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ON A BLIND PRAWN FROM THE SEA OF GALILEE
(*TYPHLOCARIS GALILEA*, g. et sp. n.).

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L O N D O N :

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V. *On a Blind Prawn from the Sea of Galilee* (*Typhlocaris galilea*, g. et sp. n.).
By W. T. CALMAN, D.Sc., F.L.S. (Communicated by permission of the Trustees of
the British Museum.)

(Plate 19.)

Read 1st April, 1909.

THE British Museum has recently received from Mr. R. Grossmann, of Tiberias, two specimens of a blind Crustacean, which differs in some remarkable characters from any species at present known. The specimens, I understand, were not actually taken in the Sea of Galilee itself, but from a small pond near the town of Tiberias communicating with the lake and fed by a mineral spring. From the fact that the animal is without any organs of sight (so far as can be ascertained by external examination), it seems most probable that it is a species of subterranean habitat, brought to the surface by the waters of the spring. It is much less probable that the specimens entered the pond from the lake, although this is no doubt the origin of some small fish, taken along with the prawns, which have been identified by my colleague Mr. C. Tate Regan as *Discognathus lamta*, a common Syrian species.

Among the numerous species of subterranean Crustacea which have been described, only a small number belong to Decapoda. The following list includes all the truly subterranean species of which I can find record:—

ASTACIDÆ.	PALÆMONIDÆ.
<i>Cambarus pellucidus</i> (Tellkamp) *.	<i>Palæmonetes antrorum</i> , Benedict §.
„ <i>hamulatus</i> , Cope & Packard *.	„ <i>eigenmanni</i> , Hay .
„ <i>setosus</i> , Faxon †.	ATYIDÆ.
„ <i>acherontis</i> , Lönnberg ‡.	<i>Troglocaris schmidtii</i> , Dormitzer ¶.
	<i>Palæmonias gauteri</i> , Hay **.

From this list have been omitted species like those of *Euryrhyndus* and some of the species of *Cambarus*, which, while known or suspected to have a subterranean habitat, have well-developed eyes, and may therefore be assumed sometimes to frequent the surface-waters.

* See Faxon, "Revision of the Astacidæ," Mem. Mus. Comp. Zool. Harvard, x. (4) pp. 40 & 81 (1885).

† Faxon, in Garman, Bull. Mus. Comp. Zool. Harvard, xvii. (6) p. 237 (1889).

‡ Lönnberg, Bih. Svenska Vet.-Akad. Handl. xx. Afd. 4, no. 1, p. 6 (1894).

§ Benedict, Proc. U.S. Nat. Mus. xviii. p. 615 (1896).

|| Hay, Proc. U.S. Nat. Mus. xxvi. p. 431 (1903).

¶ Dormitzer, Lotos, iii. p. 85 (1853).

** Hay, Proc. U.S. Nat. Mus. xxv. p. 226 (1902).

The blind marine cavernicolous species *Munidopsis polymorpha*, which I have discussed elsewhere *, belongs to a somewhat different category as regards habitat.

According to Barrois †, the only Decapod Crustacea recorded from the Sea of Galilee are the Crab *Telphusa fluviatilis* (or more correctly, according to Miss Rathbun, *Potamon potamios*) and the Atyid *Hemicaridina* (= *Atyaephyra*) *desmarestii*.

Family PALÆMONIDÆ.

TYPHLOCARIS, gen. nov.

Rostrum very short, flattened, without teeth. Carapace without antennal, hepatic, or other spines, but with a longitudinal suture-line on each side. Outer flagellum of antennule with a minute vestige of an inner branch. Mandible without a palp. Maxilla with the distal endite undivided. Third maxilliped slender. Second peræopods much larger than the first.

Type species, *T. galilea*, sp. n.

The affinities and systematic place of the genus are discussed below.

TYPHLOCARIS GALILEA, sp. n. (Plate 19, figs. 1-13.)

Description of Male.—The carapace is smooth, its surface beset with very minute, widely-scattered setæ. In front it is produced in a minute triangular rostrum, flattened and without any median keel, not extending beyond half the length of the ocular peduncles. The orbital notch is defined below by a very slight convexity, but there are no antennal, hepatic, or other teeth on the antero-lateral margin, and the antero-lateral corner is broadly rounded. On each side the carapace is traversed by a longitudinal suture-line or fine groove which runs, nearly straight, from a point opposite the base of the antenna to the posterior margin. This suture has very nearly the position of the *linea thalassinica* of certain Thalassinidea and of a similar line found in certain Penæidæ (*Parapenæus*, *Parapenæopsis*), but I cannot find mention of any comparable structure in the Caridea. Towards its lower edge the carapace becomes membranous.

