

*To the Marine
with the Author's kind
Regards*

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NOTES ON GATHERINGS OF CRUSTACEA, COLLECTED FOR THE MOST PART BY THE FISHERY STEAMER "GARLAND" AND THE STEAM TRAWLER "ST. ANDREW" OF ABERDEEN, AND EXAMINED DURING THE YEAR 1900.

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(Plates XVII. and XVIII.)

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INTRODUCTORY REMARKS.

These Notes form a continuation of the series of papers which have from time to time been published in Part III. of the Annual Reports of the Fishery Board for Scotland. The purpose of these notes is to record, in a more or less accessible form, some, at least, of the interesting organisms that have been, and still are being, obtained in connection with the investigations carried on under the authority of the Fishery Board.

It is now generally acknowledged that the Crustacea constitute a considerable portion of the food of our food-fishes, and, as will be shown in the sequel, several of the Crustaceans to be recorded here have only so far been obtained in the stomachs of fishes; a knowledge, therefore, of the kinds and distribution of these organisms is necessarily of more than merely zoological importance.

During the past year a considerable amount of information concerning the distribution of the Crustacea has been obtained, and a number of species have been added to the marine fauna not only of Scotland but also of the British Islands, while a few are apparently new to science. A considerable number of rare species have been obtained in gatherings collected by the "Garland" and forwarded to the Laboratory at Bay of Nigg. Several rich gatherings of Crustacea were also collected by the steam trawler "St. Andrew" of Aberdeen, which carried on some experiments to the east of the Orkney and Shetland Islands during the months of September and October last. One or two of the richest gatherings



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examined during the past year were collected by the "St. Andrew" off the Fair Island in October. The following are a few of the Crustacean species observed in the "St. Andrew" gatherings:—

<i>Eucalanus elongatus</i> (Dana).	<i>Arcturella delatata</i> , G. O. Sars.
<i>Eucalanus crassus</i> , Giesbrecht.	<i>Parananna bilobata</i> , G. O. Sars.
<i>Rhincalanus</i> (?) <i>gigas</i> , Brady.	<i>Macrostylis spinifera</i> , G. O. Sars.
* <i>Cyclopina longifurcata</i> , sp. n.	<i>Echinopleura aculeata</i> , G. O. Sars.
* <i>Eucanella spinifera</i> , gen. et sp. n.	<i>Diastylis cornuta</i> (Boeck).
<i>Macrocypris minuta</i> (Baird).	<i>Diastylopsis vesima</i> (Kröyer).
<i>Euonyx chelatus</i> , Norman.	<i>Leptostylis villosa</i> , G. O. Sars.
<i>Byblis gaimardi</i> (Kröyer).	<i>Peculocuma similis</i> , G. O. Sars.
<i>Aceros phyllonx</i> (M. Sars).	<i>Campylaspis rubicunula</i> (Lillj.).
<i>Lomatophilus tuberculatus</i> , Bruzel.	<i>Campylaspis costata</i> , G. O. Sars.
<i>Dulichia monacantha</i> , Metz.	<i>Erythropis serrata</i> , G. O. Sars.

Several organisms other than Crustacea were also observed in the gatherings collected by the "St. Andrew," the following of which may be mentioned:—

- Clio pyramidata*, Browne, obtained fifty miles S.E. of Fair Island (living when captured), October 19th, 1900.
Natica granlandica, Beck, dead, but fresh shell.
Siphonolentalium lofotense, Sars, a few specimens; and the following Foraminifera:—*Saccamina sphaera*, *Psammospira fusca*, *Astrorhiza arenaria*, *Placopsilina bulla*.

Some interesting collections were also sent from the "Garland," and especially those from the deep water off Aberdeen. Some moderately rare species belonging to the Amphipoda, Isopoda, Sympoda, and Macrura were obtained off Aberdeen, comprising such forms as the beautiful *Epimeria cornigera*, the curious *Lepidopercium longicornis*, and *Euonyx chelatus*, and also the following rare forms:—*Amphilocheilus intermedius*, T. Scott, *Metopina robusta* (G. O. Sars), *Cuma pulchella*, G. O. Sars, *Petalosarsia declivis*, G. O. Sars, *Pleurogonium inermis*, G. O. Sars, and a number of other minute species.

