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and weighing 52½ grammes, was torn off from its attachment to the glass and placed on the sand in the bottom of the tank. In four days it had re-attached itself to the glass by means of byssus threads. This shows, if any further demonstration was really required, that even Mussels which have attained to large size have the power of spinning fresh byssus threads by which they become anchored to surrounding objects.

SECTION IV.

Description of New and Rare Copepoda.

(By Mr. Andrew Scott.)

Family Harpacticidæ.

Sunaristes paguri, Hesse.

This rather peculiar and interesting species was obtained by washing the shells of *Buccinum* inhabited by the hermit crabs *Pagurus bernhardus*, collected in the trawl-net of the steamer while working at the mouth of the Mersey estuary on the 23rd of July, 1895. It seems to be a comparatively rare species and so far as is known this is only the third time it has been found in British waters. From our present knowledge of its distribution it appears to be confined to areas having large volumes of brackish water passing over the bottom, and has not been found in pure sea-water.

Sunaristes paguri is not unlike *Canuella perplexa* in general appearance but is readily distinguished from that species by the structure of the various appendages, especially the antennules and second pair of swimming feet of the male.

Stenhelia herdmani, n. sp. Pl. I., figs. 1—11.

Description of the species.—Female. Length 1·43 millim. ($\frac{1}{17}$th of an inch. Body moderately stout; rostrum prominent and curved. Antennules long and slender, eight-jointed; the first, second, fourth and eighth joints longer than the others, the fifth joint being the smallest of the series; the second, third and fourth joints have each a tuft of setæ on their upper distal margins. The proportional lengths of the various joints are as follows:—

$$\frac{14 \cdot 14 \cdot 8 \cdot 10 \cdot 5 \cdot 6 \cdot 7 \cdot 11}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8}$$

Antennæ moderately stout, secondary branch small and slender, two jointed; basal joint elongate narrow with one seta on its upper distal end, second joint short, about one third of the length of the first and furnished with two terminal setæ. Mandibles large and well developed, the broad biting part armed with a few large teeth and a number of smaller ones; mandible palp comparatively large, consisting of a one-jointed basal part which carries at its lower extremity two branches, one large and one small, the smaller of the two being two-jointed, whilst the larger one is composed of a single joint. Masticatory portion of the maxillæ furnished with a number of strong teeth, palp two branched, the outer one bearing three setiferous lobes. Anterior foot-jaws furnished with one large terminal claw and three digitiform setose tubercles. Posterior foot-jaws stout, of moderate length and furnished with a strong, slightly curved terminal claw at the base of which are two setæ; the basal joint of the foot-jaw has four small ciliated tubercles on its lower side, while the second joint has a row of fine cilia on its upper margin and a row of stronger cilia on its lateral surface a little way down from the upper margin, there are also two plumose setæ on the upper margin of the joint. First

pair of swimming feet somewhat similar to those of *Stenhelia ima*, Brady; basal joints of the inner branches nearly as long as the entire outer branches, second joint about half the length of the third which is less than one third the length of the long basal joint. Outer branches of the second, third and fourth pairs elongate, inner branches much shorter, those of the fourth pair only reaching to the end of the second joint of the outer branches. Fifth pair of feet large and well developed, inner branches considerably larger than the outer ones, with a subtriangular apex bearing five plumose setæ, two on the outer angle close together and three arranged at regular intervals along the inner margins; outer branches subovate, bearing six setæ on the external distal margins, the second seta from the inside is considerably longer than any of the others. Caudal stylets about as long as broad and about half the length of the last abdominal segment.

Habitat, 1 mile off Spanish Head, Isle of Man, in neritic material dredged from a depth of 16 fathoms, October 27th, 1895.

Remarks.—This large and well marked species though somewhat like *Stenhelia ima* in general appearance is readily distinguished from it and the other known members of this genus, by the form and armature of the fifth pair of feet, and by the structure and proportional lengths of the antennules.

Stenhelia similis, n. sp. Pl. I., figs. 12—25.

Description of the species.—Female. Length 1 millim. ($\frac{1}{25}$ of an inch). Body elongate, moderately robust; rostrum prominent and curved with a bifid apex. Antennules long and slender, sparingly setiferous, the second joint longer than any of the others and slightly contracted near the middle, but expanding again towards the distal end,

third, fifth, sixth and seventh joints small, the others of moderate length as shown by the formula :—

$$\frac{13 \cdot 24 \cdot 7 \cdot 12 \cdot 5 \cdot 6 \cdot 6 \cdot 10}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8}$$

Antennæ well developed, secondary branch three-jointed, second joint very small, terminal joint fully half the length of the basal one and furnished with two setæ on its apex, one large and spiniform and one very small; one seta springs from near the middle of the upper margin of the terminal joint, the basal joint bears one seta on its upper distal angle. Mandibles furnished with several strong and serrated teeth on the biting parts, mandible palp consisting of a basal part carrying two branches, the inner branch which is smaller than the outer is two-jointed, both branches are furnished with a number of setæ on the apex and upper margins, the basal part has three terminal plumose setæ, and a curved row of short spines on its lateral surface. Maxillæ somewhat similar to those of *Stenhelia herdmani*. Posterior foot-jaws slender and furnished with a short curved claw, basal joints short and furnished with three small plumose setæ on the upper distal margin, second joint fully three times longer than broad and bearing a few cilia and one seta on its upper margin, there are also a few spines on its lateral surface. The first four pairs of swimming feet are nearly as in *Stenhelia ima*, the joints of the outer branches of the first pair are subequal, basal joint of the inner branches nearly as long as the entire outer branch, second joint small and about half the length of the third which is about half the length of the basal joint, the apex of the third joint is furnished with one short stout spine and two plumose setæ, one long and one short. Fifth pair of feet large, inner branches broad and triangular, bearing five short plumose setæ from the middle of the

inner margin to the apex; outer branches elongate ovate, about two-thirds the length of the inner, proximal half of the outer margin ciliated, inner margin slightly ciliated towards the distal end, apex and distal half of the outer margin furnished with six setæ, the second from the inner part of the apex considerably longer than the others. Caudal stylets rather shorter than broad and about one-third the length of the last abdominal segment.

Male. Antennules ten-jointed, fourth and sixth joints very small. Swimming feet, with the exception of the second pair, similar to those of the female. Inner branches of the second pair two-jointed, second joint bearing at the apex two strong and slightly curved spines, the inner spine which is slightly longer than the outer one, becomes distinctly bifid at the middle. The form of the fifth pair of feet is somewhat similar to those of the female, but smaller and furnished with fewer setæ, the inner branches have only two setæ which are placed on the apex, the outer branches have two setæ on the outer distal margin, the lower one being stout and spiniform, two setæ on the middle of the inner margin and one seta on the apex.

Habitat, 1 mile off Spanish Head, Isle of Man, in neritic material dredged from a depth of 16 fathoms. A considerable number of specimens were obtained.

Remarks.—This species comes near *Dactylopus tenuiremis*, but can easily be distinguished from it by the structure and proportional lengths of the antennules, the length and armature of the inner branches of the first feet, and also by the structure of the fifth feet.

Stenhelia reflexa, T. Scott.

[T. Scott, Thirteenth An. Rep. Fish. Board for Scot., pt. III., p. 166, 1895.]

A few specimens of this *Stenhelia* were obtained from dredged material collected off Port Erin in June, 1895.

Ameira gracile, n. sp. Pl. II., figs. 1—11.

Description of the species.—Female. Length ·5 millim. ($\frac{1}{50}$th of an inch). Body elongate and slender, rostrum small and inconspicuous. Antennules long and very slender, seven-jointed; second and fifth joints longer than any of the others, fourth joint very short, the second, third and fourth joints have each a tuft of long setæ on the upper distal margins, the following formula shows the proportional lengths of the joints:—

$$\frac{9 \cdot 18 \cdot 10 \cdot 4 \cdot 13 \cdot 8 \cdot 9}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7}$$

Antennæ slender, three-jointed, secondary branch small, two-jointed, the second joint very small. Mandibles elongate narrow, apex obliquely truncate and armed with a number of teeth, mandible palp with a distinct basal part, narrow at the base but somewhat dilated towards the apex to which is attached a one-jointed elongate narrow branch. Posterior foot-jaws moderately robust and armed with a strong terminal claw, lower margin of the second joint furnished with a row of fine cilia. First pair of swimming feet elongate and slender, basal joint of the inner branches nearly as long as the entire outer branch, second joint about one-fourth the length of the basal joint and fully half the length of the third joint. Outer branches of the second, third and fourth pairs elongate three-jointed, inner branches also three-jointed but shorter than the outer branches. Fifth pair of feet foliaceous, the inner branch produced into a subtriangular lobe which reaches to about the middle of the outer branch and furnished at the apex with a stout setiform spine and a small seta, outer branch oblong ovate in shape, the greatest breadth being very nearly half the length, furnished with three setæ on the outer margin, one on the apex and one on the inner distal margin, both the

inner and outer margins are clothed with fine cilia. Caudal stylets long and narrow, being about five times longer than broad and nearly twice the length of the last abdominal segment.

Male. Antennules ten-jointed, fifth and sixth joints very small, hinged between the third and fourth joints and also between the seventh and eighth joints. The form of the fifth pair of feet is somewhat similar to those of the female, but the inner branch is much smaller.

