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Notes on some Copepoda from the Faroe Channel.

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(PLATES 1-3.)

It sometimes happens, during marine investigations, that pieces of water-logged and partly-decayed wood are brought up in the dredge or trawl-net. These pieces of wood, if carefully examined, will not infrequently be found to harbour rare, and sometimes undescribed, species of Entomostraca. In such pieces of wood dredged in the Clyde, the Firth of Forth, and elsewhere I have obtained the somewhat rare ostracod *Cytheropteron humile*, Brady & Norman, in considerable numbers; and my son, Mr. Andrew Scott, has found the same ostracod in similar pieces of wood from Barrow Channel, Lancashire*. This ostracod was described in 1889†, and at that time the Clyde near Greenock, and Vigo Bay, Spain, were the only two places where it was known to have been obtained. Moreover, it is in such pieces of wood, and often associated with the ostracod named, that I usually find the curious copepod *Laophonte simulans*, T. Scott‡. The Copepoda recorded in the following notes were, like the two species just referred to, obtained from

* Trans. Liverpool Biol. Soc. vol. xv. (1901) p. 348.

† "Mon. Marine and F.-W. Ostrac.," by Prof. G. S. Brady and Rev. A. M. Norman (Trans. Roy. Dublin Soc. vol. iv. s. II. p. 219, pl. 20. figs. 4-7).

‡ 15th Ann. Rep. Fishery Board for Scotland, part iii. (1897) p. 151.

a piece of wood dredged from about 87 fathoms in the Faroe Channel; the wood was perforated to a considerable extent by the boring mollusk, *Xylophaga dorsalis*, Turton. Seven species of Copepoda, each representing a separate genus, and all belonging to the Harpacticidæ, were obtained in this piece of wood; three of the species appear to be undescribed, but the others are all more or less widely distributed.

The drawings which illustrate these notes were made a few years ago by my son, Mr. Andrew Scott, but shortly afterwards were mislaid and have only recently been recovered.

COPEPODA.

HARPACTICIDÆ.

ZOSIME, *Boeck*, 1872 *.

ZOSIME TYPICA, *Boeck*.

This species, which is somewhat widely distributed, was represented by very few specimens.

PSEUDOTACHIDIUS, *T. Scott*, 1898 †.

The genus *Pseudotachidius* was instituted in 1898 for an interesting copepod discovered in the deep water at the mouth of Loch Fyne, and as there was but one species known at the time, the generic description was included in that of the species; but as another copepod has been found belonging apparently to the same generic type, it will be better now to give a separate definition of the genus.

Definition of the Genus Pseudotachidius, T. Scott.

Cephalothorax moderately broad, somewhat depressed; abdomen moderately narrow, more or less distinct from the cephalothorax. Antennules short, five- or six-jointed. Antennæ with secondary branches well developed and composed of three joints. Mandibles nearly as in *Tachidius*, Lilljeborg, and with a moderately developed two-branched palp. Other mouth-organs also similar to those of *Tachidius*. Both branches of the first four pairs of thoracic feet three-jointed, inner branches of first pair

* Mon. British Copepoda, Brady, vol. ii. p. 14 (1880).

† 16th Ann. Rep. Fishery Board for Scotland, part iii. p. 267 (1898).

non-prehensile. Fifth pair small, composed of two joints; basal joints usually not greatly developed; secondary joints usually small, but quite distinct.

Remarks.—This genus appears to be more nearly related to *Tachidius* than to any of the other allied genera, but it differs distinctly in the structure of the secondary branches of the antennæ and of the fifth pair of thoracic feet. Moreover, though it might be included in the subfamily *Tachidiinæ*, Boeck, with as much propriety as the genus *Robertsonia*, G. S. Brady, which has the fifth pair also composed of two joints, I prefer meanwhile, till we know more about the structure of the male, to regard *Pseudotachidius* simply as a member of the Harpacticidæ.

PSEUDOTACHIDIUS SIMILIS, sp. n. (Pl. 1. figs. 1-8.)

Description of the female.—Length about .8 mm. ($\frac{1}{30}$ of an inch). The body is moderately robust and, when seen from above, is subcylindrical, but tapering slightly towards the posterior end; the rostrum is moderately broad and rounded (fig. 1).