Copepoda were not very plentiful, neither in these gatherings nor in those collected by the "St. Andrew," but nevertheless interesting species will be found recorded in the sequel. A curious and somewhat abnormal form which was dredged by the "Garland" at Tarbert Bank, Loch Fyne, I have been unable to identify with any known species or genus, and have therefore recorded it under the name of *Cancerina confusa*; it resembles in some measure the *Cancerilla tubulosa* discovered by Sir John Graham Dalyell as the parasite of a Starfish, but it differs from that Copepod in several important points.

In concluding these introductory remarks, I desire to acknowledge my indebtedness to Mr. F. G. Pearcey of the "Garland" and to Mr. Dannevig for the valuable gatherings of Crustacea which they have collected, and which have yielded so many interesting species. I have also to thank Mr. H. C. Williamson for a few rare forms, and especially for *Ichthyocerus anguipes*, Kröyer, which he discovered in the Bay of Nigg, and of which there is no previous authentic British record.

My son, Mr. Andrew Scott, assisted by Mrs. Scott, has prepared the drawings necessary to illustrate several of the species described in the sequel.

* These were obtained in the stomach of a small fladdock captured about sixty-five miles south-east by east of Sumburgh Head, Shetland, on September 4th, 1900.

CRUSTACEA.

SUB-CLASS ENTOMOSTRACA.

Order I. COPEPODA.

GALANIDE.

Eucalanus elongatus (Dana); and *Eucalanus crassus*, Giesbrecht.

I have at different times during the past few years recorded these two species of *Eucalanus* from the north-east and north of Scotland, and this year I have again to note their occurrence in Scottish waters, but from a locality different from those previously mentioned—viz., at about fifty miles south-east of the Fair Island, between Orkney and Shetland. They were obtained in at least two tow-net gatherings collected on October 19th, 1900, by the steam trawler "St. Andrew." A number of specimens of both species were observed in this gathering.

Rhincalanus (?) *gigas*, Brady. (Pl. XVII., figs. 1-4.)

Rhincalanus gigas, Brady, Challenger Reports, vol. viii., Copepoda, p. 42, Pl. VIII., figs. 1-11.

Several specimens of a *Rhincalanus*, apparently belonging to *R. gigas*, Brady, were obtained in one of the tow-net gatherings collected to the eastward of the Fair Island, in which the two species of *Eucalanus* mentioned above were observed. Most of the specimens were females, and were apparently adult; about half a dozen males were also observed, but they were considerably smaller than the females, and appeared to be scarcely mature.

The only apparent difference between these female specimens and *R. gigas*, Brady, is in their size. The specimens of *Rhincalanus gigas* described by Dr. Brady measured from 8.5 to 10 millimeters, while those collected to the eastward of the Fair Island were 5 mm. in length. In these specimens the fifth pair of feet in the female are identical in form and armature with those of *R. gigas*. Figures 10 and 11 of Plate VIII. in Dr. Brady's "Challenger" Report probably represent the fifth feet and abdomen of a male specimen; they resemble closely figures 2 and 4 on Plate XVII. of this paper, which represent similar parts of one of the immature males in the collections from the Fair Island. Figure 3 (Plate XVII.) represents the last thoracic segment and abdomen of one of the female specimens. I am inclined to ascribe the Fair Island specimens to *R. gigas*, though they are somewhat smaller than those recorded by Dr. Brady, rather than to *R. nasutus*, Giesbrecht. It may also be noted in passing that *R. nasutus* is in some respects, and especially in the form of the female fifth feet, not very unlike *R. gigas*, Brady.

Stephus gyrens (Giesbrecht).

1892. *Mibianus gyrens*, Giesbrecht, Pelagischen Copep. d. Golfes v. Neapel, p. 205, Pl. 5, 9, 35.

1897. *Stephus gyrens*, T. Scott, Fifteenth Ann. Rept., Part III., p. 146, Pl. II., fig. 9; Pl. III., figs. 17, 18.