Habitat, 1 mile off Spanish Head, Isle of Man, in neritic material dredged from a depth of 16 fathoms, a number specimens were obtained.

Remarks.—This species in general appearance is not unlike *Ameira longicaudata* but is readily distinguished from it by the shape of the cephalothoracic segment and on dissection by the characters described above. Nearly all the specimens obtained had the last three joints of the antennules broken off.

Ameira reflexa, T. Scott.

[T. Scott, Twelfth An. Rep. Fish. Board for Scot., pt. III., p. 240, 1894.]

One or two specimens of this *Ameira* were obtained from the shelly deposit dredged 1 mile off Spanish Head, Isle of Man, depth 16 fathoms. The species is easily distinguished from the other members of this genus by the structure of the inner branches of the first pair of swimming feet and also by the fifth pair of feet.

Canthocamptus palustris, Brady. Pl. II., figs. 12—23.

[Brady, Monograph Brit. Copep., Vol. II., p. 53, 1880.]

A considerable number of specimens of a copepod apparently belonging to this species were washed from mud adhering to samples of Mussels (*Mytilus edulis*) sent from the St. Annes Mussel beds near Lytham, one of the samples was from that part of the bed which never

becomes dry at low-water, and was obtained by means of a "mussel rake," it was from this sample that the first specimens were obtained, other samples sent later on in the year also contained numbers of specimens.

The specimens differ a little from the figures given by Dr. Brady in his "monograph," especially in the length of the basal joint of the first pair of swimming feet and also in the shape of the fifth pair of feet of the female.

Mesochra macintoshi, T. and A. Scott.

[T. & A. Scott, An. & Mag. Nat. Hist., Ser. 6, Vol. XV., p. 53, 1895.]

A number of specimens of this species were obtained from the shelly material dredged 1 mile off Spanish Head, Isle of Man, from a depth of 16 fathoms. The slender appearance of the species along with the structure and armature of its various appendages, enable it to be readily distinguished from the other members of the genus.

Tetragoniceps trispinosus, n. sp. Pl. II., figs. 24 and 25; III., figs. 1—6.

Description of the Species.—Female. Length ·5 millim. ($\frac{1}{50}$th of an inch). Body elongate cylindrical, tapering gently towards the posterior end, rostrum small and triangular in shape. Antennules long and slender, six-jointed and sparingly setiferous, the basal joint is considerably longer than any of the others, fifth joint very small, about half the length of the fourth; the proportional lengths of the joints are as shown by the following formula:—

$$\frac{28 \,.\, 13 \,.\, 14 \,.\, 8 \,.\, 4 \,.\, 16}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6}$$

Antennæ of moderate length and three-jointed, secondary branch small and rudimentary, consisting of a single seta attached to the lower margin of the second joint of the primary branch at a distance of about one-third from the base. Posterior foot-jaws small, with a strong curved

claw as long as the joint to which it is attached. Both branches of the first pair of swimming feet two-jointed, outer branches small, the joints subequal and reaching to about the middle of the basal joint of the inner branch; inner branches long and slender, basal joint nearly twice the length of the entire outer branch and fully seven times longer than broad, a moderately long seta springs from near the base of the inner margin. Second joint short and narrow, fully one-fourth the length of the basal joint, furnished at its apex with a short curved seta, a seta of considerable length springs from near the middle of the inner margin. Outer branches of the second, third and fourth pairs of feet elongate, three-jointed, inner branches short and narrow, one-jointed, in the fourth pair the inner branches are only about one-third the length of the basal joint of the outer branches and furnished at the apex with three short setæ. Fifth pair of feet small, one branched and divided into two distinct portions, an inner which is produced into an elongate curved spiniform apex devoid of setæ and an outer tubercle-like process which arises from near the base of the elongate portion furnished with two short stout setæ and one long slender hair. Caudal stylets elongate narrow, slightly divergent, tapering to an acute apex and about twice the length of the last abdominal segment; on the inner margin of each stylet at a distance of about one-third from the apex there arises a single seta which is fully two-thirds the length of the animal and having a slighly thickened base. Anal operculum semi-circular in shape and produced into three spines, a median and two lateral.

Habitat, 1 mile off Spanish Head, Isle of Man, in neritic material, dredged from a depth of 16 fathoms. Only two specimens were observed.

Remarks.—This species though placed in the genus

Tetragoniceps differs somewhat from the generic description given in the Monograph of the British Copepoda, especially in the number of joints in the outer branches of the first pair of feet and in the inner branches of the second, third and fourth feet, but as the mouth organs have not been satisfactorily worked out, it is perhaps better meanwhile to place it under the genus *Tetragoniceps* its nearest ally rather than institute a new genus for its reception.

Tetragoniceps consimilis, T. Scott.

[T. Scott, Twelfth An. Rep. Fish. Board for Scot., pt. III., p. 244, 1894.]

A few specimens of this species were obtained from the material dredged 1 mile off Spanish Head, Isle of Man, from a depth of 16 fathoms, it closely resembles *Tetragoniceps bradyi* in general appearance as well as in a few structural details, but differs from it in the absence of the strong hook on the second joint of the antennules, in the inner branches of the first pair of feet being three-jointed and in the fifth pair being composed of two distinct branches.

Laophonte propinqua, T. and A. Scott.

[T. & A. Scott, An. & Mag. Nat. Hist., Ser. 6, Vol. XV., p. 460, 1895.]

A few specimens of this species were obtained from material washed from sponges collected by Dr. Hanitsch at Port Erin, Isle of Man, in August, 1894; it is not unlike *Laophonte denticornis* at first sight but on closer examination is found to differ very markedly, not only from that species, but from any of the other known members of the genus.

Laophonte intermedia, T. Scott.

[T. Scott, Thirteenth An. Rep. Fish. Board for Scot., pt. III., p. 168, 1895.]

This species was obtained from the same material as the last, and also from the mussel beds at Duddon and Morecambe, it appears to be intermediate between *Laophonte lamellata* and *Laophonte hispida* but is quite distinct from either of them, the sub-conical form of the stylets alone enable it to be easily recognised when mixed up in a collection of Copepoda along with *L. lamellata* and *L. hispida*.

Pseudolaophonte, n. gen.

Description of the genus.—Pseudolaophonte resembles *Laophonte*, Philippi, in the structure of the antennules and antennæ; the mandibles, maxillæ and foot-jaws, and the first pair of swimming feet, but differs from that genus in the structure of the second and third pairs; the second pair of swimming feet consist of a single one-jointed branch, and the outer and inner branches of the third pair are each composed of two joints. The fourth and fifth pairs of feet are somewhat similar to those of *Laophonte*.

Pseudolaophonte aculeata, n. sp. Pl. III., figs. 7—23.

Description of the species.—Female. Length 1 millim. ($\frac{1}{25}$th of an inch). Body seen from above elongate narrow, of nearly equal breadth throughout, all the segments are more or less angular in shape and furnished with a row of short teeth on their posterior margins; surface of all the segments clothed with minute cilia; rostrum small and inconspicuous, with a small hair on each side of the base. Antennules moderately stout, four-jointed, first and third joints longer than the other two, the fourth joint being the smallest, the basal joint has a row of blunt pointed teeth on its upper margin and three rows on its lateral aspect, the middle row being the longest; a stout tubercle with a quadri-dentate apex arises from near the middle of the lower margin; second joint furnished on its

lower margin with a strong slightly curved tooth which reaches to near the middle of the basal joint, and forms with the dentate tubercle of that joint, a powerful grasping apparatus; the third joint is covered with minute spines for about three-fourths of its length, the remaining fourth being covered with fine cilia, the fourth joint is also covered with cilia and has the lower distal part produced into a strong spine, the following formula shows the proportional lengths of the joints:—

$$\frac{17 \cdot 11 \cdot 16 \cdot 6}{1 \quad 2 \quad 3 \quad 4}$$

Antennæ two-jointed and of moderate size, with a small one-jointed secondary branch arising from near the middle of the lower margin of the basal joint and furnished with four setæ. Mandibles small, with a few serrated teeth on the truncate apex, mandible palp very small, with ciliated margins and bearing three setæ on the apex. Maxillæ and foot-jaws somewhat similar to those of a typical *Laophonte*, the second joint of the posterior foot-jaw long and slender, being about four times longer than broad, the terminal claw is also long and slender and is considerably longer than the second-joint. First pair of swimming feet similar to those of a typical *Laophonte*, outer branch composed of two joints. Second pair of swimming feet rudimentary, consisting of a single one-jointed branch, bearing three setæ at the apex, the innermost being longer than the other two. Both branches of the third pair of feet two-jointed, the inner branch being slightly shorter than the outer. The fourth pair of feet has the outer branch three-jointed and the inner two, the basal joint of the outer branch is nearly as long as broad and is equal to the combined lengths of the second and third joints, the first and second joints have each one stout ciliated spine on the outer distal angle, the second joint

which is very narrow, is produced on the inner margin into a hook-like process furnished with a short seta, the third joint has three strong spines on the outer margin and apex, inner branches short, reaching to about the middle of the outer branch, the second joint is furnished with three short setæ on its apex. Fifth pair of feet large and foliaceous, inner branch triangular in shape, ciliated on the inner margin and covered with a number of more or less curved rows of cilia, the branch is also furnished with five moderately stout plumose setæ on its inner margin and apex; outer branch broadly ovate, and fully half the size of the inner branch, it is also covered with rows of cilia and bears five short stout plumose setæ on its apex. Caudal stylets elongate narrow, of moderate length, about three times longer than broad and slightly longer than the last abdominal segment; bearing on the inner angles of the apex, a short stout curved spine and near the middle the dorsal surface, a slightly shorter spine and a seta, the outer margins are furnished with two short setæ, the apex also bears two setæ, one of which is very long. Anal operculum produced into a short stout spine.