The antennules are short and stout, and composed of five joints, but the fourth joint is very small (fig. 2); they are each provided with numerous plumose setæ, and a short and stout sensory filament springs from the distal end of the third joint, as shown in the figure.

The antennæ (fig. 3) are somewhat similar in structure to those of *Pseudotachidius coronatus*, T. Scott; but there is some difference of the armature, especially of the primary branches, the terminal spines of which are stouter than in that species.

The mandibles (fig. 4) are moderately stout, the biting-edge in each is subtruncate and armed with several small teeth. The basal joint of the palp is somewhat dilated and provided with two small setiferous branches; the upper branch is composed of one and the lower of two joints, as shown in the drawing. The mandibles and other mouth-organs resemble the organs corresponding to them in *Pseudotachidius coronatus*.

The first four pairs of thoracic feet have both branches three-jointed. In the first pair the second basal joints are each provided with a stout setiferous spine on both its outer and inner aspects; both branches of this pair, as well as the marginal spines of the outer branches, are also setiferous (fig. 6). The inner branches are scarcely so long as the outer ones, whereas

in the first pair in *Pseudotachidius coronatus* the inner are longer than the outer branches.

The second, third, and fourth pairs are somewhat similar to the same appendages in *Pseudotachidius coronatus*; figure 7 represents the fourth pair, and the second and third do not appear to differ very greatly from this.

The fifth pair also resembles the fifth pair of the species referred to, but the armature is somewhat different, and there appears to be no distinct secondary joint (fig. 8).

The furcal joints are very short.

No males were observed.

Remarks.—The species just described may be distinguished from *Pseudotachidius coronatus*, T. Scott, the only other member of the genus, by the difference in the structure of the antennules, by the inner branches of the first pair of thoracic feet being not longer than the outer branches, and by the difference in the armature of the fifth pair.

This was one of the rarest of the copepods obtained from the piece of wood already referred to, and only a single specimen was observed.

CERVINIA (*Norman, MS.*), *Brady*, 1878 *.

CERVINIA BRADYI (*Norman, MS.*), *Brady, loc. cit.*; *Giesbrecht, Mitth. a. d. Zool. Stat. zu Neapel*, vol. xiv. pt. 1, p. 58 (1900).

We owe the discovery of this interesting species to the Rev. A. M. Norman, who captured three specimens at Oban in July 1877, while dredging there †. *Cervinia Bradyi* appears to be a scarce species, for although, subsequent to its discovery at Oban, it has been found in a few other places in Britain, it has never occurred but in single, or at most few, specimens at one time. This, like the last, was rare in the material washed from the perforated wood.

LAOPHONTE, *Philippi*, 1840 ‡.

LAOPHONTE FARÖENSIS, sp. n. (Pl. 1. figs. 9–14; Pl. 2. figs. 1–8.)

Description of the female.—The length of the specimen represented by the drawing is .77 mm. (about $\frac{1}{32}$ of an inch); it

* Mon. British Copepoda, G. S. Brady, vol. i. p. 85 (1878).

† *Ibid.* p. 86, pl. xxiv A. figs. 3–13.

‡ *Ibid.* vol. ii. p. 78 (1880).

somewhat resembles *Laophonte curticauda*, Boeck, in general appearance, except that the second segment of the abdomen is rather wider than the segment which precedes it, and also than those which follow (Pl. 1. fig. 9).

The rostrum, which is moderately broad, is bluntly rounded at the apex, and scarcely reaches to the end of the first joint of the antennules.

The antennules are about as long as the cephalothoracic segment, seven-jointed, and moderately setiferous; the first three joints are subequal, and together are equal to fully one and a half times the entire length of the remaining four joints; the fourth and fifth joints are rather shorter than the sixth and seventh, and the fourth is furnished with a sensory filament (Pl. 2. fig. 1).

The penultimate joints of the antennæ are each provided with a small uniarticulate secondary appendage which bears a few plumose setæ (Pl. 2. fig. 2).

The mandibles (Pl. 2. fig. 3) are of moderate size, but the palp is very small and uniarticulate.

The other mouth-organs resemble those of *Laophonte curticauda*, but the second maxillipeds (Pl. 1. fig. 11) are proportionally rather stouter.