This distinct species was recorded for Loch Fyne in 1897, and up till last year this was the only Scottish locality where *Stephus gyrens* had been observed; now, however, I am enabled to record it from a second

locality, also in the West of Scotland, viz., in the Sound of Mull, where it was collected by the "Garland" in 72 fathoms on March 31st, 1900. This record shows that, though the species may be rare, its distribution in Scottish waters is probably fairly extensive.

Elidius armatus, G. S. Brady.

A few specimens of this curious species were obtained in tow-net gatherings collected to the eastward of the Fair Island in October, 1900, but they were all females, and in connection with this it is interesting to note that the specimens in the collections made by H.M.S. "Research" in the Shetland-Farøe Channel in July and August, 1896, were also all females.* In *Elidius armatus* the bifid rostrum with its stout spine-like branches, which projects from the front of the head at nearly right angles to the body, appears, when seen in profile, not unlike the beak of a bird. It was this character of the rostrum which suggested to Dr. Brady the name of the genus.†

Bradyidius armatus, Vanhöffen.

This species was collected with the tow-net in October, 1900, off the Fair Island.

Scolecithrix hibernica, A. Scott.

This species, which was discovered in the Irish Sea by my son, and which has been observed in the Firth of Clyde and the Moray Firth by myself, has now to be recorded from a new station—viz., about fifty miles south-south-east of the Fair Island, between Orkney and Shetland. It occurred in a gathering collected with a tow-net fixed to the head of one of the trawls of the steam trawler "St. Andrew," on October 16th, 1900, while that vessel was engaged in carrying on the investigations referred to in the preliminary remarks. This is the farthest north of any of the localities where *S. hibernica* has yet been observed.

CENTROPAGIDÆ.

Centropages typicus, Krøyer.

Specimens of this species were obtained in Lerwick Bay, Shetland, by the steam trawler "St. Andrew" while at anchor there in October last. It was also observed to be moderately frequent off the Fair Island on the 19th of the same month.

Centropages hamatus (Lilljeborg).

This *Centropages* occurred in a tow-net gathering collected in Lerwick Harbour about the same time as the specimens of *C. typicus* were collected.

Eurytemora affinis (Poppe).

This Copepod occurred in great abundance in some of the hatching boxes at the Sea-Fish Hatchery at Bay of Nigg, at the end of the hatching season last year (1900).

* Notes on the Animal Plankton from H.M.S. "Research." Fifteenth Annual Report of the Fishery Board for Scotland, Part III., p. 313 (1897).

† Report on the Copepoda collected by H.M.S. "Challenger," p. 75.

Metridia lucens, Boeck.

This species was taken with the surface tow-net in Lerwick Bay on October 15th, 1900. It was also obtained in a tow-net gathering collected about fifty miles south-east of the Fair Island on the 19th of the same month. *M. lucens* is not only smaller than *Metridia longa* (Lubbock), but the structure of the fifth feet is different.

Paramisophria clutha, T. Scott.

P. clutha, which was described in Part III. of the Fifteenth Annual Report of the Fishery Board for Scotland, has only hitherto been recorded for Loch Fyne, Firth of Clyde; I have now to record the species from the Cromarty Firth. It occurred in some material collected there on January 17th, 1900, and forwarded from the Fishery steamer "Garland" to the Laboratory at Bay of Nigg.

CANDACIDÆ.

Candacia pectinata, G. S. Brady.

This species was observed during the past year not only in tow-net gatherings from the Clyde and the Moray Firth, but also in one or two gatherings collected in October to the eastward of the Fair Island, between Orkney and Shetland, and also in Lerwick Bay. The distribution of *C. pectinata* would thus seem to be co-extensive with the British Islands.

PONTELLIDÆ.

Anomalocera patersonii, Templeton.

A number of specimens of this fine species occurred in one of the tow-net gatherings collected to the eastward of the Fair Island on October 19th. These specimens appeared to be even more highly coloured than those observed in the Clyde and the Moray Firth.

Acartia discaudata, Giesbrecht.

The only Scottish locality where, till recently, I have observed *Acartia discaudata* is the Firth of Forth, but I have now to record it from other two stations, from both of which specimens have been sent to the Laboratory at Bay of Nigg from the "Garland." At one of these stations—viz., Loch Eil, at the head of Loch Linnhe—specimens of *A. discaudata* were dredged in 10 to 30 fathoms on March 4th, 1900; while at the other—viz., Dornoch Firth, near Muckle Ferry—the species was moderately common in gatherings collected with the surface tow-net between the 16th and 17th of May.