Male. Antennules six-jointed, first and second joints like those of the female, third and sixth joints very small, fourth joint considerably dilated. Mouth organs similar to those of the female. The first and second feet are also similar to to those of the female. The basal joint of the outer branches of the third pair of feet has a strong curved spine on its outer distal angle which is nearly twice the length of the joint itself and extends considerably beyond the end of the second joint, second joint of the inner branches produced into a curved spine which reaches to beyond the end of the outer branch, both branches of the third pair two-jointed. The fourth pair of feet has

the outer branch three-jointed and the inner two; the basal joint of the outer branches is longer than the combined lengths of the second and third joints and bears a strong spine on its outer distal angle, second and third joints of the outer branch of about equal length; inner branches very short reaching to about the middle of the basal joint of the outer branch, basal joint of the inner branch very small and only about one-fourth the length of the second joint. Fifth pair small, inner branch not produced, furnished with two plumose setæ on its apex, the inner one being three times longer than the outer; outer branch elongate narrow, bearing at its apex three stout setæ.

Habitat, 1 mile off Spanish Head, Isle of Man, in neritic material dredged from a depth of 16 fathoms; a number of specimens were obtained.

Remarks.—This species comes very near *Laophonte spinosa*, I. C. Thompson, especially in the structure of the antennules and mouth organs, but differs considerably in the structure of the second, third and fourth pairs of swimming feet; the outer branches of the second, third and fourth feet in *Laophonte spinosa* are two jointed and the inner three, whilst in *Pseudolaophonte aculeata* the second pair of feet consists of a single one-jointed branch, in the third pair each branch is composed of two joints and in the fourth pair the outer branch consists of three joints and the inner of two, the fifth feet also differ somewhat. The appendages of the male differ also from those of the male *Laophonte spinosa*.

Laophontodes bicornis, n. sp. Pl. III., figs. 24—25; IV., figs. 1—7.

Description of the species.—Female. Length ·5 millim. ($\frac{1}{25}$th of an inch). Body seen from above elongate narrow, the breadth gradually decreasing towards the posterior

end; all the segments are more or less angular in shape and with the exception of the cephalic segment, bear each a row of short teeth on the distal margin. Cephalothoracic segment broadly triangular in outline, the frontal portion being produced into a small rostrum, and the lateral margins near the distal end into strong curved spines directed backwards and extending slightly beyond the middle of the second segment. Antennules short, five-jointed, all the joints are of moderate length except the fourth which is very short; the proportional lengths of the joints are as shown in the following formula:—

$$\frac{13 \cdot 17 \cdot 22 \cdot 3 \cdot 13}{1 \quad 2 \quad 3 \quad 4 \quad 5}$$

Antennæ small, two-jointed without any secondary appendage. Mandibles and other mouth organs nearly as in *Laophonte*. The first pair of swimming feet are similar to those of *Laophontodes typicus*, and the second, third and fourth pairs are also similar to the corresponding feet of that species. The fifth pair are large and prominent and project outwards from the sides of the fifth segment; each foot consists of a single narrow elongate branch, composed of two-joints, furnished with one seta on the inner distal angle of the first joint and two on the outer angle, the second joint has two setæ on the inner margin, two on the apex and one on the outer margin, the basal joint has also a row of cilia on its inner margin. Caudal stylets long and narrow, about equal to the combined lengths of the last two abdominal segments.

Habitat, Off Port Erin, from dredged material collected June, 1895; only one specimen has been observed.

Remarks.—This species is easily distinguished from *Laophontodes typicus* the only other member of the genus, by the lateral projections of the cephalothoracic segment, the proportional lengths of the joints of the antennules

and the length of the caudal stylets; the fifth feet also differ, in this species they are two-jointed whilst in *Laophontodes typicus* they are composed of a single joint only.

Normanella attenuata, n. sp. Pl. IV., figs. 8—20.

Description of the species.—Female. Length 1 millim. ($\frac{1}{25}$th of an inch). Body elongate cyclindrical, slender. Antennules nine-jointed; the second much longer than the others, seventh and eighth joints very small, the others are of moderate length as shown by the formula:—

$$\frac{9 \,.\, 15 \,.\, 10 \,.\, 7 \,.\, 4 \,.\, 5 \,.\, 1 \,.\, 1 \,.\, 5}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9}$$

Antennæ three-jointed, stout and of moderate length, a small one-jointed secondary branch arises from the lower distal end of the basal joint of the primary branch and is furnished with two setæ; the lower one of which appears to be articulated to the apex of the joint. Mandibles slender with a serrated apex, basal portion of the mandible palp considerably dilated and bearing two one-jointed branches, the outer branch being much longer than the inner. Maxillæ and foot-jaws nearly as in *Normanella dubia*. Inner branches of the first pair of swimming feet long and slender, two-jointed, basal joint longer than the entire outer branch, second joint about one-third the length of the basal joint, bearing one curved spine and two setæ on the apex, outer branches three-jointed, shorter than the basal joint of inner branches. In the second and third pairs of feet, the inner branches are short, and two-jointed; the outer branches are considerably longer than the inner and three-jointed. Inner branches of the fourth pair of feet three-jointed and very short, only reaching to about the middle of the second joint of the outer branches. Fifth pair of feet foliaceous, two branched, inner branch large and subtriangular

bearing two setæ on the inner distal margin and two on the apex, outer branch pyriform, arising from the middle of the outer margin and extending considerably beyond the apex of the inner branch, bearing four setæ on its outer distal margin and two on the apex. Caudal stylets of moderate length, about twice as long as broad and fully half the length of the last abdominal segment.

Male. Antennules nine-jointed, sixth joint very short, the others of moderate length, hinged between the fourth and fifth joints and also between the seventh and eighth, all the other appendages with the exception of the fifth pair of feet are similar to the corresponding appendages of the female. The inner branch of the fifth pair sub-triangular in form bearing one stout plumose spine and two plumose setæ on its apex, the outer branch pyriform, bearing three setæ on its outer distal margin, and two on the apex, with a strong plumose spine between the two apical setæ.

Habitat, 1 mile off Spanish Head, Isle of Man, in neritic material dredged from a depth of 16 fathoms; very few specimens were obtained.

Remarks.—This species differs considerably in shape from *Normanella dubia* but the structural details are almost similar to those on which the genus was founded, the only differences being that the antennules have nine joints instead of seven, and the inner branches of the fourth pair of feet have three joints instead of two. These differences are not considered to be of sufficient importance to warrant the establishment of a new genus for its reception.

Cletodes similis, T. Scott.

[T. Scott, Thirteenth An. Rep. Fish. Board for Scot. Pt. III., p. 168, 1895.]

A few specimens were obtained from material washed

from sponges collected by Dr. Hanitsch at Port Erin, Isle of Man, in August, 1894. This species is very like *Cletodes lata* in general appearance but is easily distinguished from it on dissection by the structure of the antennules, the proportional lengths and armature of the outer and inner branches of the first pair of swimming feet, and also by the form of the fifth pair of feet.

Nannopus palustris, Brady.

Several specimens of this species were obtained in the mud collected from the Mussel beds near Duddon and from mud sent to the laboratory from the Fleetwood Oyster beds. It seems to be a brackish water species and in general appearance is very like *Platychelipus littoralis* another brackish water copepod, it can be distinguished from that species however, even without dissecting, by making an examination of the fifth pair of feet and also of the inner branches of the third and fourth pairs of feet. *Nannopus palustris* has two ovisacs and *Platychelipus littoralis* one only.

Idya elongata, n. sp. Pl. IV., figs. 21—24; Pl. V., figs. 1—5.

