

ON THE OCCURRENCE OF A GENUINE
HARPACTICID

IN THE LAKE BAIKAL

BY

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WITH 1 AUTOGRAPHIC PLATE



ALB. CAMMERMEYERS FORLAG

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INTRODUCTION.

On re-examining some samples from the lake Baikal kindly forwarded to me, several years ago, from the Zoological Museum of St. Petersburg, I found in one of them some few specimens of a small Harpacticoid Copepod, which, according to the structure of the 1st pair of legs, clearly showed itself to be a membre of the family *Harpacticidæ* (sensu strictiore). As all the hitherto known forms of that family are marine or sub-marine, the occurrence of the present Harpacticid in a true fresh-water lake is very perplexing, and could easily suggest the supposition of its being a "relict" marine form. Such a supposition cannot, however, in my opinion be supported, since the lake Baikal is located far remote from the Ocean in the inner part of Siberia, and at a considerable height (469 feet) above the level of the sea. Nor there is any other evidence, either biological or geological, of this lake having ever formed part of the Ocean. I am therefore of opinion, that the present Copepod has originated quite independently of the marine forms, and that it is merely due to certain peculiar conditions of life, that it has developed its appendages in an analogous manner to that found in the typical *Harpacticidæ*. Indeed, on a closer comparison, it is found that the present Copepod in some respects differs so materially from the other known *Harpacticidæ*, that I have felt justified to establish for its reception a particular genus. In any case, it seems

to me, that the present form is interesting enough to be made the object of a particular treatise.

DIAGNOSES OF THE GENUS AND SPECIES.

Gen. **Harpacticella**, G. O. Sars, n.

Generic Characters.—Anterior division of body broader and more depressed than posterior. Rostrum prominent, but not defined at the base. Caudal rami short, with one of the apical setæ much elongated. Anterior antennæ (in female) comparatively short and stout, with the number of articulations much reduced; those in male strongly built, subchelate, terminal part produced into claw-like projections. Posterior antennæ not very strong, outer ramus small, biarticulate. Anterior lip greatly prominent, semi-circular. Mandibular palp small, but distinctly biramous. Maxillæ with the epipodal lobe long and slender, masticatory lobe armed with a limited number of claw-like spines. Anterior maxillipeds with only 2 digitiform lobes inside the claw-bearing joint. Posterior maxillipeds moderately strong, with the hand only slightly dilated. 1st pair of legs with both rami distinctly 3-articulate, the outer one, as usual, much the larger and armed at the tip with a number of sharp, curved claws. Natatory legs resembling in structure those in the genus *Harpacticus*, none of them, however, transformed in male. Last pair of legs in female well developed, foliaceous, with the inner expansion of proximal joint greatly produced; those in male much reduced, with no expansion of the proximal joint.

Remarks.—This new genus in some respects exhibits a certain affinity to the genus *Tigriopus* of Norman, differing, however, very materially in the reduced number of articulations in the anterior antennæ, and in the poor development of the outer ramus of the posterior ones. Moreover, the inner ramus of the 1st pair of legs is very distinctly 3-articulate, whereas in *Tigriopus* the outer 2 joints are imperfectly defined. Finally, none of the natatory legs are transformed in the male, and their structure more resembles that in *Harpacticus* than that in *Tigriopus*.

Harpacticella inopinata, G. O. Sars, n. sp.

(See accompanying plate.)

