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LVII.—*Notes on Sunaristes paguri, Hesse, and some other rare Crustacea.* By THOMAS SCOTT, F.L.S., Naturalist to the Fishery Board for Scotland, and ANDREW SCOTT, Fisheries Assistant, University College, Liverpool.

[Plates XI. & XII.]

IN 1893 we described * under the name of *Canuella perplexa* an apparently new Copepod that had been observed in the Firth of Forth. In our description of this Copepod we referred to a certain similarity between it and *Sunaristes paguri*, Hesse—a species that M. Hesse had discovered living as a parasite on a *Pagurus* sp. (now *Eupagurus*). We at the same time pointed out some differences which we considered warranted us in describing the Copepod from the Firth of Forth under a new generic name.

We had not at that time seen specimens of *Sunaristes*, but had been guided in our decision by the description and figures of the parasite published by M. Hesse, supplemented by those of Herr W. Müller, who, subsequent to, but evidently unaware of, M. Hesse's discovery, had, under the name of *Longipedula paguri*, also figured and described this crustacean.

Having been successful during the past year or two in obtaining several British specimens of *Sunaristes*, both male and female, we have by an examination of these been enabled to prepare the following notes and drawings, showing the

* Ann. Scot. Nat. Hist. vol. ii. p. 92, pl. ii. figs. 1-3 (Oct. 1893).

more important points of difference between this parasitic Copepod and *Canuella*, and also the close relationship between these two and the genus *Longipedia*, Claus.

Sunaristes paguri, Hesse.

(Pl. XI. figs. 1-10; Pl. XII. figs. 2-7.)

1867. *Sunaristes paguri*, Hesse, Ann. des Sci. Nat. sér. 5 (Zool.), vol. vii. p. 205, pl.

1884. *Longipedia paguri*, W. Müller, Archiv für Naturg. Jahrgang 50, Band 1, p. 19, pl. xiii.

Description of the Female.—Figure 1 (Pl. XI.) represents an adult female of *Sunaristes paguri* from the Cromarty Firth; it is an elongate and comparatively slender Copepod, and measures fully 3 millim. ($\frac{1}{8}$ of an inch) in length, exclusive of tail-setæ; the first body-segment is somewhat more robust than the others, the rostrum is large and conspicuous; the first abdominal segment, which is about equal in length to the second and third together, is composed of two completely coalesced somites, and is provided with hook-like appendages on the underside and near the proximal end (fig. 4, Pl. XII., exhibits these appendages seen ventrally); the caudal stylets are fully twice the length of the last abdominal segment.

The antennules (Pl. XI. fig. 2) are short, moderately stout and setose, and consist of five more or less subequal joints, but the penultimate joint is rather shorter than the others. The antennæ (Pl. XI. fig. 3) are similar to those of *Canuella* and *Longipedia*. The mandibles (Pl. XI. fig. 4) and other mouth-organs (Pl. XI. figs. 5-7) also closely resemble those of the same two genera. The swimming-feet resemble those of *Canuella*, except that the inner branches of the fourth pair are proportionally somewhat shorter (see Pl. XII. figs. 2 and 3, which represent the first and fourth pairs). The fifth pair (Pl. XI. fig. 8), which are somewhat rudimentary, are each furnished with a long and moderately stout seta on the outer angle and with three elongate spines interiorly.

Description of the Male.—The antennules of the male *Sunaristes* (Pl. XI. fig. 10), which, like those of the female, are short and stout, terminate each in a strongly developed hand with a stout brownish-coloured movable claw; they form powerful grasping organs and by their robust structure give the Copepod a somewhat remarkable appearance. The antennæ, mouth-organs, and swimming-feet are all more or less similar to those of the female, with this important exception, that the first two joints of the inner branches of the second pair of feet are produced distally into strong and somewhat spiniform processes that extend almost to the extremity

of the third joint (Pl. XII. fig. 5); these prolongations, especially those of the first joints, are, like the terminal claws of the antennules, of a brownish colour. The first two somites of the male abdomen are not coalesced as in the female, and therefore the male has five abdominal segments; the first segment being of somewhat greater depth than the next one, extends beyond it on the underside. The first body-segment in the male is proportionally rather more robust than the same segment in the female, but in other respects male and female are much alike in general appearance (Pl. XI. fig. 9); the male specimen represented by fig. 9* measured fully 2 millim. ($\frac{1}{12}$ of an inch) in length, exclusive of tail-setæ, being about one third shorter than the female.