The first pair of thoracic feet are somewhat similar to those of the same species, but the joints of the outer branches are subequal in length (Pl. 1. fig. 12). The second, third, and fourth pairs have the inner branches short and two-jointed, the first joints being small; the outer branches are moderately elongated. The drawing (Pl. 2. fig. 4) represents the fourth pair.

In the fifth pair, which are foliaceous, the basal joints have a somewhat triangular outline, but the inner portion is produced so as to reach to near the middle of the secondary joints; the inner margin of the produced part is provided with apparently three moderately stout setæ in addition to a small seta at the apex. The secondary joints are subcylindrical; they are fully twice as long as broad, and are each furnished with about five small setæ on the distal half of the outer margin and apex, as shown in the drawing (Pl. 2. fig. 5).

The furcal joints are about as long as the last abdominal segment.

The *male* appears to differ very little from the female, except in the following particulars:—The antennules, as shown in the

drawing (Pl. 2. fig. 6), are modified for grasping; the first two joints are moderately stout, the third is very small, while the fourth is considerably dilated; the remaining joints, which are small and hinged to the fourth, form together a kind of movable claw. The inner branches of the third pair of thoracic feet appear to be three-jointed (Pl. 2. fig. 7); the end joint, which is small and somewhat indistinct, is furnished with four terminal plumose setæ of variable lengths, while the distal end of the second joint is produced into a moderately stout hook-like process; the outer branches are not only proportionally more robust, but are also provided with rather stouter spines than the same pair in the female.

The outer branches of the fourth pair are also more robust than the outer branches of the same pair in the female; the inner branches scarcely reach to the end of the first joint of the outer branches; they are composed of two joints, but the end joint is about twice the length of the other, and bears a long spine-like seta on its outer distal angle, and four moderately long plumose setæ—two at the apex and two on the inner margin, as shown in the drawing (Pl. 1. fig. 13).

The fifth pair (Pl. 1. fig. 14) are very small; the basal joint is not produced interiorly, and is provided with a single plumose seta; the secondary joint is subcylindrical, but somewhat wider at the distal end, and provided with about four apical setæ.

This species, like most of the others, was a moderately rare one in the material washed from the perforated wood; it seems to differ from any *Laophonte* known to me.

CLETODES, *Brady*, 1872*.

CLETODES ARMATA, sp. n. (Pl. 3. figs. 4-14.)

Description of the female represented by the drawing (fig. 4):—Length about 1.5 (fully $\frac{1}{16}$ of an inch); seen from above the body is elongated and subcylindrical; the cephalic segment is somewhat longer than the next two taken together, the second to the fifth segments are subequal in length. The first two segments of the abdomen appear to be coalescent, but the others are distinct. The thoracic and abdominal segments are all fringed with a few short and moderately stout spines, as shown in the drawing. The furcal joints are elongated and slender, being

* Mon. British Copepoda, vol. ii. p. 89 (1880).

nearly as long as the abdomen. The forehead is somewhat angular and armed with a minute spine.

The antennules (Pl. 3. fig. 5) are moderately long and slender and composed of five joints; the first three joints are short, but the other two are elongated and narrow, and a moderately long sensory filament springs from the end of the penultimate joint; the formula shows approximately the proportional lengths of the various joints:—

Number of the joints	1	2	3	4	5
Proportional lengths of the joints	5	9	11	20	14

The antennæ, which are slender and of moderate length, are sparingly setiferous; the secondary branches appear to be entirely obsolete (Pl. 3. fig. 6).

The mandibles (Pl. 3. fig. 7) are stout, and have the biting-edge obliquely truncate and armed with several teeth; the mandible-palp is small, and composed of a single uniarticulate branch.

The first pair of maxillipeds are each moderately stout and armed with a stout terminal claw, bearing a few small setæ, and also with two bisetose marginal papillæ (Pl. 3. fig. 8).

The second maxillipeds are also moderately stout, and the terminal claw is curved and somewhat slender and elongated (Pl. 3. fig. 9).