Acartia bifilosa, Giesbrecht.

A second species of *Acartia*—*A. bifilosa*—was obtained in a tow-net gathering collected in Lerwick Harbour on October 15th, 1900, by the steam trawler "St. Andrew." It may be mentioned that another species of *Acartia*—*A. clausii*, Giesbrecht—was obtained during the investigations in which the "St. Andrew" was engaged. It was collected about seven miles off shore between Lerwick and Sumburgh Head on October the 16th, by passing the water from the donkey-pump through a tow-net. *Acartia clausii* occurred also in tow-net gatherings collected to the eastward of the Fair Island on the 19th of the same month.

CYCLOPIDÆ.

Pterinopsyllus insignis, G. S. Brady.

A few specimens of this somewhat rare species were obtained in some material collected in the Moray Firth about thirteen or fourteen miles north-east of Buckie, in about 50 to 55 fathoms, on November 3rd, 1900; one or two of them were females, and carried small roundish ovi-sacs, —these are the first specimens of *Pterinopsyllus* which I have seen carrying eggs.

Cyclopina gracilis, Claus.

Specimens of this small but distinct species were obtained in the store pond of the Sea-Fish Hatchery at Bay of Nigg on October 1st, 1900.

Cyclopina longifurcata, T. Scott (sp. n.). (Pl. XVII., figs. 5-14.)

Description of the female.—In this species the body is moderately stout, the forehead is narrowly but evenly rounded, and the abdomen is slender and elongated; the caudal furca are very long and somewhat lamelliform, being rather more than half the length of the abdomen; the entire length of the animal from the forehead to the end of the furca is about 1.56 mm. (about $\frac{1}{16}$ of an inch); (fig. 5).

The antennules (fig. 6) are slender and about as long as the cephalic segment; they appear to be composed of twenty-six joints, and are sparingly setiferous; all the joints are short, but the ultimate and penultimate joints are rather longer than the others; the formula shows the number and approximate proportional lengths of all the joints:—

Number of the joints,	1	2	3	4	5	6	7	8	9	10	11	12
Proportional lengths of the joints, 11.	4	4	3	3	3	4	5	6	4	5	5	4
No. of joints, 13.	14	15	16	17	18	19	20	21	22	23	24	25
Pro. len. of jts., 5	5	7	9	9	8	9	10	8	7	8	6	12

The antennæ are four-jointed, the joints are sub-equal and of moderate length, the third and fourth joints carry one or two long, slender, plain setæ at their distal extremities, the first joint is furnished with a few plumose hairs, three of which spring from a small tubercle situated near the distal end of the outer margin, as shown in the figure (fig. 7). This tubercle, with its fascicle of three plumose setæ, is probably a rudimentary secondary branch.

The mandibles are moderately stout, and provided with well-developed two-branched palps, the branches of which arise from a moderately stout basal joint, the upper branch is two- but the lower is four-jointed, both branches carry several long plumose setæ (fig. 8). The mandibles of this species have a general resemblance to those of *Cyclopina littoralis*, G. S. Brady.

The maxillæ, which are small, possess a distinctly two-branched palp, both branches of which are furnished with long plumose setæ, the manducatory lobe bears on its inner distal aspect one or two moderately stout and several small setæ, all of which are plumose (fig. 9).

The first maxillipedes resemble those of *Cyclopina littoralis*, they are moderately stout, apparently six-jointed, but though the basal joints are dilated, the end ones are small; the marginal lobe-like processes of the second and third joints are each armed with a moderately stout and long claw-like spine and a few setæ, while a number of stout plain setæ spring from the margins and apex of the three end-joints (fig. 10).

The second maxillipedes are also somewhat similar to those of *Cyclopina littoralis*. The first and second joints are elongated and moderately stout;

in the first the inner margin is slightly lobate towards the distal end, and one or two moderately stout setæ spring from the rounded apex of each lobe; the gently rounded inner margin of the second joint is fringed with minute hairs, and carries one or two setæ near its distal end; the remaining five joints are small, the end one is provided with two short and two long terminal setæ, a long seta also springs from the inner aspect of the penultimate joint, while the three preceding joints are furnished with a few setæ as shown by the drawing (fig. 11).

