winkler, 1883

Family Mecochiridae Van Straelen, 1925

Diagnosis: Carapace subcylindrical, slightly compressed laterally; short rostrum lacking supra-and subrostral teeth; cervical groove well developed; postcervical and branchiocardiac grooves reduced or absent; pleon well-developed, terga generally rectilinear, not heavily ornamented; pleura triangular; pereiopod 1 strongly elongate and subchelate; pereiopod 2 subchelate; pereiopod 3 sometimes subchelate; pereiopods 4 and 5 always with terminal dactyli; exopod of uropod with diaeresis.

Discussion: The distinction between genera within Glypheidae and Mecochiridae is not always clear; however, two characters are useful in making a distinction between the two families. Mecochiridae including *Selenisca*, the subject of this work, have postcervical and branchiocardiac grooves that are reduced or absent, whereas those of the Glypheidae tend to be strongly developed. The terga of species within Mecochiridae are weakly ornamented whereas those of Glypheidae are often very strongly ornamented. The conformation of the pereiopods can be quite similar between species within the two families so that it is difficult to make a distinction on that basis. Glaessner (1969) considered the termination of pereiopods one on taxa within Glypheoidea as being without chelae; however, examination of illustrations of *Glyphea* (Glaessner, 1969, fig; 269.3a) and *Squamosoglyphea* (Glaessner, 1969; fig. 269.4) within the Glypheidae, and *Pseudoglyphea* (Glaessner, 1969, fig. 270.3) within the Mecochiridae, document a range of variation of pereiopod one terminations that clearly include pseudochelate closures in both families.

Family placement of *Selenisca* has been contested. Van Straelen (1925) and previous workers considered the genus to be a member of the Glypheidae, and others (Oppel, 1861, 1862; Winkler, 1883; Schütze, 1907; Garassino, 1996) have considered *Selenisca* to be a junior synonym of *Glyphea*. Beurlen (1928) referred the genus *Selenisca* to the subfamily Mecochirinae within Glypheidae. Glaessner (1929) did not evaluate subfamilial placements and retained the genus within Glypheidae. In 1969, he questionably assigned the genus to Mecochiridae. De Grave *et al*. (2009) and Schweitzer *et al*. (2010) unquestionably placed *Selenisca* within Mecochiridae. This placement is confirmed by examination of the holotype.

Genus *Selenisca* Von Meyer, 1847

Type species: *Selenisca gratiosa* Von Meyer, 1847, by original designation and monotypy.

Diagnosis: Carapace granular, with longitudinal rows of granules on cephalic and dorsal part of thoracic regions; cervical groove steeply inclined, about 72º to midline, deeply impressed; postcervical and branchiocardiac grooves weak, branchiocardiac groove inclined to midline at about 25º 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; first pereiopod subchelate; exopod of uropods with diaresis; telson quadrate, tapering slightly posteriorly.

Selenisca gratiosa Von Meyer, 1847

(Figs. 1, 2)

Selenisca gratiosa von Meyer, 1847, p. 141, pl. 19, fig. 1.

Glyphea gratiosa Meyer; Oppel, 1861, p. 110.

Glyphea gratiosa Meyer; Oppel, 1862, p. 70, pl. 18, fig. 1a, b.

Glyphea gratiosa (von Meyer); Winkler, 1883, p. 113, figs. 1–3. Part translated in Annals and Magazine of Natural History, including Zoology, Botany, and Geology, 5th Series, v. 10, p. 133–149 and 306–317.

Glyphea gratiosa (von Meyer); Schütze, 1907, p. 354.

Glyphea gratiosa von Meyer sp.; Van Straelen, 1925, p. 188.

Selenisca gratiosa H. v. Meyer; Beurlen, 1928, p. 152

Selenisca gratiosa v. Meyer; Glaessner, 1929, p. 377

?*Selenisca gratiosa* von Meyer; Glaessner, 1969, p. R467, fig. 270.4.

Glyphea gratiosa (von Meyer, 1847); Garassino, 1996, p. 348.

Diagnosis: As for genus.

Description: Small lobster with heavily ornamented carapace and relatively smooth pleon. First pereiopods pseudochelate; pereiopods 2–5 achelate.

Cephalothorax cylindrical, 18.6 mm long measured from posterior margin to tip of short, rounded rostrum. Length measured along midline 16.5 mm; length of cephalic region measured along midline from cervical groove to tip of rostrum 8.4 mm. Midline of cephalothorax with well developed suture extending from posterior margin to about midlength of cephalic region.