Specific Characters.—Female. Body moderately slender, with the anterior division pronouncedly depressed and, viewed dorsally, ovale in form. Cephalic segment comparatively large, with the lower edges abruptly curved in the middle, rostral projection only slightly deflexed and obtusely rounded at the tip. Epimeral plates of the 3 succeeding segments rounded behind. Last segment of metasome very small, with the edges minutely ciliated. Urosome much shorter and narrower than the anterior division of the body, and of almost uniform width throughout, genital segment about the length of the 2 succeeding segments combined, and, as the latter, finely spinulose at the hind edge ventrally and laterally, last segment much shorter than the preceding one, and having the anal opercle very small and angular at the tip. Caudal rami scarcely longer than they are broad, and transversely truncated at the end, being armed, in addition to the setæ, with scattered spinules, inner apical seta exceeding half the length of the body, outer one rather short and densely ciliated on both edges. Anterior antennæ not nearly attaining half the length of the cephalic segment, and only composed of 7 articulations, terminal part 3-articulate and scarcely longer than the last joint of the proximal one. Posterior antennæ without any seta on the anterior edge of the proximal joint, distal joint slightly widening towards the end, which is armed with a short spine and 4 thickish geniculate setæ. 1st pair of legs with the outer ramus not very slender, its 1st joint fully as long as the other 2 combined, last joint very small, but distinctly defined, and armed with 4 sharp curved claws and a small hair-like bristle; inner ramus much narrower than the outer, and extending only slightly beyond the 1st joint of the latter, its outer 2 joints very distinctly defined and combined about half the length of the 1st, last joint carrying on the tip a slender claw and a small bristle. Natatory legs with both rami well developed and less unequal than in the other Harpacticids. Last pair of legs with the distal joint comparatively small and oval in form, being somewhat obliquely truncated at the end, and provided with 5 slightly unequal setæ, inner expansion of proximal joint very large, extending considerably beyond the distal joint, and lingui-

form in shape, carrying on the obtusely rounded extremity 5 slender setæ, the outermost but one much elongated. Ovisac of moderate size and rounded oval in form.

Male somewhat smaller than female, and having the urosome comparatively narrower, consisting of 5 well defined segments. Anterior antennæ very strongly built, with the last joint of the proximal part globularly dilated, terminal part produced into 2 strong claw-like projections. Natatory legs of exactly same structure as in the female. Last pair of legs without any trace of an inner expansion of the proximal joint, distal joint small, with only 3 setæ.

Length of adult female 0.80 mm., of male 0.70 mm.

Remarks. — The above given short description will, I think, suffice for distinguishing this form from any of the earlier known Harpacticids. As, however, it is not improbable, that in future some nearly related species may be detected in other large inland-waters, I find it appropriate to give below a somewhat more detailed description of both sexes, with references to the several figures drawn on the accompanying plate.

Description of the Female.

Fully adult ovigerous specimens measure in length about 0.80 mm., and this form accordingly is of much smaller size than its nearest ally, *Tigriopus fulvus* (Fischer).

The body (see figs. 1 & 2) is of moderately slender form and pronouncedly depressed in front, with its 2 chief divisions very sharply marked off from each other. Seen from above (fig. 1), the anterior division exhibits a regularly oval form, with the greatest width about half the length and occurring in the middle. It is, as usual, composed of 5 well-defined segments, the anterior of which, the cephalic segment, is much the largest, exceeding even somewhat in length all the other combined. This segment, which constitutes the united head and 1st pedigerous segment, is somewhat contracted anteriorly, and produced in front into a rather prominent rostral projection obtusely rounded at the tip (see also fig. 4). The lower edges of the segment (see fig. 2) are abruptly curved in the middle, without, however, obstructing laterally the oral area, which is seen freely projecting below

them. The epimeral plates of the 3 succeeding segments are rounded behind and finely ciliated for some part of their length. The last segment of the metasome, as in other Harpacticoid Copepoda, is very movably articulated to the preceding segment, whereas it is firmly connected with the 1st caudal segment, thus having more the appearance of belonging to the posterior than to the anterior division. It is of rather small size, and is destitute of any true epimeral plates, whereas the lateral edges are finely ciliated throughout. The urosome is much narrower than the anterior division and scarcely more than half as long. It is composed of 4 segments, the anterior of which, the genital segment, is much the largest, and is imperfectly divided in the middle. The anterior part of the segment is very finely ciliated laterally, and along the posterior edge of this and the 2 succeeding segments a dense row of fine spinules occurs, being, however, restricted to the ventral and part of the lateral faces. The last caudal segment is much shorter than the preceding one, and is deeply incised behind in the middle. The anal opercle is very small and angular in form. The caudal rami, or furca (see figs. 1 & 3) are scarcely longer than they are broad, and are somewhat divergent. They are armed, in addition to the setæ, with scattered small spinules especially distinct on the inner edge. To the transversely truncated extremity 2 larger setæ, both distinctly jointed near the base, are attached. The inner of these setæ is much the largest, exceeding half the length of the whole body; the outer one is much smaller and of a more soft consistency, being in some cases folded in beneath the inner. It is finely ciliated throughout, whereas the larger seta only exhibits a few small spinules beyond the middle. From the inner corner of each ramus a very small, unciliated seta issues, and from the outer corner 2 similar setæ originate, the one more dorsally than the other. Moreover, a very delicate somewhat erect seta arises from a knob-like prominence of the dorsal face, at some distance from the inner corner, and in the middle of the straight outer edge an extremely fine hair-like bristle is attached.