The first four pair of swimming feet are, each of them, two-branched and both branches are three-jointed. The outer branches of the first pair have their exterior margins armed with elongated spines arranged as follows:—One near the distal end of the first joint, one on the second joint, three on the margin and one (larger than the others) at the end of the third joint; a single long plumose seta springs also from the inner margins of the first and second joints, and four from the inner edge of the third joint. The first and second joints of the inner branches have no setæ or spines on the outer margin, but the first joint bears one and the second two setæ on the inner edge, while the third joint bears one seta near the middle of the outer margin, three on the inner margin, and two at the apex. The armature of the other three pairs of swimming feet is somewhat similar to that of the first, except that the third joint of the outer branches of the fourth pair carries five setæ on the inner margin; moreover, in the fourth pair the third joint in both branches is proportionally rather more elongated, being about equal to the entire length of the first and second joints combined (figs. 12, 13). The spines on the outer margins of the outer branches in all the four pairs are of a sabre-like form, with the edges minutely serrated.

The fifth pair of thoracic feet are each composed of a single two-jointed branch, the first joint is somewhat dilated, being about as broad as long, but the second is narrow and moderately elongated, and furnished with five setæ, one being situated near the middle of the outer margin, and four around the distal end (fig. 14).

Habitat.—In the stomach of a small Haddock, *Gadus aeglefinus*, L., 88mm. (about $3\frac{1}{2}$ inches) in length, captured 65 miles east by south of Sumburgh Head, Shetland, September 4th, 1900, by the steam trawler "St. Andrew."

Remarks.—The species now described agrees in some of its more important characters with the genus *Cyclopina* of Claus; but in that genus the antennules are described as being shorter than the cephalic segment, while the number of joints in those of the species hitherto recorded is not more than twenty-two or twenty-three; in *C. longifurcata*, on the other hand, the antennules are not only as long as the cephalic segment, but they are also apparently twenty-six-jointed; then again the antennæ of *Cyclopina* are described as four-jointed, but the third joint is very short, whereas in our specimen the third is as long as the fourth joint. Notwithstanding these and one or two other minor differences, the specimen seems to be a true *Cyclopina*. Only the one specimen was observed; and as it was apparently quite uninjured, it had probably only been a short time in the Haddock's stomach before the Haddock itself was captured.

ASCIDICOLIDÆ.

(1) *Enteropsis vararensis*, T. Scott (sp. n.). (Pl. XVII., figs. 28-34.)

Description of the female.—Length 1.2 mm. (about $\frac{1}{75}$ of an inch). Body robust, cylindrical, slightly recurved. The cephalon is very small.

and the cephalic appendages are therefore somewhat crowded together near the anterior end and on the ventral aspect of the body. The thorax exhibits a slightly articulated structure, but there is no apparent segmentation of the abdomen, this part of the body is not differentiated from the thorax; the caudal appendages are very small (fig. 28).

The antennules are very short and moderately stout; they taper towards the distal end, and are each composed of three joints of nearly equal length, and bear three short terminal spines, but are otherwise unprovided with spines or setae (fig. 29).

The antennae are simple, and are each composed of two dilated joints and armed with a strong terminal claw; there are no secondary branches (fig. 30).

The mandibles are of moderate length, and they each consist of a stout and slightly curved claw-like appendage; there does not appear to be a mandible palp (fig. 31).

The maxilla, which are of a simple structure, appear to be two-jointed, the basal joint is stout, but the end one consists of a somewhat narrow and elongated plate, rounded and slightly crenulate at the extremity (fig. 32).

Only one pair of maxillipedes could be made out, and these are very rudimentary; they each consist of a slightly elevated and broadly rounded prominence armed with a small apical spine (fig. 33).

The thoracic feet comprise four pairs, they are very small but comparatively stout, and appear to be all more or less uniform in structure. Each foot is composed of a single two-jointed branch, both joints are somewhat dilated, but the end one is much smaller than the other, and is armed with two short and apparently movable terminal spines (fig. 34). The position of the first pair is somewhat abnormal, they are not in line with the other three pairs, as is more or less usually the case with free-living species, but are situated round towards the lateral aspect; this position of the first pair does not appear to be accidental, but has been observed in the other specimens examined.