The abdomen has little of the "humped" form supposed to be characteristic of the Caridea (*Eukyphotes* of Boas), but this feature is ill-defined in many other Caridea. The pleural plates of the second somite are comparatively little expanded. The abdomen is about the same width throughout its length, the sixth somite being broad and depressed, hardly longer than the preceding somite, and much broader than long. The telson (fig. 3) is longer by one-half than the sixth somite, and has a broadly triangular or rounded tip, extending well beyond a pair of stout subapical spines and fringed with spinules and setæ; there are two pairs of spinules on the upper surface.

The ocular peduncles (fig. 4) have the form of flattened scales, lying horizontally and nearly touching each other in the middle line. On the upper surface of each are a

* Ann. Mag. Nat. Hist. (7) xiv. p. 213 (1904).

† Th. Barrois, "Liste des Décapodes fluviatiles recueillis en Syrie," Rev. Biol. Nord France, v. pp. 125-134 (1893); also "Contribution à l'étude de quelques lacs de Syrie: IV. Lac de Tibériade," *op. cit.* vi. pp. 250-293 (1894).

few setæ. I could detect no trace of pigment or of ocular structure. The antennules (fig. 2) have the stylocerite of the first segment blunt, closely applied to the side of the segment, and not reaching its distal end. There are two long flagella (incomplete in both specimens), the outer of which bears, at about the 52nd articulation in one specimen and at the 25th in the other, a small biarticulate appendage (fig. 5); in other words, the bifurcation of the outer flagellum is reduced to a minimum. I have been unable to detect a statocyst in the basal segment of the antennule, but I am not confident that it is absent.

The antenna (fig. 2) has a flagellum longer than the body. The scale is about two-thirds as broad as long, with the spine on the outer edge a little beyond the middle of its length.

The mandibles (fig. 6) have well developed incisor and molar processes but no palp. The maxillulæ resemble those of *Palæmon*. The maxillæ (fig. 7) have a very unusual form; the proximal endite is obsolete (as in *Palæmon* and many other Caridea) and the distal endite is undivided, perhaps owing to the suppression of its proximal lobe.

The first maxilliped (fig. 8) has the lobe of the exopodite very large and pointed. The second maxilliped (fig. 9) has a large epipodite, but the podobranchia appears to be represented only by a small fleshy lobe on the anterior surface of the epipodite.

The third maxillipeds (fig. 10) are stout, and extend forwards well beyond the scales of the antennæ. The terminal segment is considerably longer than the penultimate. The epipodite is represented by a small fleshy lobe which bears a group of yellow spines, each very stout in the proximal half and tapering to a very slender tip. The first legs are slender and, when extended forwards, the distal end of the merus reaches to the tip of the antennal scale. The carpus is about equal to the merus and longer by one-half than the chela. The fingers are nearly twice as long as the palm.

The second legs (fig. 11) are large and subequal, and the merus extends beyond the antennal scale. The carpus is about two-thirds as long as the merus. The palm is inflated and slightly compressed laterally. In two of the chelæ examined the palm is about two-thirds as long as the fingers; the third, which may be abnormal, has the immovable finger much shorter than the dactylus, which is about equal to the palm. The fingers have a thin smooth cutting-edge, which forms a low tooth near the base of each, and internally to this edge they have a series of widely-spaced teeth. The whole limb is clothed with long and soft hairs.

The walking-legs are moderately stout. The dactyli are not toothed on the lower (concave) edge, but have some stout spines on the upper surface. The pleopods (fig. 12) have broad protopodites, on the posterior face of each of which, near the outer edge, is a patch of stout yellow spines with filiform tips. Some of these spines (fig. 13) are irregularly thickened or distorted. In the first pair of pleopods the endopodite is about half as long as the exopodite, and has near its distal end on the inner side a clavate process bearing a group of coupling-hooks. In the second pair the *appendix masculina* is shorter than the *appendix interna*.

The uropods have both rami very broad and pointed, instead of rounded, distally. The exopodite extends beyond the telson for half its length. The tooth on the outer margin is about the middle of its length, and an oblique ridge runs inwards from it. The

endopodite possesses a suture-line running inwards from the outer margin in a corresponding position, which looks as though it might be produced by the pressure of the endopodite against the ridge of the exopodite. It is very rare for the endopod of the uropods to show any trace of division into two segments by a suture-line, and I do not know of any other case among the Caridea.