Remarks.—It is evident from the foregoing description that there is a considerable resemblance between the two genera *Sunaristes* and *Canuella* and, in some respects, between these and *Longipedia*; the antennules, antennæ, and the whole of the mouth-organs of the females in the three genera are all nearly alike; the same may to some extent be also said of the males; moreover, the swimming-feet of the females belonging to the three genera (with the exception of the second and fifth pair in *Longipedia*) are all very similar; but though the three genera *Sunaristes*, *Canuella*, and *Longipedia*, and especially the first two, resemble each other so closely in many of their structural details, there are also the following important differences to be observed:—The female *Sunaristes* differs from the females of *Canuella* and *Longipedia* in having the first two somites of the abdomen completely coalesced. The female *Longipedia* differs from the female of *Sunaristes* and *Canuella* in having the inner branches of the second pair of swimming-feet greatly elongated, being from two to nearly three times the length of the outer branches (in the male of *Longipedia* the inner branches of the second pair are also elongate). The male *Sunaristes* differs from the male of *Canuella* and *Longipedia* not only in possessing more powerfully armed antennules, but also in the peculiar prolongations of the first and second joints of the inner branches of the second pair of swimming-feet. The male of *Canuella* differs from the male of *Sunaristes* and *Longipedia* in having both branches of the second pair of swimming-feet short and similar in structure to those of the female. On the other hand, *Longipedia* differs from the other two in the form of the fifth pair of thoracic feet in both sexes.

* This specimen was obtained near the mouth of the River Mersey. It would thus seem that *Sunaristes* is partial to brackish water conditions.

After a careful study of the structure of all these three forms, it seems to us that, though the affinity between *Canuella* and *Sunaristes* is very close, yet the differences that separate them are too important to be regarded as of merely specific value, and that we are therefore justified in still retaining *Canuella* as a distinct genus.

The following is a tabular arrangement of the more important differences that distinguish the three genera:—

Genus.	Male antennules.	Inner branches of second pair of swimming-feet.	Fifth pair.	Abdomen of female.
<i>Longipedia</i> ..	Feebly clawed.	From two to nearly three times the length of the outer branches and nearly alike in both sexes (end-joints greatly elongated).	Small, foliaceous.	Composed of five segments, as in the male.
<i>Canuella</i>	Feebly clawed.	Of about the same length as the outer branches and alike in both sexes.	Rudimentary.	Composed of five segments, as in the male.
<i>Sunaristes</i> ..	Strongly clawed.	Of about the same length as the outer branches; in the male the first and second joints are produced into strong spine-like processes.	Rudimentary.	Composed of four segments (the first consisting of two completely coalesced somites); in the male composed of five segments.

Note on Remigulus tridens, T. and A. Scott.

In October 1893 we published * a description, with figures, of a somewhat curious Copepod from Loch Linnhe, Argyshire. It was described under the name of *Remigulus tridens*, gen. et sp. n., as no previous record of its occurrence was at the time known to us; and from certain peculiarities of structure observed we stated in our remarks of the Copepod that, "though obtained amongst dredged material, its structure clearly indicates semiparasitic habits similar to the Lichomolgidae and other allied forms." A considerable time after our description was published we ascertained that MM. Canu and Cuenot, in a memoir entitled "Commensaux

* Ann. & Mag. Nat. Hist. ser. 6, vol. xii. p. 242, pl. xi. figs. 15-20, pl. xii. figs. 1-3 (Oct. 1893).

parasites des Echinodermes" *, had described under the name of *Synatiphilus luteus* a Copepod parasite which appears to be identical with the form we have recorded from Loch Linnhe; and as MM. Canu and Cuenot's memoir was published in 1892, *Remigulus tridens* necessarily becomes a synonym of *Synatiphilus luteus*, Canu and Cuenot.