It will also be observed that the genital opening is situated on the dorsal aspect of the abdominal part of the body (see fig. 28).

Habitat.—In the branchial chambers of a compound Ascidian (*Botryllus* sp.), associated with *Botryllophilus* (?) *ruber*; not very common. The *Botryllus* was dredged in the Moray Firth in 1896.

Remarks.—This species, if not a true *Enteropsis*, is very closely allied to that genus. The most important point of difference seems to be the apparent absence of a mandible palp. If the presence of this appendage is clearly established in the other members of the species *Enteropsis*, the one now described may have to be removed to some other genus or a new one instituted for its reception.

Botryllophilus (?) *ruber*, Hesse. (Pl. XVII., figs. 15-27.)

1864. *Botryllophilus ruber*, Hesse, Ann. Sci. Nat., Zool. (5), t. i., Pl. XII., figs. 1-7.

1900. *Botryllophilus* (?) *ruber*, T. Scott, 18th Ann. Rept. Fishery Board for Scot., Part III., p. 388.

In my paper "Notes on some gatherings of Crustacea," published in Paper III. of the Eighteenth Annual Report, I recorded the occurrence of a *Botryllophilus*, in the Clyde and the Moray Firth, under the name of *Botryllophilus* (?) *ruber*, Hesse, but only the females had at that time been observed. In consequence of further research I am able to give a more detailed description of the species than was done last year, and to include

in it an account of the male as well as of the female. In my previous record of the species I stated that one of the peculiarities of *Botryllophilus* was "the almost constant existence of a single ovigerous sac of a strictly spherical form sheltered between the fifth feet." I now find that this sac in the specimens observed, both in the Clyde and the Moray Firths, is really composed of two sacs, partly adherent to each other and so closely joined as to appear as if they formed but a single globular mass.

Description of the female.—Length of the specimen figured, 1.16 mm. (about $\frac{1}{8}$ of an inch). The cephalothorax, which terminates anteriorly in a short bluntly rounded rostrum, is somewhat narrow in front, but becomes gradually dilated towards the posterior end and especially on the dorsal aspect. Scarcely any trace of segmentation can be made out in the cephalothoracic region, but this is probably due to the fact that the *Botryllus* in which the specimen was obtained had been for several years (since 1896) preserved in alcohol. The abdomen is narrow and elongated, but is rather shorter than the cephalothorax (fig. 15).

The antennules are very short and composed of four joints, the first is considerably dilated, the second is moderately stout but much smaller than the first; the third and fourth are small; the antennules are furnished with a number of long and moderately stout setae, which appear to be devoid of feathering (fig. 17).

The antennae, which are two-jointed, are comparatively long and slender and of nearly equal thickness throughout, they are each composed of two (or (1) three) joints; the end joint is provided with three stout spines on its inner margin, and a few spines and setae at the apex, the other joints appear to be unarmed (fig. 18). The antennae are not provided with secondary branches.

The mandibles and maxillae appear to be obsolete or very rudimentary.

The first maxillipedes are small and feeble, they are each composed of three joints, the second and third joints are sub-equal and rather smaller than the first; the first joint is unarmed, the second bears two or three spine-like setae on its inner aspect, and the third is provided with a few terminal setae of unequal lengths, the outermost being considerably longer than any of the others (fig. 19).

The second maxillipedes are short but somewhat robust, the basal joint is moderately distended, and larger than the second one, the third joint is very small, the end-joint is narrow and fully twice the length of the third and bears a short but strong terminal claw (fig. 20).