The thoracic feet are all moderately slender. In the first four pairs the outer branches are all composed of three and the inner of two joints. The first pair has the inner branches very short, they scarcely reach to the end of the second joint of the outer branches, and their first joint is almost obsolete, the second joint bears two small spiniform apical setæ; the outer branches are moderately elongate, and armed with long slender marginal and terminal spines, as shown in the drawing (Pl. 3. fig. 10). Both branches of the next three pairs are slender, the outer branches being more slender than those of the first pair; the first joints of the inner branches are very short, but the second is elongate, and the terminal setæ of both the inner and outer branches are considerably longer than the branches from which they spring; figure 11 represents the fourth pair.

The fifth pair (Pl. 3. fig. 12) are small; the inner portion of the basal joint is produced into a moderately long and narrow appendage, which is furnished with four spiniform setæ on the apex and distal part of the inner margin; the outer portion of

the basal joint extends into an elongate and slender process bearing a single seta at its extremity. The secondary joints are very narrow and reach to about the end of the inner produced part of the basal joints; they are each provided with two apical setæ—one long and one very short—and a small seta near the distal end of the outer margin (Pl. 3. fig. 12).

The *male* differs little from the female, except in the following particulars:—The antennules are modified as shown in the drawing (Pl. 3. fig. 13). The third pair of thoracic feet are furnished with a sigmoid appendage, which is moderately stout at the base, but tapers towards the extremity (fig. 14). The fifth pair of feet also differ slightly from those of the female.

The *Cletodes* just defined is distinctly different from any described species with which I am familiar; its slender form, elongated caudal furca, and the peculiar structure of the antennules distinguish it almost at a glance from allied species. Only a few specimens were obtained.

DACTYLOPUS, *Claus*, 1863*.

DACTYLOPUS STRÖMII (*Baird*), var. FARÖENSIS, var. n. (Pl. 2. figs. 9–14; Pl. 3. figs. 1–3.)

1837. *Cyclops Strömii*, Baird, Mag. Zool. & Bot. vol. i. p. 330, t. 9. figs. 23–25.

1863. *Dactylopus Strömii*, Claus, Die frei-lebenden Copepoden, p. 126, t. 16. figs. 1–13.

Description of the female.—Body moderately stout; rostrum short (Pl. 2. fig. 9). Length from the extremity of the rostrum to the end of the caudal furca about 1 mm.

Antennules eight-jointed, somewhat similar in structure to those of *Dactylopus Strömii*; but when compared with the description and figures given by Claus there appears to be a slight difference in the proportional lengths of the last four joints. Claus states that the fifth and seventh joints are short, and his figure shows them as being subequal; whereas in our specimen the fifth joint is short, the sixth and seventh subequal and longer than the fifth, while the last, which is longer than either of the three preceding joints, is about equal in length to

* Mon. British Copepoda, Brady, vol. ii. p. 105 (1880).

the fourth (Pl. 2. fig. 10). The proportional lengths of the various joints are shown by the formula :—

Number of the joints	1	2	3	4	5	6	7	8
Proportional lengths of the joints.	16	14	10	13	5	7	8	13

The antennæ (second antennæ) are somewhat similar to those of *Dactylopus Strömii*.

The mandibles (Pl. 2. fig. 11) are also similar to those of the same species.

The second maxillipeds (second foot-jaws) are moderately stout; the first and second joints are each provided with two small setæ, as shown in the drawing (Pl. 2. fig. 12). The terminal claw, which is nearly as long as the second joint, is only slightly curved, and furnished with a small lateral seta.

The first four pairs of thoracic feet are almost similar to those of *Dactylopus Strömii* (Pl. 2. fig. 13).

The fifth pair (Pl. 2. fig. 14) have a general resemblance to the same pair of feet in *Dactylopus Strömii*, but the armature of the basal joint and the form as well as the armature of secondary joint are different; the basal joint is furnished with about five terminal setæ, the two innermost of which are short and of nearly equal length, the next two are also subequal, but they are about twice the length of the others—all these four setæ are moderately stout; the fifth, which is close to the fourth, is comparatively small and slender. The secondary joint is broadly ovate and is provided with six setæ round the distal end; the innermost and the three outermost of these setæ are moderately stout and plumose, while the remaining two are slender and elongate.

The furcal joints are very short.