Description of the species.—Female. Length ·74 millim. ($\frac{1}{35}$th of an inch). Body seen from above elongate narrow, tapering rapidly towards the posterior end, the length being nearly equal to four times the greatest breadth; rostrum prominent with a bluntly rounded apex. Antennules short and comparatively stout; shorter than the cephalothoracic segment, eight-jointed; second and third joints longer than any of the others, as shown in the following formula:—

$$\frac{11 \,.\, 16 \,.\, 17 \,.\, 13 \,.\, 6 \,.\, 8}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6} \,.\, \frac{5 \,.\, 12}{7 \quad 8}$$

Antennæ, mandibles and maxillæ nearly as in *Idya gracilis*, T. Scott. Foot-jaws also similar to those of that

species but shorter and stouter. Inner branches of the first pair of swimming feet slender and of moderate length, basal joint nearly as long as the entire outer branch, and furnished with a plumose seta arising from the lower half of the inner margin and extending to slightly beyond the end of the branch, second joint fully two-thirds the length of the basal joint also furnished with a plumose seta arising from near the middle of its inner margin, third joint very small, bearing on its apex two stout spines and one short plumose seta; outer margins and proximal halves of the inner margins of the first and second joints fringed with short hairs, the joints of the outer branches are short and broad, the second joint is slightly shorter than the first and the third joint a little shorter than the second, the armature of the joints is somewhat similar to that of the first pair in *Idya furcata*; the spines are furnished with a row of moderately long cilia on the upper margins. Second, third and fourth pairs of swimming feet similar to those of *Idya furcata*. Fifth pair of feet very short being little more than half the length of the joint to which they are attached and extending only a little way beyond the base of the first segment of the abdomen, the length of each foot is about equal to twice the breadth, the secondary joint is furnished with three setæ on the apex, the innermost one being longer than either of the other two, outer very short; a short seta is attached to the outer margin a little way from the apex. Caudal stylets narrow and slightly divergent, length equal to about twice the breadth and nearly as long as the last segment of the abdomen.

Male. Antennules nine-jointed, hinged between the third and fourth joints and also between the seventh and eighth joints, fourth joint very small; the other appendages are similar to those of the female, fifth feet also similar to the fifth feet of the female but smaller.

Habitat, obtained from the mud collected on the Mussel beds between Morecambe and Heysham; only a few specimens were obtained.

Remarks.—This species is very distinct from *Idya furcata* and also from two other species recently described—*Idya longicornis*, T. and A. Scott, and *Idya gracilis*, T. Scott—and can easily be recognised from either of them by the elongate form of the animal, the short antennules and the small fifth feet.

Idya gracilis, T. Scott.

[T. Scott, Thirteenth An. Rep. Fish. Board for Scot., pt. III., p. 171, 1895.]

A number of specimens of this species were obtained from the shelly material dredged 1 mile off Spanish Head, Isle of Man, from a depth of 16 fathoms; it is easily recognised by the long and slender inner branches of the first pair of swimming feet and also by the shape and arrangement of the setæ on the fifth pair of feet.

Family SAPPHIRINIDÆ, Thorell.

Modiolicola insignis, Aurivillius.

Living as a messmate within the mantle of the "horse mussel," *Mytilus modiolus*. A number of specimens were found in the examples of this Mollusc which were brought up in the trawl-net of the steamer, while working in the vicinity of the north end of "the Hole" on March 23rd, 1895. This appears to be a widely distributed species of Copepod, its range being probably co-extensive with that of the Mollusc. It has been recorded from the Firth of Forth, the Moray Firth, and from the vicinity of Mull. It has also been obtained in specimens of the same species of Mollusc dredged by Dr. Norman in 1893, off Trondhjem in Norway.

Family Ascomyzontidæ, Thorell (1859).

Dermatomyzon gibberum, T. and A. Scott.

[T. & A. Scott, An. & Mag. Nat. Hist., Ser. 6, Vol. XIII., p. 144, 1894.]

A considerable number of specimens of this species were obtained by washing the common starfish (*Asterias rubens*) in weak methylated spirit and afterwards examining the sediment. It was taken from starfish collected at Hilbre Island and afterwards from the same species of starfish taken in other parts of the district; both males and females were found, many of the latter with ovisacs attached.

Collocheres elegans, n. sp. Pl. V., figs. 6—15.

Description of the species.—Female. Length 1 millim. ($\frac{1}{25}$th of an inch). Body elongate, subpyriform, anterior segment large and somewhat triangular in outline and equal to twice the combined lengths of the second, third and fourth segments, rostrum small and inconspicuous. Antennules moderately long, slender and sparingly setiferous, twenty-jointed; the first, eighteenth and twentieth joints of about equal length and longer than any of the others, the second and tenth joints slightly smaller than the others; a sensory filament springs from the end of the third last joint. The following formula shows the proportional lengths of the joints:—

9	2	3	3	3	3	3	4	4	2	3	6	5	6	6	6	6	9	3	8
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Antennæ three-jointed, basal joint long and narrow, bearing near the middle of the lower margin a small secondary branch, which consists of a single joint, nearly oval in outline and furnished with three small setæ on the apex and one near the middle of the upper margin, second joint of the antennæ about half the length of the first, third joint about two-thirds the length of the second and

bearing at the apex a long slender spine having a slightly thickened base, and a small hair; a short seta also springs from near the base of the upper margin. Mandibles elongate narrow, denticulated on the oblique apex, palp rudimentary and consisting of a single moderately long hair. Maxillæ two-lobed, both lobes of about equal length, but one is slightly narrower than the other and is furnished with one seta at the apex, the broad lobe has four setæ on its apex. Foot-jaws somewhat similar to those of *Collocheres gracilicauda* (Brady). First four pairs of swimming feet also similar to those of that species; the outer branches of all the four pairs are armed with short dagger shaped spines and the terminal joint of the inner branch of the fourth pair is furnished with one stout dagger shaped spine on the apex and a smaller one near the middle of the outer margin. Fifth pair of feet somewhat rudimentary, two-jointed, basal joint broadly triangular in shape, the second joint which is attached to near the middle of the outer margin of the basal joint is elongate, curved, and bluntly serrated at its apex, the length being about equal to three and one-half times the breadth; it is furnished with three setæ, one on the apex and two a little lower down on the outer margin and slightly separated from each other. Abdomen slender, four-jointed, genital segment elongate narrow, length nearly equal to twice the breadth, and longer than the combined lengths of the next three segments, second joint about one-third the length of the first, third joint slightly smaller than the second, fourth joint smaller than the third. Caudal stylets about four times as long as broad and nearly equal to the length of the last two segments of the abdomen.

Habitat, off Port Erin, from dredged material collected June, 1895, only one specimen has been observed.

Remarks.—This species is not unlike *Collocheres gracili-*

cauda and may perhaps have been passed over for that species, but it can be readily distinguished from it by the much shorter caudal stylets and also by the shape of the fifth pair of feet.

Ascomyzon thompsoni, n. sp. Pl. V., figs. 16—26.

Description of the species.—Female. Length 1 millim. ($\frac{1}{25}$th of an inch). Body broad, suborbicular in shape, cephalothorax broadly ovate, last segment of thorax and abdomen much narrower, rostrum not prominent. Antennules slender, twenty-one-jointed, the first being the largest and ciliated on its upper margin; second to eighth joints small and of about equal length, ninth joint smaller than any of the others, eighteenth joint furnished with a short sensory filament. The proportional lengths of the joints are shown in the following formula:—

48	7	7	5	6	6	6	7	8	4	7	8	11	8	12	11	14	15	7	8	7
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Antennæ four-jointed, first joint long and bearing near the distal end of the lower margin, a small one-jointed secondary branch, which bears at the apex a moderately long seta, a small hair also springs from near the middle of the upper margin; second joint of the antennæ shorter and narrower than the first and having its lower margin ciliated, third joint very small, fourth joint about as long as broad and bearing at its apex one strong curved spine and two setæ. Mandibles slender, and stylet shaped; palp elongate narrow, two-jointed, second joint about one-third the length of the first and bearing at its apex, one long and one short plumose seta. The maxillæ consist of a short basal joint bearing two lobes of about equal length, but one is considerably narrower than the other, each lobe is furnished with four plumose setæ; one of the setæ on the broad lobe is much stouter and longer than the others, two of the other setæ on the same lobe are

also comparatively stout but are only about half the length of the long seta. Anterior foot-jaws simple, bearing a strong curved apical claw. Posterior foot-jaws elongate slender, four-jointed, resembling those of *Dermatomyzon nigripes* (B. and R.). Both branches of the first four pairs of swimming feet short and stout, three-jointed and nearly equal in length. Fifth pair of feet rudimentary, two-jointed, inner joint short and broad, furnished with one plumose seta on its upper distal angle, outer joint elongate, length about equal to twice the breadth and bearing at its apex two moderately long plumose setæ and one small spine, both margins of the joint ciliated. Abdomen three-jointed, genital segment about as long as broad and nearly equal to the combined lengths of the next two segments and caudal stylets, second joint about half the length of the first, third joint about two-thirds the length of the second. Caudal stylets slightly longer than the last abdominal segment, length about equal to twice the breadth.

Habitat, 1 mile off Spanish Head, Isle of Man, in neritic material dredged from a depth of 16 fathoms; a few specimens only were obtained. A number of specimens have since been found in material washed from Ophiuroids (*Ophioglypha* and *Ophiothrix*) taken in the trawl-net off Blackpool, and sent to us by Mr. Ascroft.

Remarks.—This species is readily distinguished from the other members of the *Ascomyzontidæ* by the almost oval outline of the cephalothorax and on dissection by the structure of the mandible palp and maxillæ, the stout setæ on the larger lobe of the maxillæ appears to be a well marked character. Dr. W. Giesbrecht of the Zoological Station Naples, is preparing a monograph on this interesting family and an abstract which appeared in the Ann. and Mag. of Natural History for August, 1895,

shows a number of changes in the nomenclature and classification of the genera and species.