Diaptomus laciniatus, Lilljeborg. (Pl. XII. fig. 1.)

A freshwater Copepod from Loch Doon, Ayrshire, new to Britain.

This species of *Diaptomus* is readily distinguished from any other member of the genus in the British fauna by the peculiar form of the last two thoracic segments in the female, as well as by the difference in the structure of the fifth pair of thoracic feet in both sexes.

Figure 1 (Pl. XII.) represents a female specimen seen from above, and shows the peculiar form of the last two thoracic segments referred to; this specimen measured 1·8 millim. ($\frac{1}{14}$ of an inch) in length. MM. Jules de Guerne and Jules Richard, in their revision of the freshwater Calanidæ, when referring to the characteristic form of the last two thoracic segments in *Diaptomus laciniatus*, say:—"Ce *Diaptomus* se distingue au premier coup d'œil de tous les autres par la forme des deux derniers segments thoraciques."

This Copepod occurred very sparingly in the gathering from Loch Doon, while another species of the same genus—*D. gracilis*, G. O. Sars—was of frequent occurrence. There does not appear to be any previous British record of *D. laciniatus*, but on the continent it has been found at Kola in Russian Lapland and in the vicinity of Bergen in Norway. Prof. Cleve (of Upsala, Sweden) has also collected it in abundance in the Lake of Geneva †. The altitude of Loch Doon is between 600 and 700 feet above the sea.

Lathonura rectirostris, Lilljeborg.

From Loch Doon, Ayrshire; new to Scotland.

In the gathering of Entomostraca from Loch Doon there were, besides *Diaptomus laciniatus*, already referred to, several other species of more or less interest, most of which have, however, been recorded from other parts of Scotland;

* Revue Biol. du Nord de la France (Oct. 1892), p. 19, pl. i. figs. 6 and 7.

† "Révision des Calanides d'eau douce," by Jules de Guerne and Jules Richard, p. 47, separate copy (1887).

but, so far as we know, this is the first time *Lathonura rectirostris* has been observed in a Scottish loch. This Cladoceran appears to be very fragile, for though a number of specimens have been obtained, all are more or less damaged. "The peculiar plates attached to the ventral margin of *Lathonura rectirostris*, instead of the usual setæ or spines, at once serve to distinguish this species from all other Entomostraca with which we are acquainted" (Rev. A. M. Norman and Dr. G. S. Brady in 'Mon. of Brit. Entom. belonging to the families Bosminidæ, Macrothricidæ, and Lynceidæ,' p. 16). The same authors give for this Cladoceran only one locality in the British Islands, viz. Lough Bollard, Connemara.

Note.—Our friend D. J. Scourfield, Esq., Leytonstone, Essex, has just informed us that he has obtained *Lathonura* on two occasions, and has seen specimens of it that were collected at one of the excursions of the Quekett Club to Staines; and adds, "it appears to be a very rare species."

EXPLANATION OF THE PLATES.

PLATE XI.

Sunaristes paguri, Hesse.

- Fig.* 1. Female, lateral view, $\times 26\frac{1}{2}$. 2. Female antennule, $\times 127$. 3. Antenna, $\times 124$. 4. Mandible, $\times 127$. 5. Maxilla, $\times 127$. 6. Anterior foot-jaw, $\times 127$. 7. Posterior foot-jaw, $\times 190$. 8. Foot of fifth pair, female, $\times 253$. 9. Male, lateral view, $\times 40$. 10. Male antennule, $\times 127$.