The branchial apparatus comprises five pleurobranchiæ on the somites of the peræopods, an arthrobranchia on the third maxilliped, mastigobranchiæ (epipodites) on the first and second maxillipeds and possibly also on the third (if this be the value of the spinose lobe described above), and a vestigial podobranch, represented by the simple lobe on the epipodite of the second maxilliped. The branchial formula of *Palæmon* differs from this by the presence of a pleurobranchia above the third maxilliped and a distinct podobranchia on the second.

The colour in life is stated to be white.

Measurements in millimetres:—

	♂.	♂.
Total length	51	42·5
Length of carapace and rostrum	20	17·5
Inner flagellum of antennule (incomplete)	28	—
Second leg	—	48·5
" " merus	—	11·0
" " carpus	—	7·5
" " palm	—	10·0
" " fingers	—	13·0

The characters of this species, as described above, show that it must be referred to the family Palæmonidæ as defined by Borradaile*, but its exact position within the family is not so easy to define. Borradaile includes as a subfamily of the Palæmonidæ, the *Pontoniinæ* (formerly ranked as a distinct family), which are distinguished from most of the *Palæmoninæ* by having, among other characters, the rostrum often small and not serrated, the bifurcation of the outer antennular flagellum reduced to a minimum, and the mandible without a palp. In these points the present species agrees, but I do not think that it can be regarded on that account as having any special affinities with the exclusively marine *Pontoniinæ*. As a matter of fact, the *Palæmoninæ* already include one genus, *Euryrhynchus*, Miers†, which agrees with that here described in the three points of palpless mandibles, reduced and non-serrated rostrum, and freshwater (possibly also subterranean) habitat. From *Euryrhynchus* and all the other *Palæmoninæ*, however, *Typhlocaris* differs not only in the suppression of all spines or teeth on the antero-lateral margin of the carapace, but in other characters so important as to suggest that it may be necessary to establish at least a new subfamily for its reception. Chief among these characters are the presence of a pair of suture-lines on the carapace and the undivided distal endite of the maxilla. I am not aware that these characters are paralleled in any of the Caridea, and if, as seems possible, the suture of the carapace be homologous with

* Ann. Mag. Nat. Hist. (7) xix. p. 472 (1907).

† See Calman, Ann. Mag. Nat. Hist. (7) xix. p. 295 (1907).

that of some Penæidæ and with the *linea thalassinica*, it may indicate that *Typhlocaris* has been derived from some very ancient and primitive Caridean type. The resemblance to the Thalassinidea in this character adds another to the indications already existing (phyllobranchiæ, appendix interna, larval development) that that group has some affinity with the Caridea.

As indicated above, the only blind subterranean Palaemonidæ known are two species referred to *Palaemonetes* occurring in Texas and Cuba respectively. Both have been described only in a very summary fashion, but so far as their characters are known they indicate no special affinity with the present species*.

According to information supplied by the collector, the species would appear to be very rare. Repeated searches in the same locality over a period of two years only resulted in the discovery of three specimens, one of which was afterwards lost by accident. The other two specimens, which are males, are now in the British Museum, and form the types of the species.

EXPLANATION OF PLATE 19.

Fig. 1.	<i>Typhlocaris galilea</i> , g. et sp. n.	Male, from the side.	× $\frac{7}{4}$.
2.	„ „ „	Head, from above.	
3.	„ „ „	Telson and uropod, from above.	
4.	„ „ „	Ocular peduncle: <i>a</i> , from above; <i>b</i> , from the side.	
5.	„ „ „	Portion of outer flagellum of antennule, showing the secondary appendage.	
6.	„ „ „	Mandible.	
7.	„ „ „	Maxilla.	
8.	„ „ „	First maxilliped.	
9.	„ „ „	Second maxilliped (anterior surface), showing vestigial podobranchial lobe on the epipodite.	
10.	„ „ „	Third maxilliped.	
11.	„ „ „	Second leg.	
12.	„ „ „	Pleopod of first pair (posterior surface), showing patch of modified spines on protopodite.	
13.	„ „ „	Spines from protopodite of pleopod.	

* Since this was written I have been enabled, by the courtesy of Miss M. J. Rathbun and of the authorities of the United States National Museum, to examine specimens of these two species. They differ widely from the species here described.