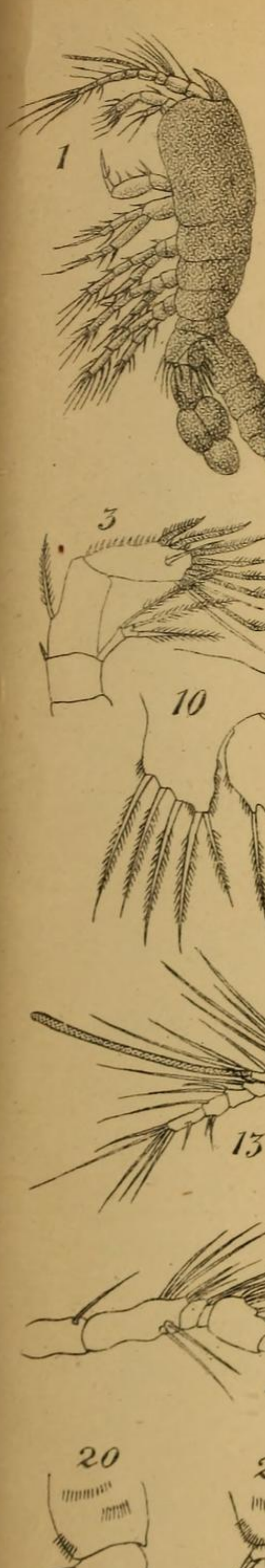
SECTION V.

Investigations on Oysters and Disease.

(By Professor Herdman.)

From the earliest times more or less well grounded suspicion has been cast from time to time upon shellfish—chiefly oysters and mussels—as being the cause of outbreaks of disease amongst consumers. These outbreaks fall into two categories:—1st Cases of sudden poisoning due to the presence of putrefactive products, and 2nd Diseases due to a specific micro-organism, where there is a period of incubation and where therefore a considerable interval has elapsed between the infection and the actual illness. In the latter case it is obviously much more difficult to determine with certainty the source from which the disease germ has entered the body; and although many positive assertions have appeared of late years attributing outbreaks of enteric or typhoid fever to the consumption of oysters, still it must be pointed out that the connection between the two has not yet been scientifically proved, and is only at present more or less of a possibility or, at most, probability.