The *male* differs from the female in several particulars, the following of which appear to be the more obvious :—The antennules (anterior antennæ) are modified for grasping. The first joint of the inner branches of the first thoracic feet (Pl. 3. fig. 1) is shorter and proportionally much stouter than that of the inner branches of the first pair in the female. The end joint of the inner branches of the second pair of feet is prolonged into a stout and spiniform process, which extends beyond the end of the outer branches, and which bears one or two setæ, as well as an elongated slender filament (Pl. 3. fig. 2). The fifth pair

are nearly similar in form and armature to those of the male of *Dactylopus Strömii* (Pl. 3. fig. 3).

Perhaps the *Dactylopus* just described ought to be regarded as a distinct species, because of the differences which characterize both sexes when compared with its nearest of kin, *Dactylopus Strömii* (Baird), but meanwhile I prefer to consider it merely as a variety of that species. A number of males and females were found.

IDYA, *Philippi*, 1843 *.

IDYA FURCATA (*Baird*).

This species was also washed from the piece of perforated wood dredged at Faroe, and is the last I have at present to record. *Idya furcata* appears to have an extensive distribution; it is a moderately common form around the British Islands, and it sometimes occurs in large numbers in the material washed from the filters at the Sea-fish Hatchery of the Fishery Board for Scotland; it has been obtained in gatherings of Copepoda from Franz-Josef Land and other places within the Arctic seas, and also in material collected by the aid of a ship's pump in the vicinity of Suez. Its occurrence near Faroe at a depth of over 80 fathoms is an indication that the species is not limited to littoral or shallow-water conditions.

EXPLANATION OF THE PLATES.

PLATE 1.

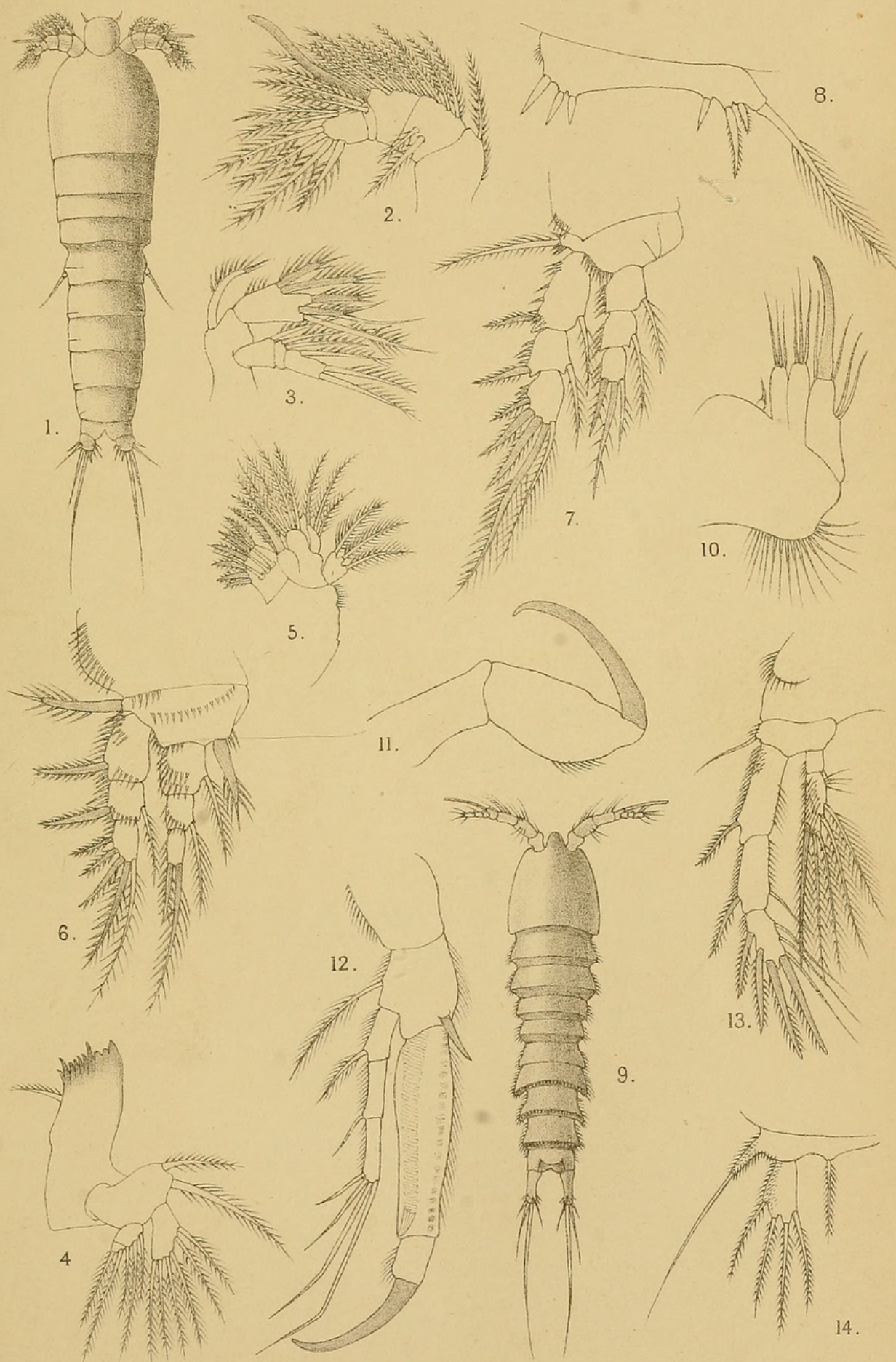
Pseudotachidius similis, sp. n.

