Miers. Crustacea in Euplectella & Meyerina

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On Species of Crustacea living within the Venus's Flower-basket (*Euplectella*) and in *Meyerina claviformis*.

By EDWARD J. MIERS, F.L.S., F.Z.S., Assistant in the Zoological Department, British Museum.

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(Plate XXIV.)

WITH the late Dr. Bowerbank's collection of Sponges recently purchased by the Trustees of the British Museum, a bottle was received containing Crustacea preserved in spirit and labelled as follows:—"Crustacea from within *Alcyoncellum speciosum*, off Zebu, Philippine Islands, 95 fathoms, from 'Challenger.'" These specimens were in excellent condition, and, upon examination, proved to belong to two species, one belonging to the *Peneidæ*, the other being an Isopod of the genus *Æga*.

The existence of Crustacea within the cavities of the beautiful and well-known Vitreous Sponges, which have been variously described under the generic names of *Alcyoncellum* and *Euplectella*, has long been known to naturalists. De Haan, in his account of the Crustacea in the 'Fauna Japonica' of v. Siebold (p. 194, pl. xlvi. fig. 9), describes and figures a new genus and species of the family *Peneidæ*, to which he assigns the name *Spongicola venusta*, and habitat "in *Alcyoncellis*," without definite locality, and which is characterized by the non-palpigerous outer maxillipeds, and the very great development of the third pair of legs, which is analogous to the enlargement of the second pair in many genera of *Palæmonidæ*. Dr. J. E. Gray (Ann. & Mag. Nat. Hist. xviii. p. 489, 1866) briefly notices the occurrence of "a crab" in the *Euplectella speciosa*, which is regarded by the Spaniards in Manilla as formed by the animal for its protection, observing that the animal must take its place in the tube before the network at the upper end is formed, as when that part is added it becomes imprisoned. In a further notice of the same species of sponge in the following year (Ann. & Mag. Nat. Hist. xix. p. 44, 1867), he quotes the opinion of the fishermen of Zebu, and of M. Trimoulet, fils, of Bordeaux, that the sponge is the nest of the crustacean that inhabits it, which, in the case of the specimens examined by M. Trimoulet, belonged to the "section des *Isopodes nageurs*."

Dr. Semper, 'Archiv f. Naturgeschichte,' 1867, p. 84, in an interesting memoir "On *Euplectella aspergillum*, Owen, and its Inhabitants" (translated in Ann. & Mag. Nat. Hist. ii. p. 26, 1868),

after justly repudiating the theories of the Spanish fishermen and French naturalist regarding the origin of the sponge, describes the Isopod from specimens in his collection under the name of *Æga spongiophila*, stating that it is always associated with a pretty species of *Palæmonidæ*, which, on account of the damaged condition of the specimens, he was unable to determine generically, but which I have little doubt is the *Spongicola venusta* of De Haan. This *Æga spongiophila*, although the description leaves some important particulars unnoticed, agrees, as far as it goes, with the specimens from Zebu recently acquired by the Trustees. Mr. T. J. Moore (Ann. & Mag. Nat. Hist. iii. p. 196, 1869) gives, upon the authority of Captain Robert Morgan, Zebu as the true habitat of *Euplectella aspergillum*, and appends a rough sketch by Capt. Morgan of the sponge *in situ* and its inhabitant (by which latter is presumably intended the *Spongicola venusta*); but the figure is evidently a mere sketch from memory. Finally, the late Dr. R. v. Willemöes Suhm, in his fifth letter to Prof. C. v. Siebold on the results of the 'Challenger' Expedition (Zeitsch. f. wiss. Zool. xxvi. Append. p. lxxiv, 1876), mentions that, of the parasites of the *Euplectella*, the *Æga spongiophila* occurs most commonly, next to it the *Palæmon* (probably the *Spongicola venusta*), whose zoëa he was able to hatch, also a white *Aphrodita*, and, lastly, in less abundance, a small *Pecten*.