The eye was in none of the specimens visible, but has undoubtedly originally been present in its usual place.

The anterior antennæ (see fig. 4) are comparatively short, not even attaining half the length of the cephalic segment.

They are only slightly attenuated distally, and are composed of 7 articulations only, whereas in other Harpacticids their number is 8 or 9. This reduction concerns, however, only the terminal part, whereas the proximal part consists of the normal number of joints, viz. 4. These joints are nearly of equal size, though somewhat diminishing in thickness distally, and are clothed anteriorly with moderately long curved setæ. The 2nd joint has moreover on the upper face, near the hind edge, 3 unequal setæ. The 4th joint is produced at the end anteriorly to a knob-like prominence carrying a band-like sensory appendage and a slender seta. The terminal part is very short, being scarcely longer than the last joint of the proximal one, and is composed of only 3 articulations, the middle of which is the smallest. To the somewhat bilobular end of the last joint several slender setæ are attached, being arranged in 2 bundles.

The posterior antennæ (fig. 5) are less strongly built than in most other Harpacticids, and constitute each a biarticulate stem arising from a short, imperfectly defined basal joint. The proximal joint of the stem does not exhibit any trace of the usual seta of the anterior edge, whereas at the posterior edge, at some distance from the base a very small biarticulate appendage is attached. This appendage, which constitutes the rudimentary outer ramus of the antenna, is provided with 3 setæ, one issuing from the end of the proximal joint, the other 2 from the tip of the somewhat smaller distal joint. The terminal joint of the stem is very movably articulated to the proximal joint, forming with it a more or less pronounced geniculate bend. It gradually widens towards the end, and is armed anteriorly with 2 small spines, the one issuing somewhat inside the other. To the transversely truncated extremity of the joint a short spine and four thickish geniculated setæ are attached, gradually increasing in length inwards.

The anterior lip is greatly prominent (see fig. 2) and, viewed from the lower face (fig. 6), almost semicircular in form, covering over the oral orifice. It terminates in a somewhat thickened, finely ciliated lamella, to each side of which a small piece is cutt off carrying a number of slender incurved cilia.

The mandibles (fig. 7) have the body rather thick and the masticatory part narrowly exerted, with a knob-like promi-

nence outside in the middle. The cutting edge is somewhat oblique and is divided into 6 minutely bifid teeth, inside which a delicate bristle is attached. The palp is comparatively small, but distinctly biramous, consisting of a slightly dilated basal part carrying inside 2 unequal setæ, and of 2 narrow recurved rami. The inner ramus is uni-articulate and provided in the middle of the inner edge with 2 or 3 small setæ, the tip being clothed with a number of more slender bristles. The outer ramus is a little shorter than the inner, and exhibits a distinctly defined terminal joint tipped with slender setæ.

The maxillæ (fig. 8) have the masticatory lobe rather coarse and armed with a number of curved spines, 2 of which are much stronger than the others and claw-like. The palp is membranous and divided into 4 setiferous lappets, the 2 outer of which are movably articulated to it, and represent the epipod and exopod. The epipodal lappet is rather slender and finely ciliated on both edges, carrying on the tip one long and 2 or 3 short bristles. The exopodal lappet is smaller and more deflexed, with 3 setæ on the extremity.