The thoracic feet.—All the thoracic feet, with the exception of the fifth pair, are short and robust and composed of two branches. In the first and second pairs, the inner branches are very short and two-jointed; about eight plumose setae of moderate length spring from the rounded apex of the second joint, and one from the inner margin of the first joint. The outer branches, which appear to be unarticulate, are rather longer than the inner ones and are armed with a few small marginal and apical spines, as shown in the drawing (fig. 21). In the third and fourth pairs the outer as well as the inner branches are two-jointed; the inner branches, which are somewhat alike in both pairs, are rather longer than those of the first pair, but their armature is somewhat similar, except that the end-joints bear six instead of eight plumose setae; the outer branches of the third pair are somewhat similar to those of the first except that there is an articulation between the two proximal marginal spines, dividing the branches into two joints (fig. 22); the outer branches of the fourth pair are less robust than the inner branches, but are nearly equal to them in length; a single small seta springs from near the end of the outer margin of the first joint, while the second is furnished with four apical and sub-

apical setae, the two outer sub-apical setae are small, but the other two are moderately stout and unequal in length, the inner one being the longest, both are feathered on the distal half (fig. 23). Each foot of the fifth pair consists of a single unarticulated branch, elongated and somewhat slender and spine-like; this pair, instead of being situated on the ventral aspect, which is the usual position in the majority of Copepods, are placed well round towards the back, and are probably utilised for supporting between them the egg-sacs which combine to form a globular mass on the dorsal aspect of the genital segment of the abdomen. This globular mass is easily detached, and would be even more so were it not supported and kept in position by the fifth feet (fig. 15).

The first segment of the abdomen is of moderate size, but the other segments are small; the caudal furca are very short and somewhat divaricate.

Description of the male.—The male is about half the size of the female, being only .825 mm. (about the $\frac{1}{30}$ of an inch) in length. The cephalothorax is distinctly segmented, and of a somewhat oval outline, the cephalic segment is moderately large, being equal to about two-fifths the entire length of the cephalothorax, but the thoracic segments are small. The genital segment of the abdomen is somewhat dilated, and equal to about half the entire length of the remaining segments and the caudal furca combined, the posterior portion of the abdomen is composed of what appear to be seven or eight distinct articulations, but with the exception of the ultimate segment they are for the most part very small; the caudal furca, which are scarcely equal in length to the last abdominal segment, are each provided with a small seta near the base of the outer margin in addition to a few short apical setae (fig. 16).

The antennules are very short and four-jointed, the first joint is moderately large and somewhat inflated, numerous delicate hairs spring from its rounded upper surface, as shown in the drawing (fig. 24). The remaining joints are small, the second one and the last are furnished with several delicate hairs similar to those on the first joint.

The thoracic feet.—The first four pairs of thoracic feet are all two-branched, and the outer branches are all three-jointed and armed on their exterior margins with strong sabre-like spines, the first and second joints being each furnished with one of these spines, and the third joints with three, except that the third joints of the first pair carry four spines; in all the outer branches the terminal spines are considerably larger than the others. Moreover, in the outer branches of all the four pairs, the inner margins of the first joints appear to be devoid of spines or setae, but the second joints are each provided with one plumose seta on the inner margin; on the other hand, the third joints of the outer branches of the first pair have only four plumose setae on their inner margin, while on the inner margin of the third joints of the next three pairs there are five plumose setae, so that though the outer branches of the first pair have one spine more than the other three pairs, the number of setae is correspondingly fewer.

But although all the four pairs of thoracic feet are somewhat similar as regards the structure and armature of the outer branches, a considerable divergence is observable when the inner branches are compared. In the first pair of feet the inner branches are composed of a single small but somewhat tumid joint bearing one or two claw-like spines (fig. 25). In the second and third pairs the inner branches are three-jointed, but considerably shorter than the outer branches; in each of the inner branches the first joint bears one and the second and third two moderately elongated plumose setae, in addition to two small sabre-like terminal spines

(fig. 26). In the fourth pair the inner branches are two-jointed, and not much more than half the length of the outer branches; a moderately long plumose seta springs from the inner margin of the first joint, and three similar setae from the inner margin of the second joint; the inner branches are also provided with two small apical spines (fig. 27).

Remarks.—It is probable that the species described above may be new to science, as it does not agree very satisfactorily with any described species known to me; but in the meantime I prefer to place it under the *Botryllophilus ruber* of Hesse, with which it agrees in some of its more characteristic features.

HARPACTICIDÆ.

Longipedia minor, T. and A. Scott.