Dr. Semper, in the paper above referred to, announced his intention of shortly publishing more accurate descriptions of the Crustacea observed by him, accompanied by figures, but does not appear ever to have carried his purpose into effect. I have therefore thought it desirable to append to this notice full descriptions and accurate illustrations of the specimens I have before me, by which the question of their identity with the *Spongicola venusta* and *Æga spongiophila* may be determined with certainty.

Spongicola venusta, *De Haan, Crust. in Fauna Japonica*, p. 194, pl. xlvi. fig. 9 (1850), ♂. Pl. XXIV. figs. 1 & 2.

Body nearly smooth. Rostrum trigonous, about reaching to the apex of the peduncle of the antennules, with eight to ten small teeth on its upper margin, and one on the lower margin near the apex. One or two of the teeth of the upper margin are posterior to the anterior margin of the cephalothorax. On the dorsal surface of the cephalothorax, a short distance behind the origin of the rostrum, are two small spines.

On the anterior margin of the carapace, between the points of insertion of the eye-peduncles and antennæ, is a small spine, posterior to this upon the hepatic region a second spine, and beneath the hepatic spine, upon the antennal region, a series of 2–4 spines in an oblique series. The posterior margin of the cephalothorax is deeply sinuated above; the terminal half of the postabdomen is inflexed and usually more or less adpressed to the ventral surface of the body. The first segment of the postabdomen is the shortest; the lateral lobes of the second to sixth segments are triangular and acute in the male, broader and more rounded in the female; the terminal segment is elongate-oval, ciliated on the posterior margin, with two longitudinal keels, each of which is trispinose, on the upper surface, and with three spines on the lateral margins. The eyes are short and subcylindrical. The antennules are about as long as the cephalothorax, the two flagella of equal length. The peduncles of the antennæ are short, not half as long as the outer scale; the flagella broken, but evidently much longer than those of the antennules, and thickly clothed with long hairs; the outer lamina with the outer margin straight, denticulated in its distal half, the inner margin strongly arcuate and ciliated. The outer maxillipeds are slender, with long hairs on their inner margins, the joints diminishing successively in length. The first and second pairs of legs are very slender; the chelæ shorter and no thicker than the wrists, those of the second pair longer than the first; third pair very much enlarged, the arm thickening to the distal extremity, near which is a small spine on the superior and exterior margins; the wrist very small, with a blunt subapical lobe on its upper and lower surface: the hand ovate, slightly granulated and hairy on its outer and inner surface, much larger at base than the wrist; the superior and inferior margins thin, but scarcely carinated, and ciliated, the superior margin armed with serrated teeth; the fingers compressed, serrated on their outer margins, meeting along their inner edges when closed, acute at the apices, a blunt tooth on their inner margins. Fourth and fifth pairs of legs slender and slightly hairy; claws bispinose. Rami of the appendages of the postabdominal segments ovate and ciliated; those of the penultimate segment serrated on their outer margins and with long hairs on the posterior margins; the inner ramus longitudinally unicostate, the outer subtruncate at the extremity and longitudinally bicostate. Length to end of rostrum about 1 inch 2 lines.

Two specimens are in the Collection—one is a female with ova, the other I believe to be a male.

In De Haan's description of *Spongicola venusta* no mention is made of the two spines on the dorsal surface of the cephalothorax, behind the rostrum (which in his specimens is 9-toothed), nor of the serrate teeth on the upper margin of the hand and on the appendages of the sixth postabdominal segment, although there are indications of these in his figure of the species in the case of the last-mentioned organs. The hand in the figure is represented as longer in proportion to its depth. The description, however, coincides in all essential particulars with the specimens from Zebu; and the habitat "in *Alcyoncellis*" being the same, I have little doubt that the species are identical.

ÆGA SPONGIOPHILA, *Semper, Archiv f. Naturg.* xxxi. p. 84 (1867); *Ann. & Mag. Nat. Hist.* (ser. 4) vol. ii. p. 26 (1868). Pl. XXIV. figs. 3–5.