Cephalic region with at least four pairs of longitudinal nodose carinae. Subdorsal carinae bearing about seven nodes extends from cervical groove to midlength of region and converges anteriorly. Supraorbital carinae bearing more than five nodes parallels midline and extends from cervical groove to front. Another short, subtle carina bearing three spines lies close to and parallels supraorbital carinae along midlength. Antennal carina bearing at least four small nodes extends from front at least to midlength of cephalic region.

Cervical groove deeply incised at midline, intersects midline at about 72º angle, extends as straight line anteroventrally to level of antennal carina, and curves more anteriorly to approach ventral margin.

Thoracic region coarsely nodose with two nodose rows flanking midline. Postcervical groove indistinct, shallow, short, paralleling branchiocardiac groove along midlength. Branchiocardiac groove weakly impressed in convex forward arc from near ventral margin to about 70% length of thoracic region where it curves dorsally to cross midline nearly at right angle to it.

Pleon flattened dorsally with smooth surface. First somite short, poorly preserved. Terga decrease in length from 3.9 mm of somite 2 to 3.2 mm of somite 5; somite 6 is 3.8 mm long. Terga 2–5 rectangular with deep straight or weakly concave forward transverse grooves and moderately deep lateral longitudinal grooves defining smooth, rectangular medial surface of terga. Tergum of somite 6 tapers posteriorly. Pleurae broadly triangular with tip directed posteroventrally. Proximal part of pleurae with about four irregular swellings; distal part of pleurae with depressed center and swollen margin. Posterior edge of pleurae 2–5 appear to have very fine spines. Telson nearly straight-sided, tapering slightly posteriorly; posterior margin not preserved. Axis of telson slightly elevated and bounded by shallow longitudinal depressions. A finely nodose longitudinal ridge separates axial area from smooth, depressed lateral surfaces.

Uropods ovoid with longitudinal nodose ridge on exopod and endopod. Exopod with diaresis extending obliquely across structure.

Antennules with at least three long basal elements and moderately long, paired flagellae. Antennae with at least three basal elements, the medial one extremely long and bearing at least three longitudinal rows of distally-directed needle-like spines. Antennal scale large, lanceolate.

Small, 0.4 mm diameter structures flanking rostrum, and set in advance of it, may be remnants of eyes.

Third maxilliped pediform, extending anteriorly to level of base of flagellae on antennules.

First pereiopod stout. Merus, carpus, and propodus bearing longitudinal rows of nodes. Dactylus long, slender, recurved, positioned to occlude with distal end of propodus as pseudochelate structure. Remainder of walking legs long, slender, generally smooth. Pereiopod 2 longest, extending to level of distal end of propodus of P1. P3–P5 decreasing in length posteriorly. Dactyli of P2–P5 long, ensiform.

Holotype: The holotype, and sole specimen, MCZ Invertebrate Paleontology 109949, is deposited in the Invertebrate Paleontology collections of the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA.

The specimen bears several numbers. The original catalogue number, presumably that of the Boston Society of Natural History, is 6263. Original cataloguing in the Harvard collection assigned a number of 6245, and subsequent recataloguing has resulted in the number 109949.

Discussion: Examination of the holotype specimen of *Selenisca gratiosa* confirms that the original drawing of Von Meyer was generally quite faithful to the original. However, certain observations could be made on the original that permit a more precise description and that tend to strengthen placement within Mecochiridae. The original drawing shows no evidence of postcervical and branchiocardiac grooves, whereas examination of the actual specimen shows a very weak branchiocardiac groove and a short, discontinuous postcervical groove parallel to the midregion of the branchiocardiac groove. Further, the original illustration shows that the granular rows on the thoracic region extend over nearly the entire area in view. On the actual specimen there are two rows of granules on either side of the midline, and the remainder of that region is irregularly granular.

Discovery of the location of the type specimen of *Selenisca gratiosa* has made it possible to confirm its unique identity and to assure placement in the Mecochiridae.

Acknowledgments

The original indication that the specimen of *Selenisca gratiosa* might be in the collections of Harvard University came from Günter Schweigert, Staatliches Museum für Naturkunde, Stuttgart, Germany. He learned of the sale of the Eser collection to A. Hyatt in the 19th Century. Jessica Cundiff, Curatorial Associate, Department of Invertebrate Paleontology, Museum of Comparative Zoology, Harvard University, Cambridge MA, USA, made the loan of the specimen possible and provided valuable literature and anecdotal information about the acquisition of the collection by the University. The laboratory work was supported by NSF DEB EF0531670 to Feldmann and Schweitzer.

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