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XXXVII.—*On the Genus Notopterophorus of Costa.*

By RUDOLPH LEUCKART*.

[With a Plate.]

DURING my residence in Nice in 1853, I several times found amongst other parasites†, in the cloacal space and respiratory cavity of *Phallusia mamillaris*, a parasitic Crustacean of very peculiar appearance, such as I had never previously met with. I regarded it as new, and gave it the name of *Calathopterus*, on account of the basket-like structure of the wing-like processes attached to the back of the thoracic segments; and, in compliment to my honoured friend Verany, who took the greatest interest in this Crustacean, I called it *C. Veranyi*.

On my return journey, I was enabled, at Turin, by the kindness of Professor de' Filippi, to inspect Costa's 'Fauna del Regno di Napoli,' a work very little known in Germany; and here, after the first few leaves, I met with plate 2 of the Entomostraca, containing a figure of my parasite, or of a very similar form. The text and explanation of the plates were wanting, at least for the plate in question; I therefore remained in a state of uncertainty as to the name of my animal.

This uncertainty has only been partially removed since. I succeeded, however, in discovering a second copy of Costa's work in the library of Senator von Heyden of Frankfort; but in this also the text and explanation of the plates were wanting.

* Translated from Wiegmann's Archiv, 1859, p. 241, by W. S. Dallas, F.L.S.

† Especially *Amphipoda* and *Nemertina*. Once, also, a small Cecropiform parasite ($\frac{3}{4}$ line in length), with long tufts of bristles between the legs, was met with. The margins of the thoracic segments were elongated, especially that of the last segment, which formed a regular roof destined for the reception of the cylindrical abdomen and the two rose-coloured egg-sacs.

The catalogue belonging to it, however, indicated that the following species were described under the order *Pæcilopodi*:—*Edwardsia fulgens*, Costa (*Sapphirina*, Auct.); *Cecrops Latreillei*; *Gunenotophorus globularis*, n.; *Notopterophorus elongatus*, n.; and *N. elatus*, n. Our animal consequently belonged to one of the two last-named genera; and, indeed, judging from the etymology (although the derivation of *Gunenotophorus** is quite unintelligible to me), to *Notopterophorus*. As, however, Costa describes two species of this genus, it remains doubtful which name belongs to the figure referred to. Plate 2 contains, besides the animal in question (fig. 4), two other allied Crustaceans (figs. 1 & 2), possibly, however, only different states of the same species, which, instead of the wing-like processes on the back of the thorax, possess a hump-like inflation, apparently filled with young. The name *Notopterophorus* would hardly apply to these, so that the two figures are perhaps to be referred to the problematical *Gunenotophorus*. (I did not see the third plate, which might possibly give us some information on this point; at least, I have no recollection of it.)

As, however, I have already remarked that Costa's figure differs in many respects, especially as regards the dorsal wings, from my parasite, I may justly describe it here as *Notopterophorus Veranyi*.

I am not, however, the only person who has observed this Crustacean. On mentioning my parasite to Dr. Krohn, at the time of the meeting of naturalists at Bonn, I learnt that this distinguished student of the fauna of our coasts had likewise met with it, and indeed not unfrequently, in various species of *Phallusia* (at Naples). Dr. Krohn was so kind as to place at my disposal the drawing which he had made, together with the notes connected with it. This drawing is reproduced in Plate XVI. B. fig. 2, and the notes, wherever they differ from, or serve to complete my own, are incorporated in my description, with the name of the observer.

Our Crustacean (fig. 1) is two lines in length, and, if we do not take into consideration the wing-like processes of the thorax, has a cylindrical body gradually decreasing posteriorly, with a head, thorax, and abdomen. The thorax exhibits four, and the abdomen five segments, which are all distinctly separated from each other; so that our animal has a certain resemblance to a Woodlouse, especially as the limits of the head towards the first

* Professor Leuckart seems here to be misled by the beautiful simplicity of the etymology, which, however, is, unfortunately, by no means without parallel. *Gunenotophorus* is evidently compounded, in the simplest fashion, of the Greek words *γυνή* and *νοτοφόρος*, and is doubtless intended to indicate that the female carries something on her back.—W. S. D.

thoracic ring are marked with equal distinctness. The appendages are confined to the head and thorax, as usual in the *Parasita*. On the former we find two pairs of antennæ, and a series of oral organs which, in consequence of the nearly globular form of the head, follow each other at very short distances, and on each segment of the thorax a pair of rather short, cleft, ventral feet. (Krohn thinks he could count five pairs of feet, but he has probably taken the organs of the mouth, which are otherwise overlooked by him, as an anterior pair of feet. The figure, in fact, only shows four feet.) A remarkable character is furnished by the wing-like foliaceous processes of the dorsal segments, which are distinguished from the analogous structures occurring elsewhere in certain parasitic Crustacea by their standing nearly perpendicular, and, by the overlapping of their lateral margins, enclosing an elongated space, closed like a basket.

In the median line of the head, at a little distance in front of the antennæ, is seen a single red eye, "composed, as in *Cyclops*, of two ocelli fused together" (Krohn).

The two antennæ (figs. 3 & 4) are short and composed of only a few joints; the posterior (fig. 4) are hooked and furnished with a claw-like acute terminal joint. The animal is not unfrequently seen adhering to the walls of the respiratory cavity [of the *Phallusia*] by means of this apparatus. Moreover, it appears as if the first antennæ also occasionally perform the office of a clinging apparatus, although the want of a terminal claw and the presence of short tactile setæ certainly indicate a different destination. In the anterior antennæ I count seven joints, in the posterior only four, which in both cases gradually diminish both in length and thickness towards the apex.