- Fig. 1. Female, dorsal view. $\times 64$.
 2. One of the antennules. $\times 190$.
 3. One of the antennæ. $\times 190$.
 4. One of the mandibles. $\times 300$.
 5. One of the maxillæ. $\times 253$.
 6. One of first pair of thoracic feet. $\times 253$.
 7. One of fourth pair. $\times 253$.
 8. Foot of fifth pair. $\times 253$.

Laophonte faröensis, sp. n.

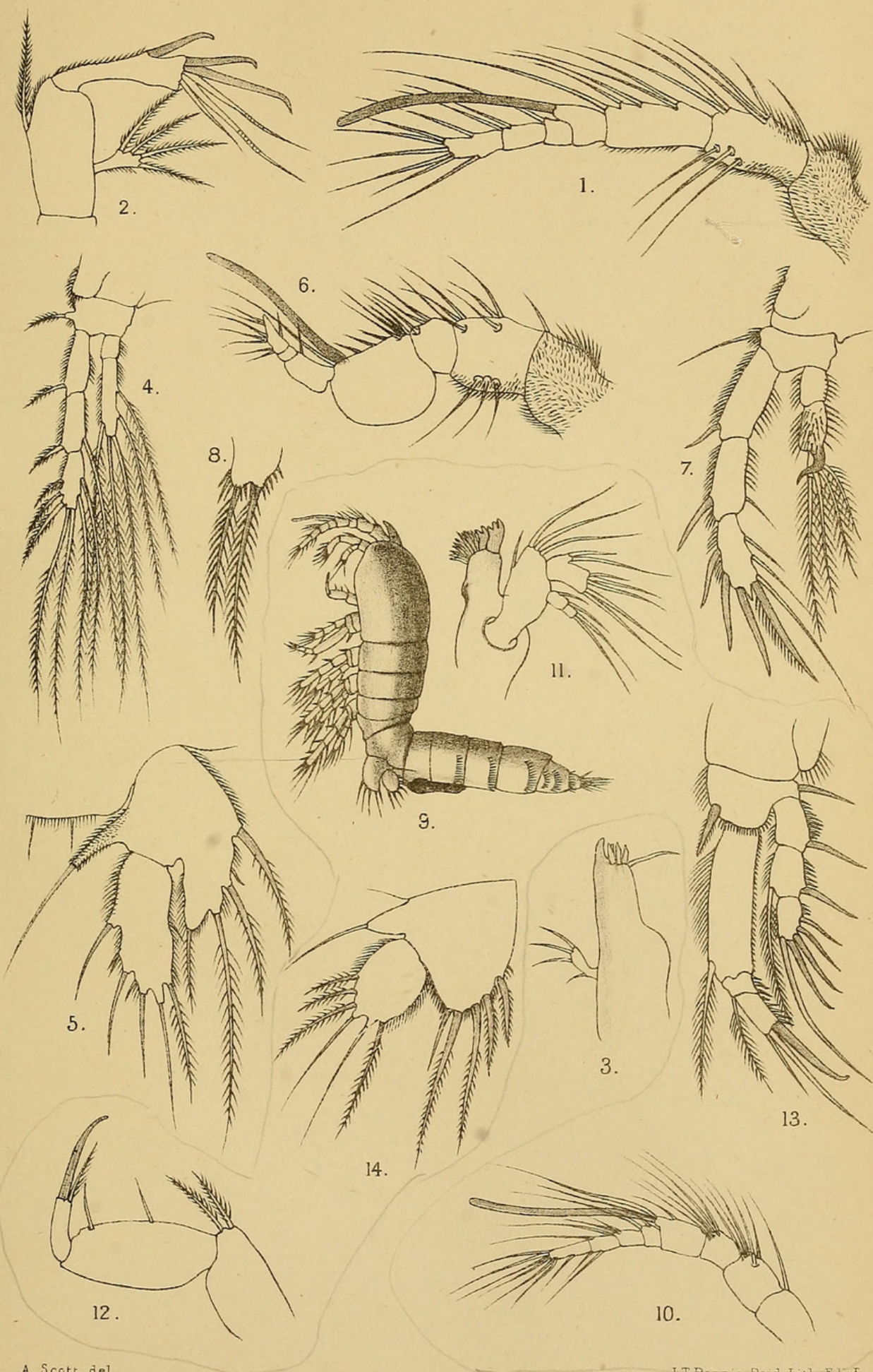
- Fig. 9. Female, dorsal view. $\times 52$.
 10. First maxilliped. $\times 500$.
 11. Second maxilliped. $\times 300$.