The anterior maxillipeds (fig. 9) are comparatively small, and exhibit each a thickish somewhat flattened basal joint, finely ciliated outside and carrying inside 2 digitiform lobes, each tipped with 2 short ciliated setæ. Inside these lobes, in other Harpacticids, another lobe, bifurcate at the tip, occurs. I have, however, failed to detect any trace of such a lobe in the present form. To the end of the basal joint a much smaller joint is movably articulated, being produced inside to a strong claw-like projection which extends in close juxtaposition to the 2 above-mentioned digitiform lobes. A very small knob-like prominence clothed with 3 or 4 slender diverging setæ is moreover seen on the outer side of this joint, representing the rudimentary terminal part of the maxilliped.

The posterior maxillipeds (fig. 10), as in other Harpacticids, consist each of a somewhat compressed basal joint carrying at the end in front a thickish plumose seta, and of a strongly clawed hand movably articulated to that joint. The hand itself is, however, in the present form only slightly dilated, and has the palmar edge perfectly smooth and nearly straight. The terminal claw, or dactylus, is moderately strong and some-

what thickened at the base, from which a small hair-like bristle springs off.

The 1st pair of legs (fig. 11) are very unlike the succeeding pairs and pronouncedly prehensile, being built upon the type characteristic of the family Harpacticidæ. The 1st basal joint is fringed along the outer edge with a regular series of slender spinules. The 2nd basal joint carries outside about in the middle a very strong denticulated spine, and another somewhat more slender deflexed spine is seen issuing from the inner corner. The joint is moreover armed with scattered small spinules and has the inner edge finely ciliated. The rami are both distinctly 3-articulate, but very unequal in size, the outer one being much the larger. This ramus is, however, less slender than in most other Harpacticids, with the 1st joint slightly curved and longer than the other 2 combined. Its outer edge of the joint is fringed with slender spinules, and has moreover close to the end a strong spine. The 2nd joint has a similar spine, but more remote from the end, and in front of it some small spinules. To the inner edge, at some distance from the tip, moreover, a small hair-like bristle is attached. The last joint is very small, but distinctly defined, and is armed on the obliquely truncated end with 4 sharp curved claws, inside which a small bristle occurs. The inner ramus is narrower than the outer, and extends only slightly beyond the 1st joint of the latter. Its 1st joint is about twice as long as the other 2 combined, and is provided inside, at some distance from the end, with a strong plumose seta; its inner edge in front of this seta is finely ciliated, whereas the outer one is fringed with a regular row of slender spinules. The 2 outer joints are very distinctly defined and about of equal size, each carrying outside a few short spinules. The last joint is tipped with a slender claw and a small bristle.

The natatory legs (figs. 12, 13, 14) are on the whole built upon the same type as in the genus *Harpacticus*, though having the proximal joint of the rami less dilated. Both rami, as also the basal part, are coarsely spinulose on the outer edge, and have the normal number of spines and setæ. In the anterior pair (fig. 12) the rami are nearly equal in length, whereas in the 2 succeeding pairs the inner one is somewhat shorter than the outer. In all pairs the 2 first joints of the rami carry each inside

a well developed natatory seta and those of the outer ramus moreover at the end outside a strong spine. The terminal joint of the outer ramus has outside 3 similar spines and at the tip a considerably longer spine, conspicuously denticulated outside, and accompanied by a natatory seta; that of the inner ramus has near the end outside a slender spine and at the tip 2 natatory setæ. In the 2nd pair of legs (fig. 12) the terminal joint of each ramus carries inside 2, in the 3rd pair (fig. 13) 3 setæ. In the 4th pair (fig. 14) that of the outer ramus has 3, that of the inner 2 setæ inside.