Under these circumstances I suggested to my colleague Professor R. Boyce that the subject was one well worthy of our attention, and during the past year we have been making a number of observations and experiments, both in our Liverpool laboratories and at Port Erin, upon the conditions under which oysters live healthily, and upon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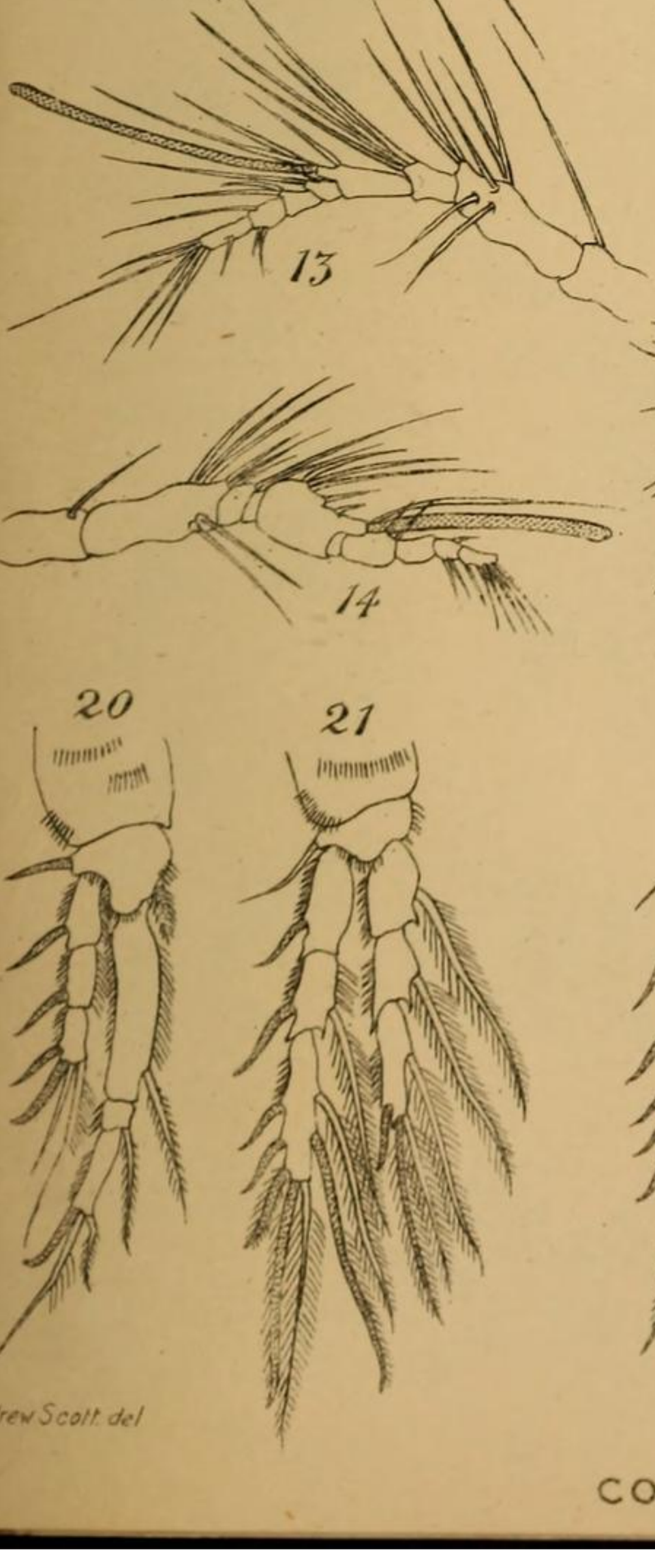
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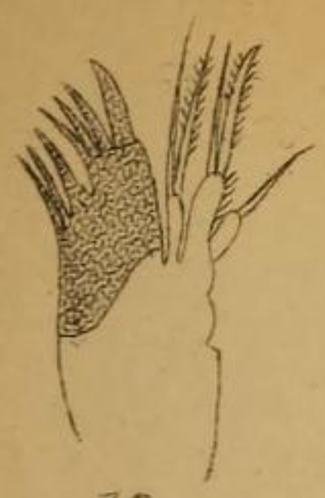
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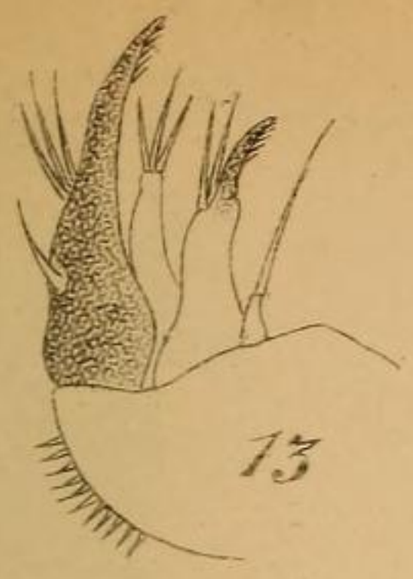
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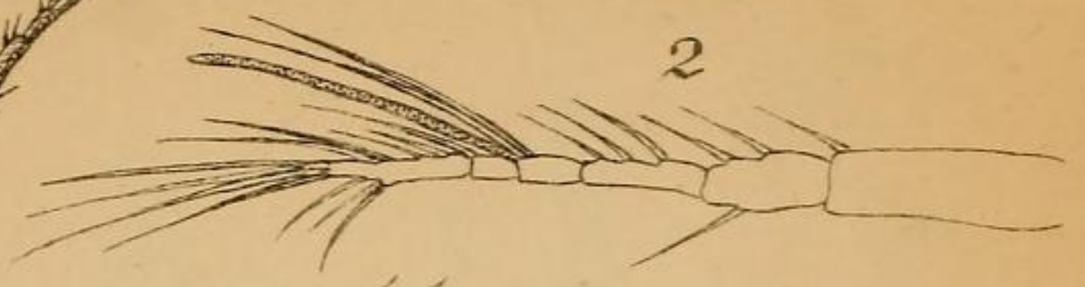
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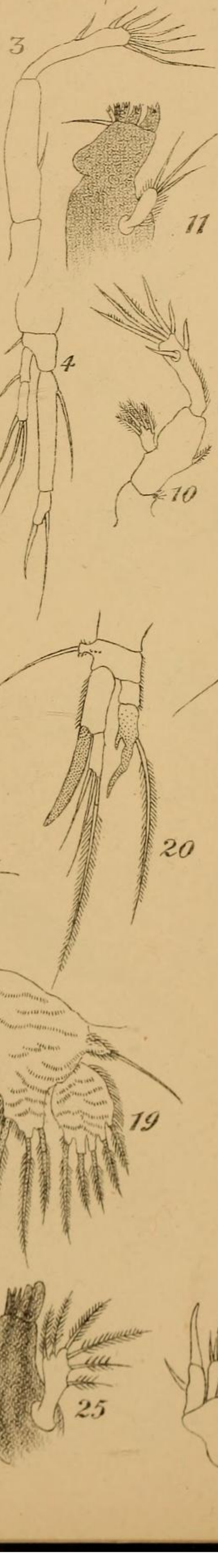
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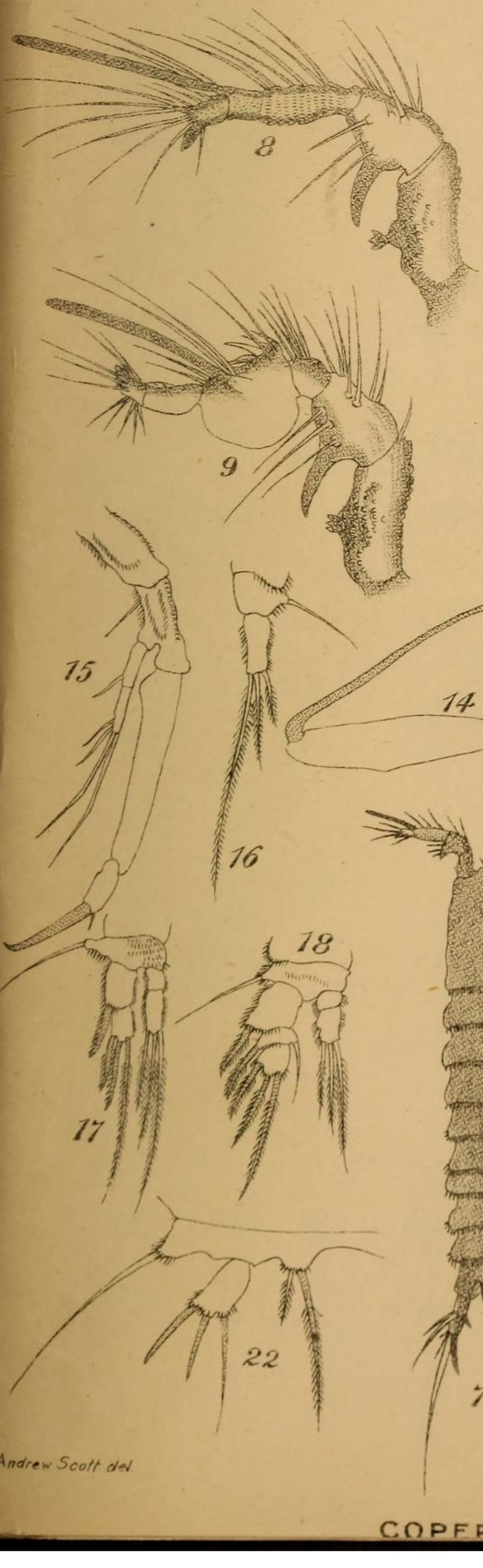
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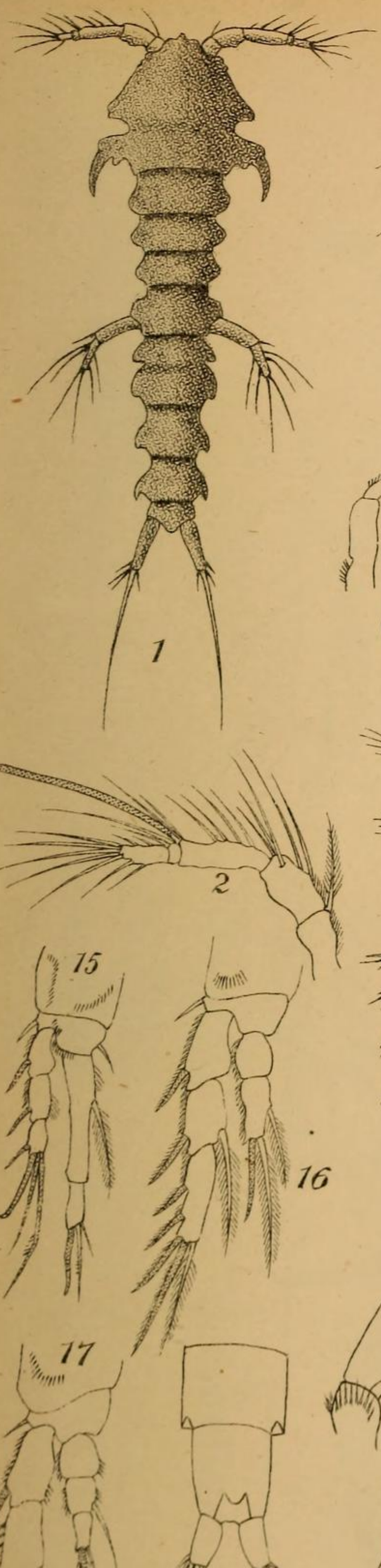