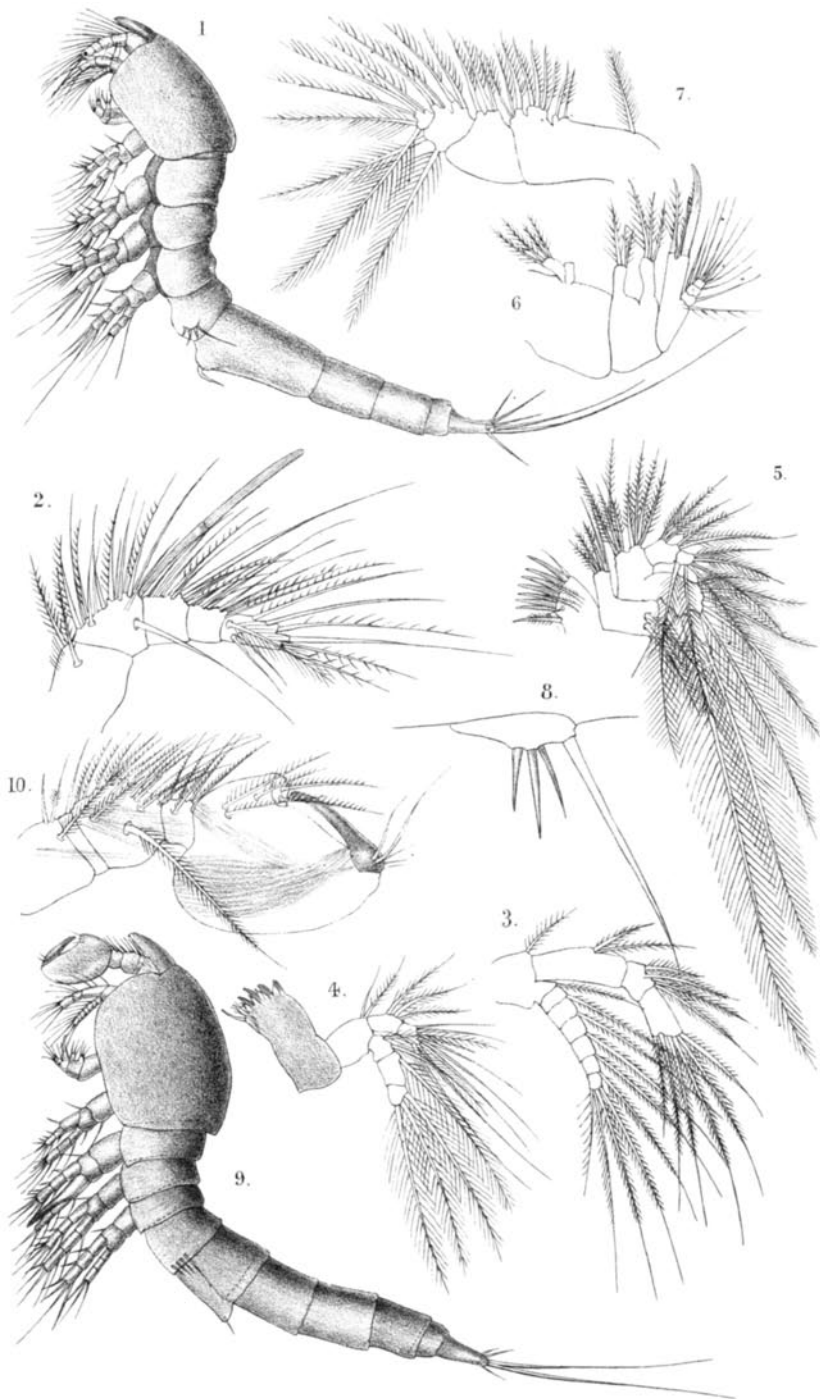
PLATE XII.

