XXII.—On the Isopod Genus Leptocheilia.
By the Rev. Thomas R. R. Stebbing, M.A., F.L.S.

While recently exploring Dana's great Atlas of Crustacea for certain objects, I found my attention arrested in passing by the figures of his *Leptocheilia minuta*. These drawings and the text relating to them, as well as a still earlier account in the 'American Journal of Science,' produced the painful impression that, so long ago as 1849, the famous American naturalist must have taken advantage of my inexperience in such matters at that period to predescribe on his own account *my Dolichocheilia Forresti*. As he is unhappily beyond the reach of any personal expostulations, I will only suggest that the two points in which his account differs from mine may safely be ignored. He draws a line by which the head is marked off both dorsally and laterally from the large first segment of the peraeon. But both the West-Indian specimens described in the Ann. & Mag. Nat. Hist. last month and the general character of the family Tanaidæ warrant the inference that no such line existed, though, while the family character was insufficiently known, its presence might well have been thought necessary. In the next place, the first antennæ are said by Dana to have the "base" or peduncle four-jointed, with the second joint the longest, from which it is clear that he has taken the dilatation of the proximal end of the long first joint as a separate joint. Kröyer, before him, had done the same thing in a parallel case, and probably misled his successor. There is good reason to know that, with specimens only a tenth of an inch long, it was not difficult forty or fifty years back to make such mistakes as these.

Dana reports his specimen as coming "from among seaweed and small corals, Feejee, Island of Ovalau," and further remarks:—"This species is Caprelloid in habit. It was observed by the author attached by its hinder legs to seaweed, and reaching out the long arms in different directions as if in search of prey."

That a minute shallow-water organism like this *Leptocheilia* should as yet be recorded only from two localities so extremely remote from one another as the Leeward Islands and the Fijis is at first sight rather striking. But, however the distribution may have been effected, probably the species will be found to occur at many intermediate stations whenever research is more generally directed than it has been hitherto to the inconspicuous occupants of the coast-lines of the globe.

The exact character of Dana's genus has long remained
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misunderstood. This is partly to be explained by the circumstance that Dana's writings are often almost as inaccessible as they are celebrated. *Leptochelia*, with its type species *minuta*, was first described in the 'American Journal of Science,' vol. viii. p. 425, 1849. A fuller account was given in the 'Crustacea of the U.S. Exploring Expedition, 1852-53,' wherein the remark is made that "Tanais Edwardsii of Kröyer (Tids. iv. 1842) is of this genus." Figures of the type species were published in the Atlas in 1855.

It must be borne in mind that, besides the extremely slender and elongate first gnathopods, the type species has very long upper antennæ, in which the second joint is unusually elongate as well as the first, and biramous uropods, in which the small outer branch has two joints. Dana says:—"Caudal stylets as long as abdomen, longer branch six-jointed, shorter minute, two- or three-jointed." The appearance of a third joint may have been produced by the crossing or apical meeting of two setules. In the *Tanais Edwardsii* of Kröyer, to which Dana refers, the gnathopods are stouter, the second joint of the upper antennæ is by Kröyer's account not more than a quarter as long as the first, and the outer branch of the uropod is distinctly one-jointed. When Bate and Westwood in 1866 adopt the genus *Leptochelia* for Kröyer's species, they declare that the uropods are "unibranched," distinguishing the genus from *Paratanais* by the fact that the pleon "has only a single branch to the caudal pair of pleopoda attached to the sixth segment;" and again, in their specific description, they repeat that "the posterior or caudal pair of pleopoda consist of a single multiarticulate branch." They give not the slightest intimation that both the authors to whom they refer had described the appendages in question as double-branched. In 1878 the late Oscar Harger, in his 'Report on the Marine Isopoda of New England and adjacent waters,' makes Dana's *Paratanais* a synonym of *Leptochelia*, supposing the former genus merely to represent the females of the latter, but at the same time being well aware of the structure of the uropods in the various species which he groups under the same generic name; so that he says in regard to the uropods, "the outer ramus may also consist of more than one segment." He remarks, too, that the type species, "*L. minuta*, possesses all the characters of *Paratanais* that could occur in the male." This way of putting it was not sufficiently direct to warn other writers of the differences between Dana's species and the *Tanais Edwardsii* of Kröyer, with which Dana had himself compared it. Accordingly in 1880, and again in 1886, Professor G. O.
Sars (followed in the latter year by Norman and Stebbing) assigns to *Leptochelia* two characters which are not appropriate to the type—one, that the upper antennæ in the male have the flagellum adorned with bundles of sensitive cilia; the other, that the outer branch of the uropods is uniarticulate. He mentions also that the immobile finger of the gnathopods is strongly tuberculate within, whereas in *L. minuta* it is very weakly tuberculate. Beddard also, in 1886, in his Report on the 'Challenger' Isopoda, when describing his genus *Neotanais*, says that, "as in *Heterotanais*, the exopodite of the uropoda is distinctly two-jointed, and this character distinguishes both genera from *Leptochelia*, Dana." Lastly Hansen *, in 1895, figures the uropods of his *Leptochelia affinis* with the outer branch one-jointed.