The parts of the mouth are organized for biting, and not for piercing; they consist, in the first place (fig. 5), of a strong toothed mandible, immediately behind which, and in close contact with it, there is a stout three-jointed appendage, which must be regarded either as a palpus or as a second jaw,—the latter view appearing to me to be most natural, from the architectonic conditions of the *Parasita*. The terminal joint of this appendage bears a row of four long and strongly curved spines. The third, or second, and last pair of jaws is represented by a curved conical process (fig. 6), formed of thin, gradually diminishing joints, and bearing on its concave surface, which is turned towards the orifice of the mouth, a longitudinal series of stiff bristles or spines. The spines of the last two joints are considerably larger, but at the same time less numerous, than those of the preceding basal joint.

The legs of our Crustacean are essentially of the same structure on all the four thoracic segments. They consist (fig. 7) of

a basal joint, upon which two branches of several joints, but otherwise differently developed and destined for different purposes, are inserted. One of these branches, which is turned inwards, appears to be a swimming-foot. It consists of only two flattened joints, of which the apical one is somewhat the larger, and is furnished on its sharp margin with a number of long bristles. The other, longer, branch is formed of four cylindrical joints, which gradually diminish in size towards the extremity. Instead of the long swimming bristles, there are, on this, shorter and stiffer spines, especially on the terminal joint, where these at the same time attain their greatest development. These structures are evidently better adapted for pushing; they may do good service in creeping.

As regards the wing-like processes of the thoracic segments, these (figs. 1 & 2) appear to be folds, and not separate, independent appendages. They are therefore to be compared less with the wings of insects than with the laminar processes so often occurring in the Parasitic Crustacea; although, as already remarked, they differ from these in their position. The two middle segments of the thorax each bear two such laminæ, to the right and left, whilst the anterior and posterior segments are furnished with only a single leaf, which is curved to form a furrow, as if here the two lateral leaves, touching each other at an angle, had become fused together at their inner margins. The concavity of the anterior leaf is turned backwards; that of the posterior one, on the contrary, is directed forwards. At the same time the laminæ gradually become broader as they depart from the base, so that the margins overlap, and the space enclosed by them becomes limited on all sides. The anterior leaf stands most perpendicularly; whilst the posterior one is most inclined, but at the same time is the longest. The free margins of the leaves are usually (the posterior angle of the third leaf most constantly) furnished with one or more small points, but never with such long and beak-like teeth as are represented in Costa's figure.

Of the five segments of the abdomen, the first three gradually increase in length, whilst the last two again become shorter. The total length of the abdomen is nearly the same as that of the thorax, but its thickness is less than that of the thorax even at the first segment (which, however, is not counted as a segment by Krohn), and from this gradually becomes less to the apex. There are no appendages upon the two styles representing the *furca*, which include the anus between them, and are furnished at the extremity with three minute tubercles.

In the specimen figured by Krohn (fig. 2), we observe in the last segment of the thorax, immediately below the leaf attached

at this point, a great mass of eggs, which are characterized by a grass-green colour (brownish, according to Costa), and shine through the outer coverings. According to Krohn, these eggs are contained in the oviducts, which open here (above the abdomen). The ovaria, with their very numerous small ova, lie, in the form of one or two pair of sacs, in the lateral parts of the body, where they may be traced, partly beside and partly above the intestine, nearly to the head.

The nutritive canal is a brown tube, somewhat broader in the thorax than in the abdomen, and without appendages. The central nervous system consists, as stated by Krohn, of an elongated ganglionic mass, situated in the anterior part of the thorax, from which a number of nerves proceed, of which two stems, distinguished by their length and thickness, may be traced into the abdomen.

According to Costa's figure, the embryos have the ordinary *Monoculus*-form; they were not observed by me. On the other hand, along with the full-grown animals, I twice met with a wingless individual of about one-half their size. Whether this represents the male form, or merely an earlier stage of development, I must leave undecided.

As regards the affinities of our Crustacean, there can be no doubt that it evidently belongs to the group of the Parasitic Crustacea. Still I scarcely think that it can be arranged in any of the families already established in this group. The only form which comes near our animal is Allman's *Notodelphys*, described by him as a Lophyropod. (Annals and Mag. Nat. Hist. 1848, xx. p. 1.) But, according to Peters's Report, which is the only record now before me, *Notodelphys** is distinguished (without taking into consideration the statements regarding the structure of the mouth) especially by the absence of the dorsal leaves. The thorax also appears to be differently constructed, and perhaps disturbed in its normal development by the enormous size of the brood-sac, in the same way as in the species represented by Costa in plate 7. figs. 1 & 2 (which may be identical with *Notodelphys*?).

EXPLANATION OF PLATE XVI. B.

- Fig. 1. *Notopterophorus Veranyi*.
- Fig. 2. The same (from Krohn's drawing).
- Fig. 3. Anterior antennæ.
- Fig. 4. Posterior antennæ.
- Fig. 5. Mandible with attached palpus(?).
- Fig. 6. Last jaw.
- Fig. 7. Leg.

* The generic name *Notodelphys* has since been used a second time for the American Pouched Frog discovered by Weinland and Lichtenstein (*N. Lichtensteinii*).



Leuckart, Rudolf. 1860. "XXXVII.—On the genus Notopterophorus of Costa." *The Annals and magazine of natural history; zoology, botany, and geology* 5, 353–357.

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