The body is elongate-oval, moderately convex and punctulated; the punctures nowhere very crowded, but most numerous upon the head and first segment of the body. The head is transverse, about twice as broad at base as it is long, with a small median triangular frontal lobe, that is produced between the basal joints of the upper antennæ. The first segment of the body is rather the longest; the lateral margins of all the segments form nearly a right angle with the posterior margins, the postero-lateral angles of the segments being themselves somewhat rounded. Six segments of the postabdomen are exposed; the first five are very short, acute, and slightly produced backward at the lateral angles; the terminal segment is longer than the five preceding taken together, but not quite as long as broad at the base, flat above, with a shallow indentation parallel to its basal margin, semioval, with ciliated margins. The eyes are black, broad at base, where they cover a part of the inflexed lateral margins of the head; seen from above, they are pyriform in shape, narrowing to the distal extremity, which recedes slightly from the anterior margin of the head. The upper antennæ are short, when retracted not reaching to the posterior margin of the first segment of the body: three joints of the peduncle are visible; the first much enlarged, with a shallow indentation on its upper surface, perhaps indicating the coalescence of two joints; the third joint is about twice as long as and narrower than the second. The inferior antennæ are very long, when retracted reaching beyond the posterior margin of the sixth segment of the

body; their bases are concealed by a narrow process of the epistoma: five joints of the peduncle are visible; of these, the first and second are very short, the third rather longer, the fourth as long as the three preceding, the fifth as long as the fourth. The first three pairs of legs are short and prehensile; the coxæ of the second and third pairs oblong, rounded at their postero-lateral angles, and marked with two oblique impressed lines; the femora not dilated; the succeeding joints short, naked; the dactyli strong, arcuate, and acute. The fourth to seventh pairs of legs are slender and gressorial; the coxæ are acute at the postero-lateral angles, those of the fifth to seventh pair greatly produced backward; the femora are slender, elongate, not dilated, but slightly keeled on their posterior margins; the succeeding joints slender, with a few stiff hairs at their distal extremities and along their anterior margins. The foliated appendages of the first five postabdominal segments are not ciliated on the margins; the rami of the appendages of the sixth segment are broad and semitransparent, truncated at the distal extremities, obscurely serrated and ciliated on the posterior and exterior margins, and do not quite reach to the end of the terminal segment; the inner triangular; the outer irregularly quadrilateral, with the inner margin straight and parallel to the distal half of the outer margin. Colour yellowish white, with minute brownish-pink spots, which are visible only upon the head and first two segments of the body. Length 1 inch $7\frac{1}{2}$ lines.

Of this species an adult female, from which the above description is taken, a smaller individual (length 1 inch 2 lines), and four young, the smallest scarcely exceeding 7 lines, are in the collection. The length of the antennæ and form of the terminal segment and of the serrated uropoda suffice to distinguish this species from its congeners.

Nearly all the specimens of *Euplectella* in the Collection of the British Museum contain Crustacea which appear to belong to one or other of the species above described, but cannot be determined with certainty without extraction from the sponges—an operation which could not be effected without injury to the specimens.

In another fine species of Sponge from Zebu (the *Meyerina claviformis*, described by the late Dr. J. E. Gray from specimens brought home by Dr. A. B. Meyer) are several specimens of an Isopod Crustacean quite distinct from the foregoing species. An example of this Sponge having been divided longitudinally for the purpose of showing its interior structure, I have been enabled to examine and identify these Isopoda with a species

noticed but not described by A. White, in the 'List of Crustacea in the British Museum,' p. 107, 1847, under the name of *Ægа hirta*, and subsequently described as *Æ. multidigita* by Dana, in his account of the Crustacea collected in the U.S. Exploring Expedition under Commodore Wilkes.

CIROLANA MULTIDIGITATA.—Ægа hirta, *White, List Crust. Brit. Mus.* p. 107 (1847), sine descr.—Æ. multidigita, *Dana, U.S. Expl. Exp.* xiii., *Crust.* i. p. 768, pl. li. fig. 3 (1853). Pl. XXIV. figs. 6–11.