Thus we find, according to the various accounts of the genus *Leptochelia*, that the uropods have no outer branch and that they have an outer branch, and in the latter case that the branch is one-jointed, that it is one- or two-jointed, that it is two- or three-jointed, or that it is two-jointed. The last view I believe to be the correct one, so far as the type species is concerned.

The following list shows the species which have been referred to *Leptochelia*, and distinguishes the character of the uropods:

<table>
<thead>
<tr>
<th>Species</th>
<th>Inner branch</th>
<th>Outer branch</th>
</tr>
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<tbody>
<tr>
<td><em>Leptochelia minuta</em>, Dana, ♂</td>
<td>6-jointed.</td>
<td>2-jointed.</td>
</tr>
<tr>
<td><em>limicola</em>, Harger, ♀</td>
<td>4-5-jointed.</td>
<td>2-jointed.</td>
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<tr>
<td>(This species and <em>Paratanais tenuis</em>, G. M. Thomson, are considered by Sars to belong to his <em>Heterotanais</em>, although Thomson says of his species that the outer branch is 1-jointed.)</td>
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<td></td>
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<tr>
<td><em>ceca</em>, Harger</td>
<td>2-jointed.</td>
<td>2-jointed.</td>
</tr>
<tr>
<td>(This is referred by Sars to his genus <em>Leptognathia</em>.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>filum</em> (Stimpson)</td>
<td>4-5-jointed.</td>
<td>Nothing known.</td>
</tr>
<tr>
<td><em>rapax</em>, Harger, ♂ ♀</td>
<td>5-jointed.</td>
<td>1-jointed.</td>
</tr>
<tr>
<td>(The gnathopods of the male and, to a less extent, its first antennæ are remarkably like those of <em>L. minuta</em>.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Edwardsii</em> (Kröyer), ♂</td>
<td>8-6-jointed.</td>
<td>1-jointed.</td>
</tr>
<tr>
<td>(This is recognized as a synonym of the next species.)</td>
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<td></td>
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</tbody>
</table>

* In the Ann. & Mag. Nat. Hist. for last month, p. 52, line 13, for "Dr. H. J. Hansen gives," I should have said "Dr. Hansen refers to."
Leptochelia Savignyi (Kröyer), \( \Phi \) 7-jointed. Inner branch. 1-jointed. Outer branch.

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**Leptochelia Savignyi** (Kröyer), \( \Phi \) 7-jointed. 1-jointed.

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**Leptochelia Savignyi**, Harger, \( \Phi \) 6-jointed.

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**Leptochelia Savignyi** (Kröyer). 1-jointed.

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This species is supposed by Sars to correspond partly to **L. dubia** (Kröyer) and partly to **L. Savignyi** (Kröyer).

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**Leptochelia Savignyi**, Harger, \( \Phi \) 6-jointed.

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**Leptochelia Savignyi** (Dana), \( \Phi \) 6-jointed. Nothing known.