* Mon. British Copepoda, Brady, vol. ii. p. 171 (1880).



A. Scott, del.

J. T. Rennie Reid, Lith. Edin^r

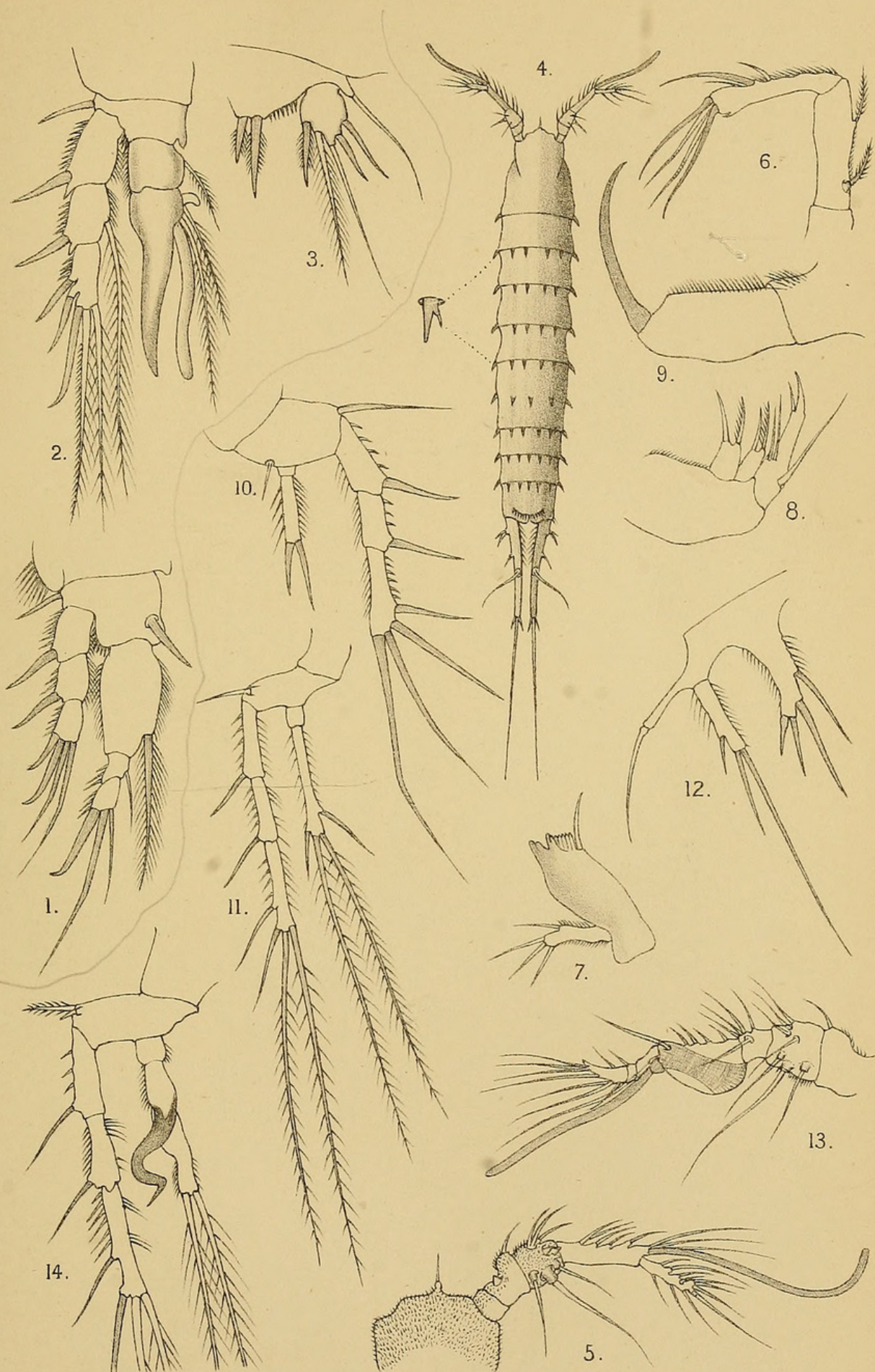


A. Scott, del

J.T. Rennie Reid, Lith. Edin'

1-8, LAOPHONTE FARÖENSIS

9-14 DACTYLOPUS STRÖMII, var. .



A. Scott, del.

J. T. Rennie Reid, Lith. Edin^r

1-3, DACTYLOPUS STRÖMII, var. 4-14, CLETODES ARMATA.

- Fig. 12. Foot of first pair of thoracic feet. $\times 253$.
 13. Foot of fourth pair (male). $\times 200$.
 14. Foot of fifth pair (male). $\times 300$.

PLATE 2.

Laophonte faröensis, sp. n.

- Fig. 1. One of the female antennules. $\times 300$.
 2. One of the antennæ. $\times 253$.
 3. One of the mandibles. $\times 253$.
 4. Foot of fourth pair of thoracic feet. $\times 168$.
 5. Foot of fifth pair. $\times 300$.
 6. One of the male antennules. $\times 300$.
 7. Foot of third pair of thoracic feet (male). $\times 200$.
 8. Appendage to first abdominal segment. $\times 380$.

Dactylopus Strömii, var. *faröensis*, var. n.

- Fig. 9. Female, lateral view. $\times 53$.
 10. One of the antennules. $\times 168$.
 11. One of the mandibles. $\times 252$.
 12. Second maxilliped. $\times 300$.
 13. Foot of first pair of thoracic feet. $\times 200$.
 14. Foot of fifth pair. $\times 168$.

PLATE 3.

Dactylopus Strömsii, var. *faröensis*, var. n.

- Fig. 1. Foot of first pair of thoracic feet (male). $\times 252$.
 2. Foot of second pair (male). $\times 252$.
 3. Foot of fifth pair (male). $\times 252$.

Cletodes armata, sp. n.

- Fig. 4. Female, dorsal view. $\times 40$.
 5. Antennule and portion of cephalothoracic segment. $\times 152$.
 6. One of the antennæ. $\times 190$.
 7. One of the mandibles. $\times 252$.
 8. One of the first maxillipeds. $\times 300$.
 9. One of the second maxillipeds. $\times 380$.
 10. Foot of first pair of thoracic feet. $\times 253$.
 11. Foot of fourth pair. $\times 126$.
 12. Foot of fifth pair. $\times 190$.
 13. One of the male antennules. $\times 152$.
 14. Foot of third pair of thoracic feet. $\times 190$.
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Scott, Thomas. 1903. "Notes on some Copepoda from the Faroe Channel." *The Journal of the Linnean Society of London. Zoology* 29(187), 1–11.

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