Body oblong-elliptical, moderately convex; all the segments hispid, with short hairs, which are longest on the posterior margins of the segments, and denser on the postabdominal segments. The head is transverse, with a small, acute, median frontal lobe. The first segment of the body is rather the longest, and its anterior margin is closely applied to the base of the head; the postero-lateral margins of all the segments are broadly rounded. Five segments of the postabdomen are exposed; the first four are very short; the lateral angles of the second segment are acute, of the third obtuse and round; the terminal segment is triangular, usually about as long as broad (but in the specimen bearing White's MS. name rather broader than long), subacute at the apical extremity. The eyes, viewed from above, are suboblong, and extend along half the lateral margins of the head. The upper antennæ are short, reaching little beyond the posterior margin of the head; peduncle two-jointed, the basal joint but little enlarged, the second joint scarcely thicker than the flagellum. Lower antennæ more than half as long as the body, and separated at base by a very narrow process of the epistome; peduncle five-jointed, the first three joints very short, the fourth and fifth long, slender, and subequal; flagellum naked. The coxæ of all the legs are obliquely carinated; those of the first to third pairs rounded at the postero-lateral angles; of the fourth to seventh pairs with the postero-lateral angles acute, and of the sixth and seventh pairs greatly produced backward; the basal joints of all the legs are but slightly dilated, those of the last four pairs slightly keeled on their posterior margins; the third to sixth joints of all the legs armed with short spines on their under surface; the dactyli of all the legs are short, arcuate, and acute. The rami of the appendages of the penultimate postabdominal segment are very unequal; the outer very narrow and shorter than the inner, which is triangular, broadest and truncate at its distal extremity; the margins are not serrated; they do not reach to the apex of the terminal segment. Length nearly 1 inch.

Hab. Philippine Islands. (Several specimens, adult and young, within *Meyerina claviformis*, Gray, from Zebu.)

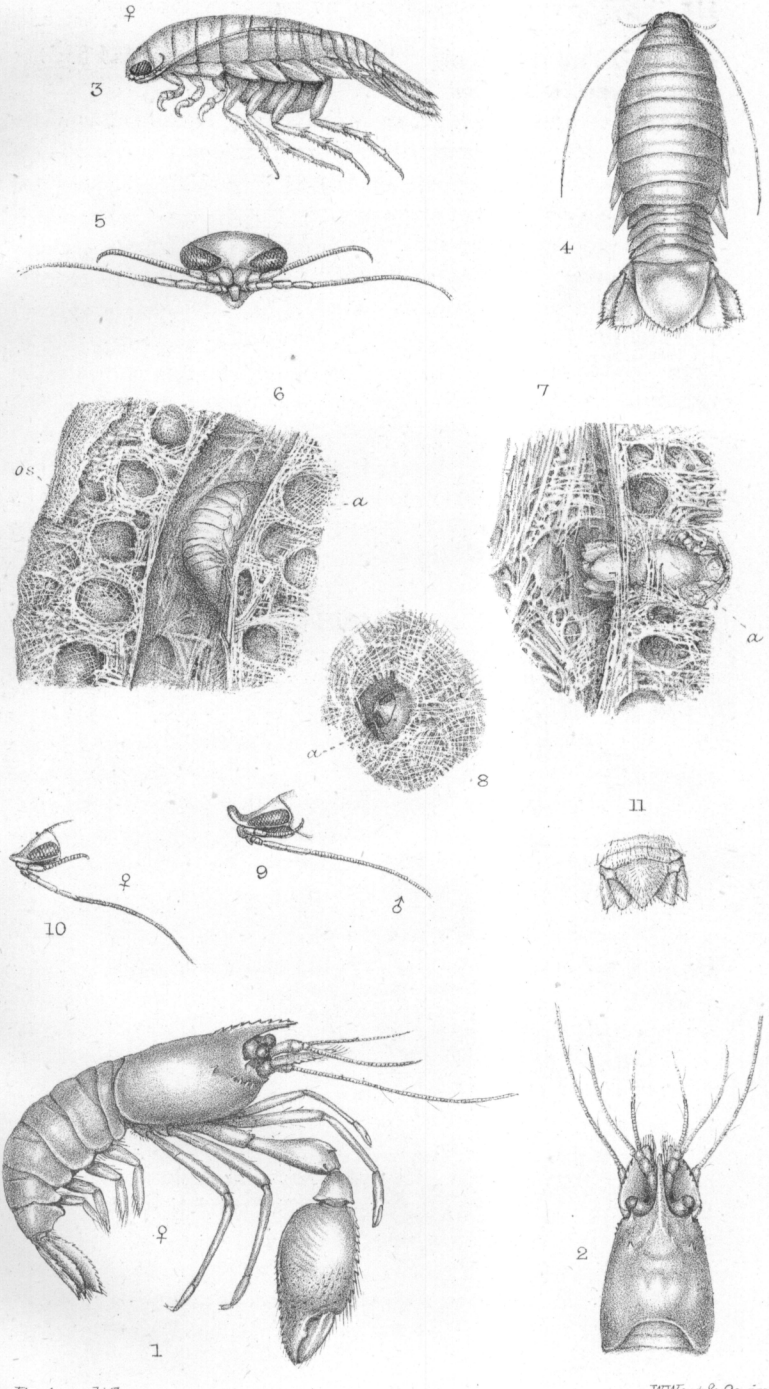
If the position of the animals in the Sponge be natural and undisturbed, they would seem to have made their way to the hollow interior by breaking through the tissues. Several specimens are actually embedded in the substance of the Sponge. One which I extracted is an adult female with ova; another is quite young.