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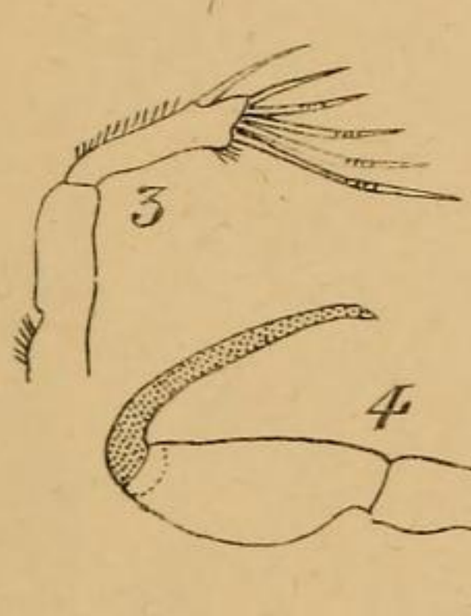
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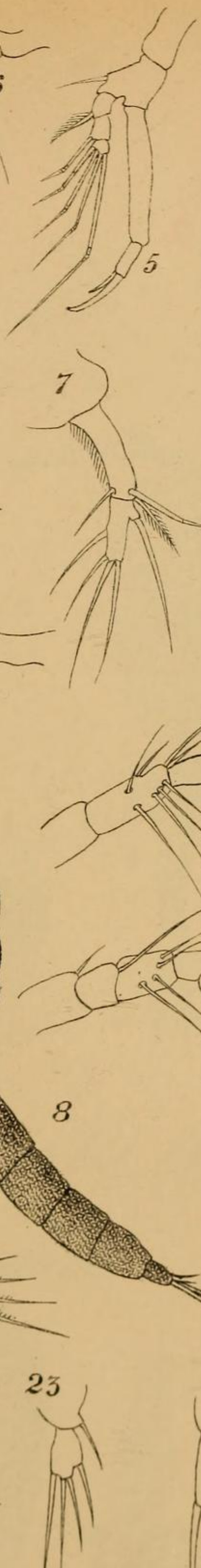
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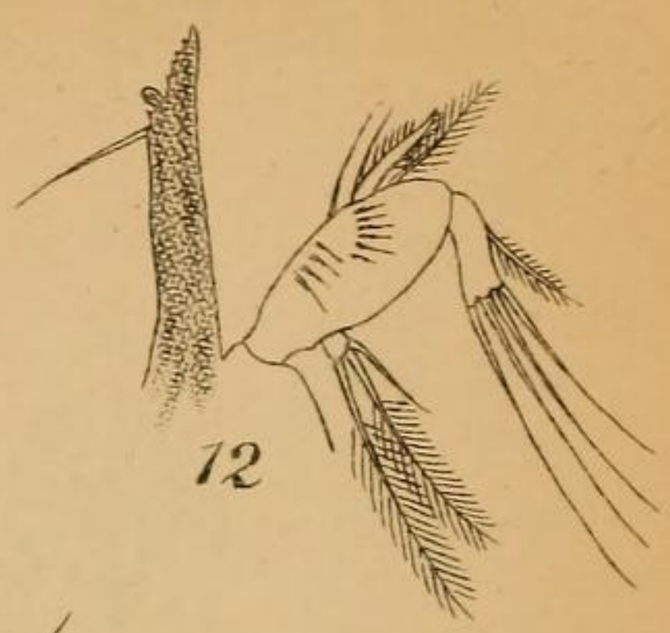
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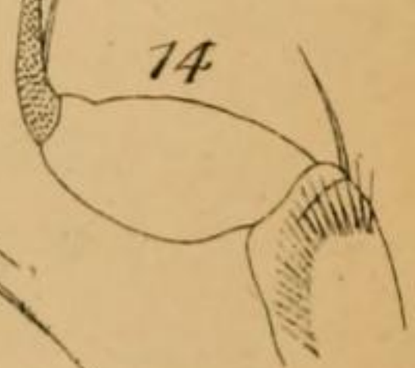
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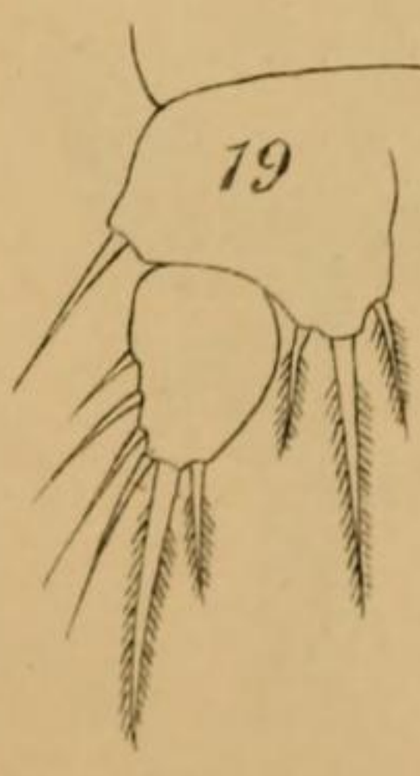
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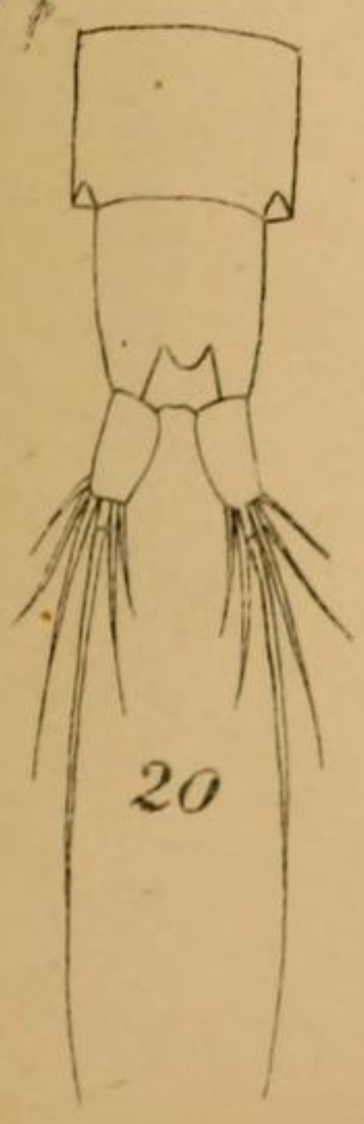
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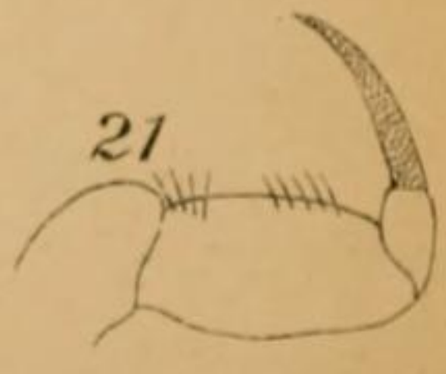
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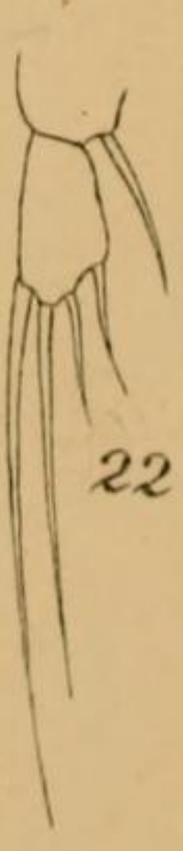
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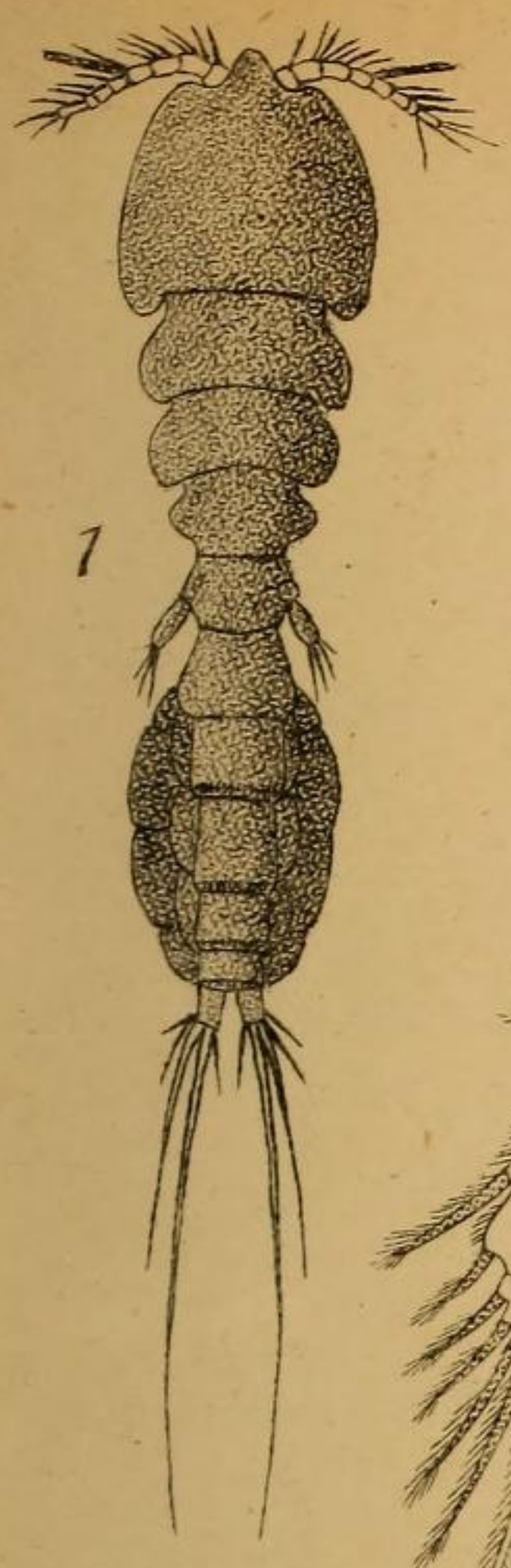
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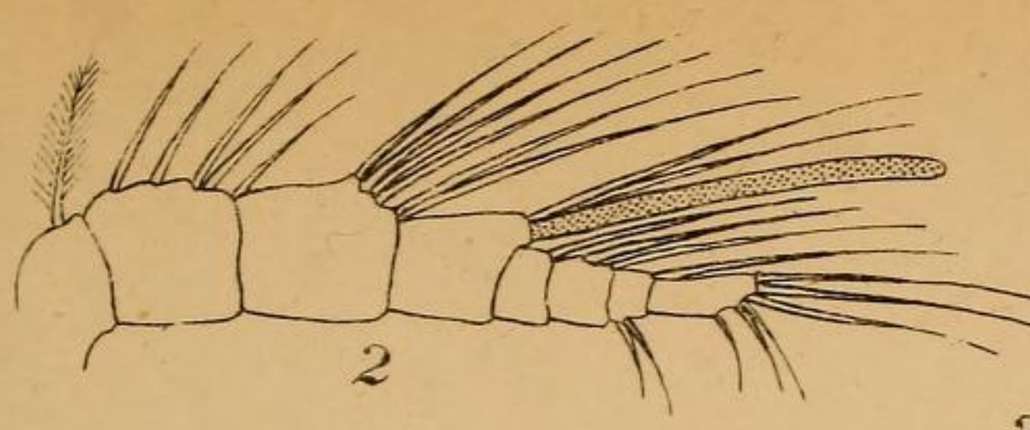
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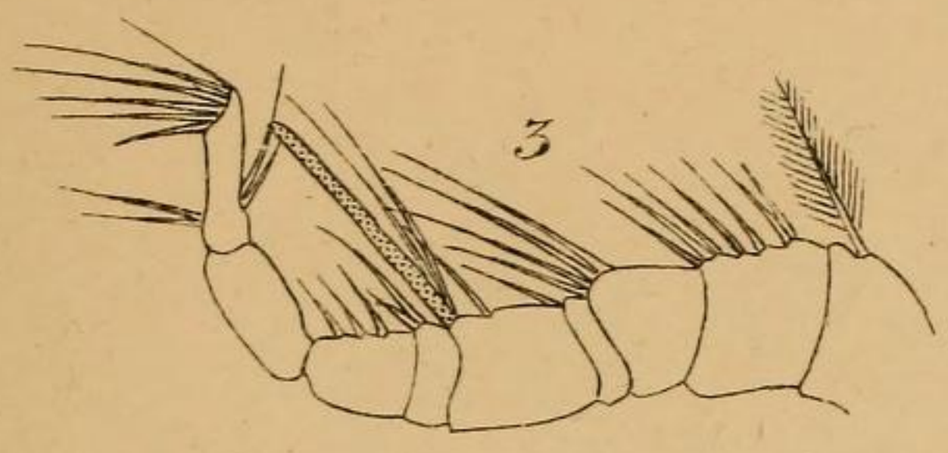