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**Leptochelia Savignyi**, Sars, \( \Phi \) 6-jointed.

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**Leptochelia Savignyi** (Dana), \( \Phi \) 6-jointed.

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**Leptochelia Savignyi**, Hansen, \( \Phi \) 4-jointed.

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Of these twelve specific names Edwardsii and algicola may be dismissed as synonyms, filum and brasiliensis as having no certainty of position, ceca as obviously belonging elsewhere. The reasons for referring limicola to **Heterotanais** are somewhat hypothetical, since limicola is known only in the female, while the principal distinction of **Heterotanais** consists in the gnathopods of the male, which, instead of being strongly chelate, are very imperfectly so. The group formed by Savignyi, dubia, and neapolitana presents no difficulty in itself, and might very well be separated under a new generic name from **Leptochelia minuta**. But to this **Leptochelia rapax** interposes an obstacle, for this species agrees with the group just mentioned in having the one-jointed outer ramus of the uropods, but agrees very closely with **L. minuta** in the elongate gnathopods of the male, with feebly tuberculate immobile finger, and in the considerable elongation of the first antennae.

For the present, therefore, it seems advisable to leave the five species last-named as constituents of the genus **Leptochelia**, making the definition of it more comprehensive by recognizing that the outer ramus of the uropods may be either one- or two-jointed, and by omitting such details in regard to the antennae and gnathopods as have been found to be unsuitable to some of the species. **L. dubia** seems to be rather doubtfully distinguishable from **L. Savignyi**.

Hansen's species, published last year, was described from a single female specimen taken at St. Vincent, Cape Verde Islands. Hansen considers that, on the whole, it makes a near approach to **Leptochelia dubia** (Kröyer), but he remarks that it differs from all hitherto described species of the genus in having only four joints on the inner branch of the uropods. In this respect it will be observed that it makes an approach to **Leptochelia rapax**, and, by accepting affinis as a sixth species of **Leptochelia**, we permit the inner ramus of the uropods to consist of either four, five, six, seven, or eight joints. Bate and Westwood, by their description of **Leptochelia Edwardsii**, would carry the number up even to nine; but
in their figure, with unexplained inconsistency, they represent only six.

"Tanais (Paratanais?) brasiliensis" is described by Dana as having the caudal stylets simple, six-jointed. But he recognizes the chance of his having overlooked the outer branch of the uropods and the likeness of the species to Kröyer's Tanais dubius. Sars accepts it as Leptochelia brasiliensis. Yet, though it is probably the female of some Leptochelia, specifically it remains indeterminate.

The only other Paratanais described by Dana is Paratanais elongatus from "the Sooloo Archipelago." This, therefore, is the type, and it has the inner branch of the uropods two-jointed, the outer one-jointed, whereas in this genus, as redefined by Sars, each branch of the uropods has two joints. Here also, perhaps, a slight modification of the definition will suffice.

XXIII.—Atta (Ecodoma) cephalotes, Latr.: "The Soldier."
By J. H. Hart, F.L.S.

In studying the various forms of the inhabitants contained in a nest of the "Sauba" or "Parasol-Ant" I have observed:—
(1) males, (2) queens, (3) soldiers, (4) large workers, (5) smaller workers, and (6) nurses.

Lubbock gives only five classes—1, 2, 3, 4, and 5—the fourth and fifth of which he calls large workers, and states:—
"Bates never saw either of the last two kinds do any work at all, and was not able to satisfy himself as to their functions. They have also been called Soldiers, but this is obviously a misnomer—at least they are said never to fight. Bates suggests that they may serve in some sort as passive instruments of protection to real workers. Their enormously large, hard, and indestructible heads may be of use in protecting them against the attacks of insectivorous animals. They would be on this view pièces de résistance, serving as a foil against onslaughts made on the main body of the workers."

Lubbock then states* that he is not satisfied with this solution, and thinks the true function of these large-headed forms is not yet satisfactorily explained.

I have personally had the advantage of studying the insect both in Nicaragua and in Trinidad, and I must agree with

* 'Ants, Bees, and Wasps.'