The last pair of legs (fig. 15), as usual, are very different from the preceding ones and not natatory, serving only for obstructing the ovisac in front. They consist each of 2 joints, the proximal of which projects outside to a conical prominence tipped with a slender bristle. Inside this joint forms a very large foliaceous expansion of linguiform shape and densely ciliated on both edges. From the rounded extremity of the expansion 5 slender setæ originate, the outermost but one being much longer than the others. The distal joint is comparatively small, not nearly extending as far as the inner expansion of the proximal joint, and is of oval form, with the inner edge nearly straight and the outer somewhat arcuate, both densely ciliated. It carries 5 setæ, 2 of which issue from the tip, the other 3 from the outer edge.

The ovisac (see figs. 1 & 2) is of moderate size and rounded oval in form, containing a number of comparatively large ova.

Description of the Male.

The adult male (fig. 16) is somewhat smaller than the female, scarcely exceeding in length 0.70 mm. In the general form of the body it does not differ much from the female, though being perhaps a little more slender. The urosome, moreover, appears comparatively narrower and is divided into 5 sharply defined segments.

The anterior antennæ (fig. 17) are much more strongly built than in the female and pronouncedly sub-chelate. They are composed of 6 articulations, 5 of which belong to the proximal part, the 2nd joint being subdivided near the base, as is

also the case in other Harpacticids. The last joint of the proximal part is globularly dilated, and contains a strong muscle acting upon the terminal part. The sensory appendage with its accompanying seta is attached to a slender cylindrical process projecting from the end of this joint. The terminal part is quite short and uniaarticulate, but strongly chitinized, being generally bent in against the preceding joint. It is produced at the end into 2 strong incurved claws.

The posterior antennæ and oral parts are of perfectly same structure as in the female. This is also the case with the 4 anterior pairs of legs, whereas in other Harpacticids at least the inner ramus of the 2nd pair, and in some cases also the outer ramus of the 3rd pair, is conspicuously transformed.

The last pair of legs (see fig. 18) are much reduced in size, and have the proximal joint imperfectly defined from the segment, with no trace of any inner expansion. The distal joint is rather small, and is only provided with 3 marginal setæ.

At the hind edge of the 1st caudal segment (see fig. 18) a thin lamella is seen on each side ventrally, carrying 3 slender diverging setæ. These lamellæ, which represent the genital lobes, are prolonged inside in the form of low membranous stripes, thus having a certain resemblance to a pair of true limbs analogous to those of the last pair.

In the specimen examined 2 juxtaposed *spermatophores*, ready to escape, were present within the genital segment, partly extending also into the preceding segment (see fig. 18). One of these spermatophores is represented, on a somewhat larger scale, in fig. 19. It is of oval or elliptical form, with rather thin walls, which, however, at the hind, obtusely rounded extremity appear considerably more thickened. The anterior extremity is drawn out to a narrow flexuous collar.

Occurrence.—The sample in which the present remarkable form occurred, was, according to the label, taken on the 18th July 1898 at Pestschinol, located at the southern end of the lake. The sample contained also some few young specimens of *Epischura baikalensis* G. O. Sars, and besides a considerable amount of vegetable matter (*confervæ*).

EXPLANATION OF THE PLATE.

HARPACTICELLA INOPINATA, G. O. Sars.

- Fig. 1. Adult ovigerous female, dorsal view; magnified 130 diameters.
« 2. Same, viewed from left side.
« 3. Right caudal ramus, with adjoining part of urosome, dorsal view; magnified 340 diameters.
« 4. Rostrum and left anterior antenna; same amplification.
« 5. Posterior antenna.
« 5a. Outer ramus of same, more highly magnified.
« 6. Anterior lip, front view.
« 7. Mandible with palp.
« 8. Maxilla.
« 9. Anterior maxilliped.
« 10. Posterior maxilliped.
« 11. Leg of 1st pair.
« 12. — of 2nd pair.
« 13. — of 3rd pair.
« 14. — of 4th pair.
« 15. — of 5th pair.
« 16. Adult male, dorsal view; magnified 130 diameters.
« 17. Anterior antenna of same, magnified 340 diameters.
« 18. Last segment of metasome and 2 first segments of urosome from a male specimen, ventral view, exhibiting the last pair of legs, the genital lobes, and 2 spermatophores lying inside the skin; same amplification.
« 19. One of the spermatophores more highly magnified.