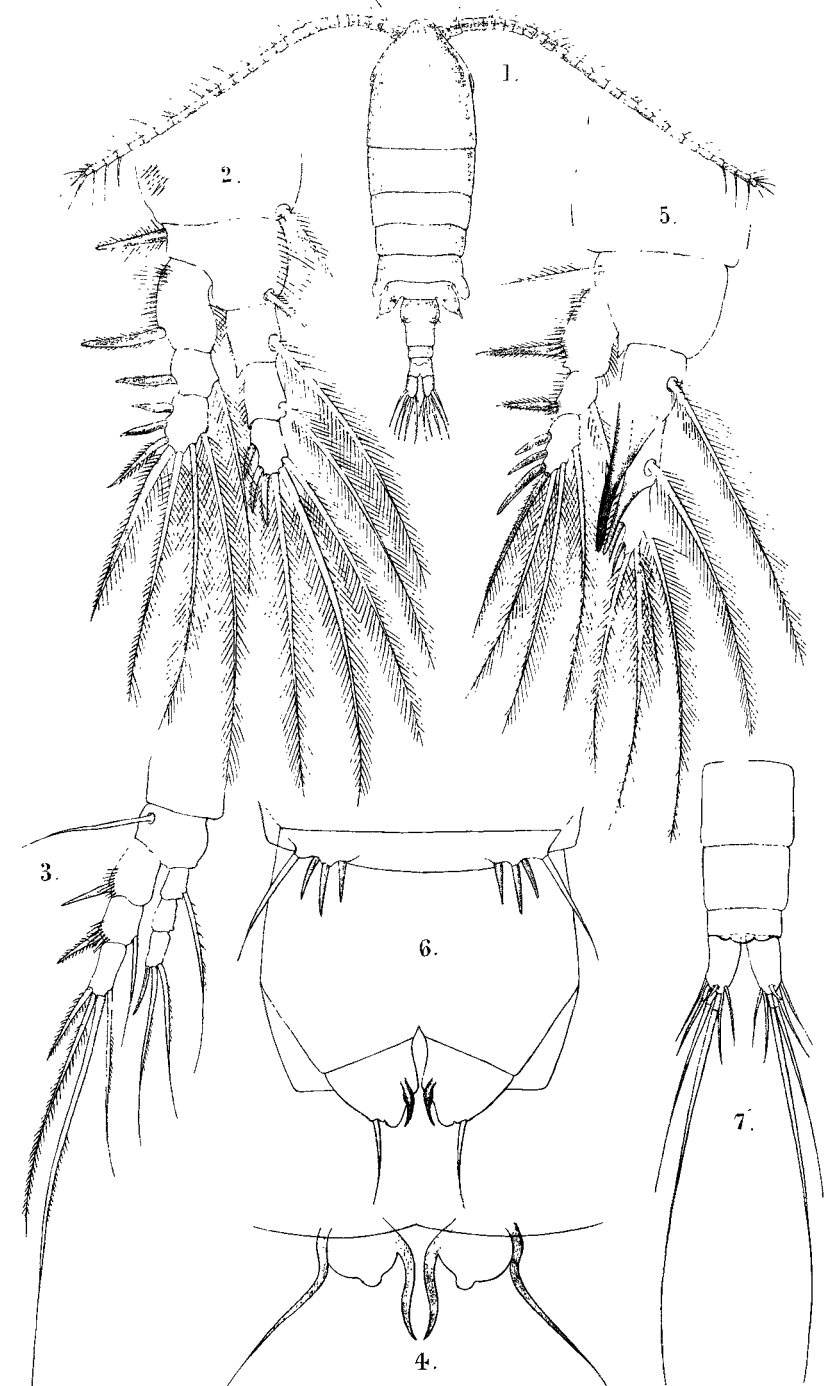
Diaptomus laciniatus, Lilljeborg.

- Fig.* 1. Female, seen from above, $\times 27$.

Sunaristes.

- Fig.* 2. Foot of first pair, $\times 127$. 3. Foot of fourth pair, $\times 84$. 4. Appendages of first abdominal segment, female, $\times 190$. 5. Foot of second pair, male, $\times 127$. 6. Foot of fifth pair and appendages of first abdominal segment, male, $\times 127$. 7. Last three abdominal segments and caudal stylets, male, $\times 40$.





A.Scott del.

MinternBras lith.

Fig.1 DIAPTOMUS LACINIATUS, Lilljeborg.

Figs. 2-7. SUNARISTES PAGURI, Hesse.