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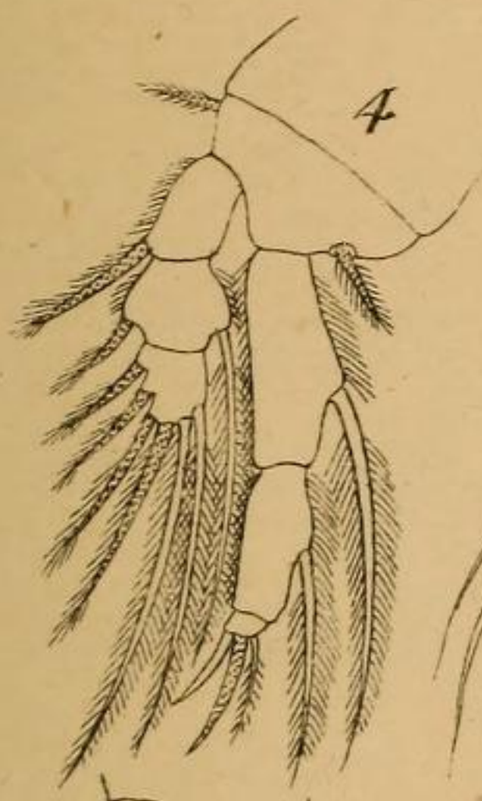
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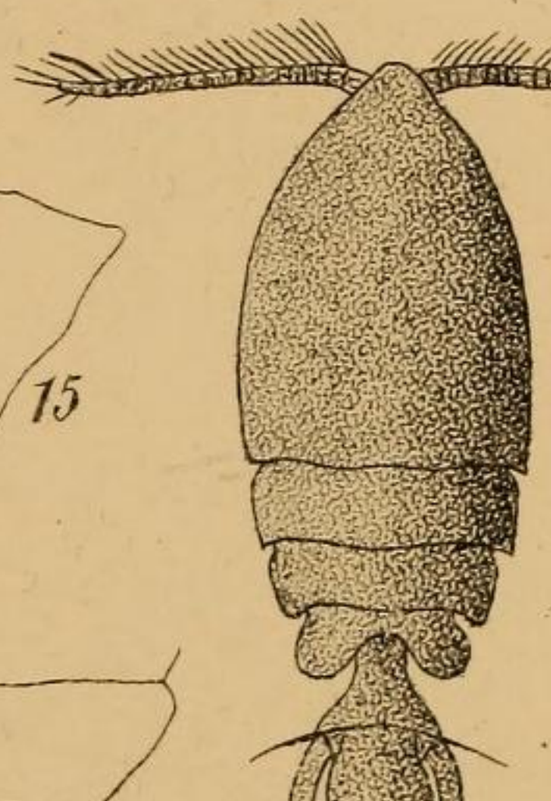
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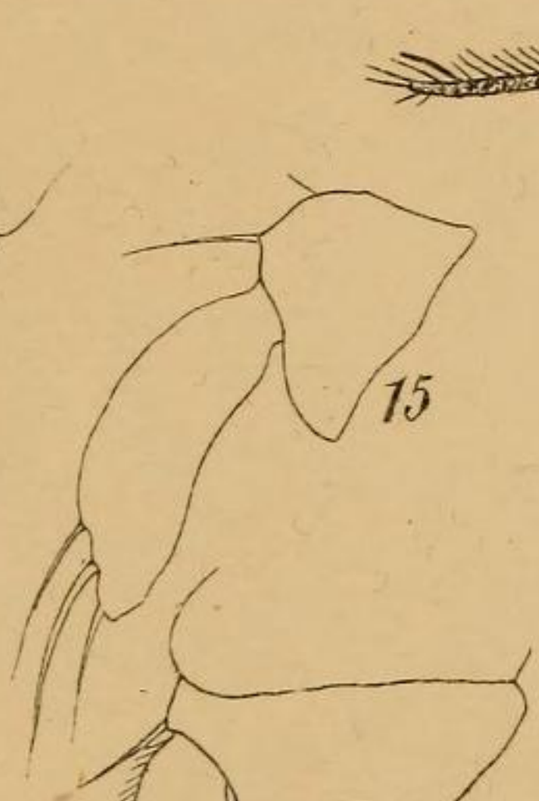
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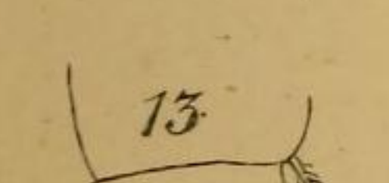
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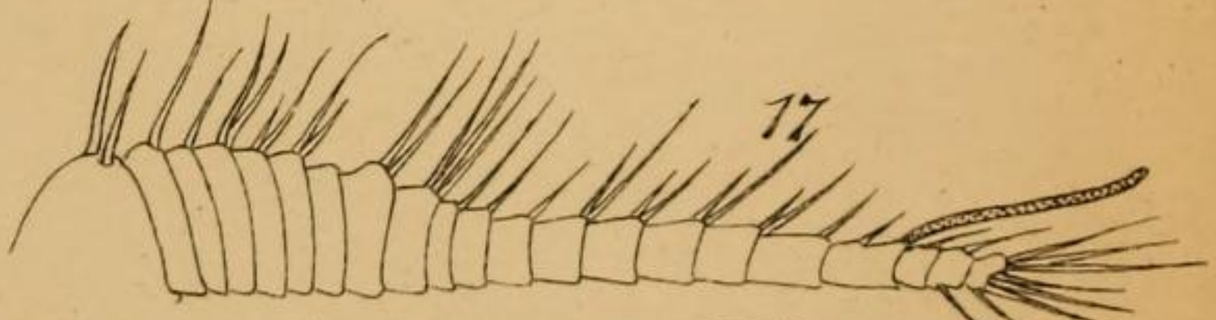
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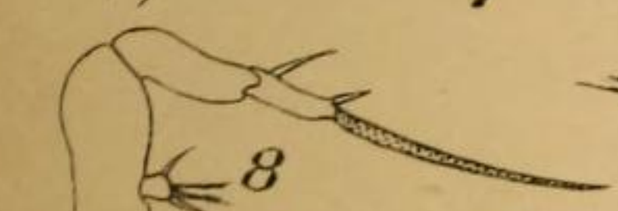
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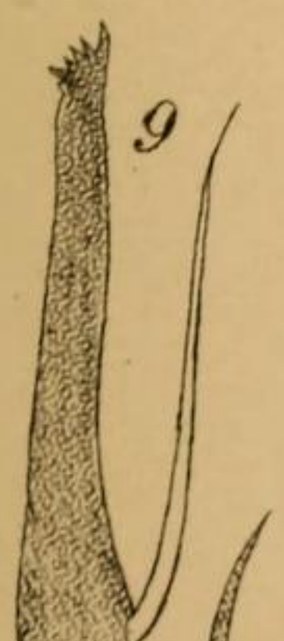
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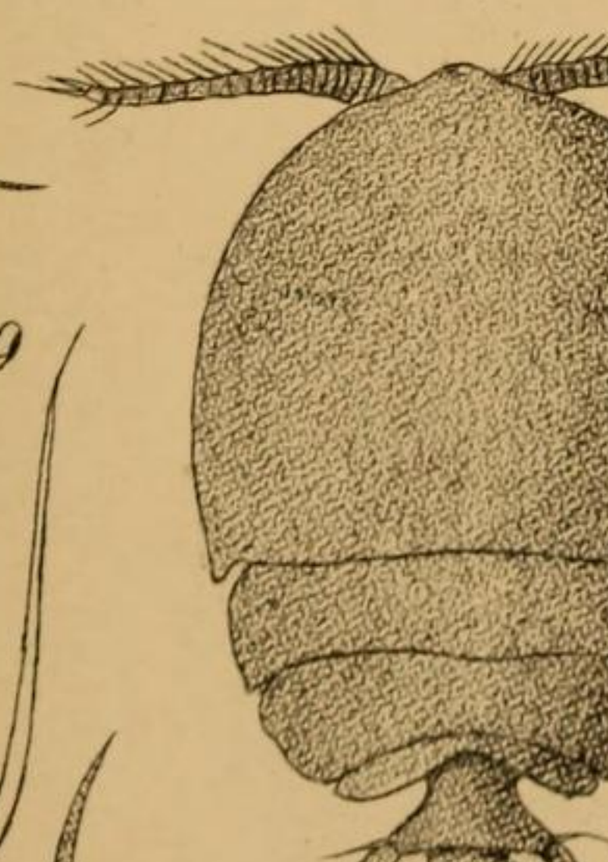
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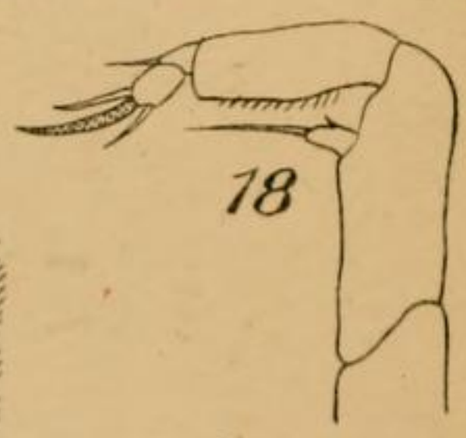
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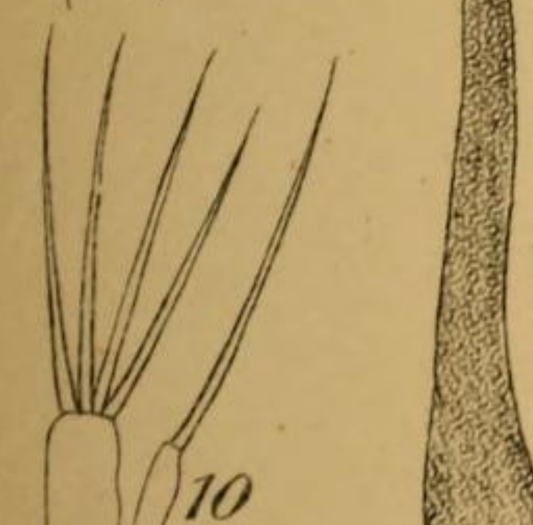
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