On account of the non-dilatation of the basal joints of the antennules, and the long inferior antennæ, &c., this species appears to be better placed in the genus *Cirolana* than in *Æga*. It is at once distinguishable by the triangular terminal segment, the spines on the under surface of the legs, and the form of the rami of the sixth pair of postabdominal appendages. The specimen bearing White's MS. name is from Swan River. Dana's specimens are from Borneo; and his figure agrees in every respect with the specimens from the Philippines, except that the inner ramus of the uropoda is represented as less distinctly triangular and truncated at the extremity. The *Æga macronema* of Bleeker (Acta Soc. Sci. Indo-Neerl. ii. p. 23, pl. i. fig. 1, 1857), taken from various species of fish inhabiting the seas of Batavia, has, like this species, a triangular terminal segment, but differs in the form of the uropoda, &c.

In the British Museum are several specimens from the Philippines, presented by S. T. Martin, Esq., "from the interior of *Meyerina*," and others "from Sponges collected by Dr. Meyer." In what appear to be the males, the median frontal lobe is greatly produced, reflexed, and blunt at the extremity. In some specimens the body is nearly or quite destitute of hair.

DESCRIPTION OF PLATE XXIV.

Fig. 1. *Spongicola venusta*, De Haan. Lateral view of ♀, × twice nat. size.
2. —— ——. Dorsal view of its cephalothorax.
3. *Æga spongiophila*, Semper. Lateral view of ♀, nat. size.
4. —— ——. Dorsal aspect of ♀, nat. size.
5. —— ——. Front foreshortened view of head, antennules, and antennæ, × twice nat. size.
6, 7, 8. *Cirolana multidigitata*, Dana, shown in three different positions within the sponge-tissue of *Meyerina claviformis*, Gray; drawn from mounted specimen in British Museum. Fig. 6 is a sketch of a median longitudinal section of the sponge, displaying (*a*) the animal in the central excretory canal: *os*, oscular area; others close by are partially covered by the spicular veil. In fig. 7 an animal (*a*) fills an oscular space; and in fig. 9 an exterior view of same is shown, a dermal lace-work of spicules surrounding. All nat size.
9. Head of male *C. multidigitata*, × twice nat. size.
10. Ditto of female *C. multidigitata*, × twice nat. size.
11. Upper view of terminal segment and uropoda of same species, nat. size.



Berjeau lith. W. West & Co. imp.

CRUSTACEANS IN SPONGES.