Specimens of this Copepod were obtained in a gathering collected at 72 fathoms in the Sound of Mull, on March 31st, 1900. There can be no reasonable doubt as to there being two distinct forms of *Longipedia*, a larger (*L. coronata*, Claus), and a smaller (*L. minor*, T. and A. Scott), for ova-bearing females of both are occasionally obtained. Whether the smaller form should be regarded as a species or a variety is a question that is comparatively unimportant; the two terms are in not a few instances convertible, as their use depends to a large extent merely on one's opinion as to the value that should be placed on certain observed differences either in structural details or otherwise.

Canuella perplexa, T. and A. Scott.

This fine species was obtained in tow-net gatherings collected in Dornoch Firth, near Muckle Ferry, on May 19th, 1900. This is a new station for *Canuella perplexa*.

Eucanuella, T. Scott (gen. nov.).

Eucanuella is, in some respects, not unlike *Longipedia*, Claus, but is somewhat intermediate in structure between that genus and *Canuella*. *Eucanuella* differs from both of the genera named in the structure of the antennae, of the maxillae and of the second maxillipedes, and to some extent in that of the first thoracic feet; it agrees with *Canuella* in the structure of the second, third, and fourth pairs of feet, and to some extent in that of the first pair, but differs in that of the fifth pair; it agrees with *Longipedia* in the structure of the third, fourth, and fifth pairs of thoracic feet, and to some extent in that of the first pair, but differs in that of the second pair. As there is but the one species of *Eucanuella*, a detailed description of the various points referred to will be found in the specific definition.

Eucanuella spinifera, T. Scott (sp. n.). (Pl. XVIII, figs. 1-10.)

Description of the female.—Body elongated, moderately stout, gradually tapering towards the extremity of the abdomen; length, 1.33 mm. (about $\frac{1}{2}$ of an inch). The forehead terminates in a broadly conical rostrum, the apex of which is rounded. The first cephalothoracic segment is about as long as broad, and equal to fully the entire length of the remaining segments of the thorax, which are all moderately short. The posterio-lateral angles of the fourth joint of the thorax and the first joint of the

abdomen are produced backward into distinct tooth-like processes. The caudal furca are moderately stout and rather longer than the last abdominal segment (fig. 1).

The antennules are short and seven-jointed, and also moderately setiferous; the first four joints are moderately large and tumid, but the last three are very small; the second joint is armed with a short conical tooth on its exterior aspect, and a stout and elongated plumose seta springs from the interior distal angle of the fourth joint (fig. 2). The formula shows the proportional lengths of the joints of the antennules:—

Numbers of the joints, . . .	1	2	3	4	5	6	7
Proportional lengths of the joints, . . .	13	7	16	9	4	4	9

The antennae.—The primary branches of the antennae are three-jointed, the joints, which are sub-equal in length, are moderately elongated, a secondary four-jointed branch is articulated to the distal end of the first and is nearly equal to it in length; the last three joints of the secondary branches are small and their entire length scarcely exceeds that of the preceding joint. Both branches of the antennae are provided with a number of plumose setae of moderate length (fig. 3). In *Longipedia* and *Canuella* the antennae differ from those just described, not only in the character of the basal joints and in the manner in which the secondary branches are hinged to them, but also in the secondary branches, in both being six- instead of four-jointed.

The mandibles are moderately stout, sub-cylindrical, and truncate at the apex, each mandible is armed with several coarse apical teeth, and provided with a well-developed two-branched palp; the branches of the palp are supported on a slightly tumid basal joint; the terminal branch appears to be unarticulate, but the posterior branch is composed of about four joints, the three end ones of which are minute, both branches are moderately setiferous (fig. 4).

The maxillae are each furnished with a distinct manducatory lobe armed with several moderately long and awl-shaped apical spines; the palp is obscurely two-branched and turned toward the same side as the manducatory process, it is also furnished with a number of slender and moderately elongated setae (fig. 5).

The first maxillipedes are robust and somewhat similar in structure to those of *Canuella* (fig. 6).

The second maxillipedes are smaller than the first pair, and are apparently four-jointed; the first joint is larger than the other three combined, but the third and fourth are very small. These maxillipedes are armed with several stout and spiniform marginal setae and two or three elongated spines, two spines at the end and on the inner aspect of the first joint have a fringe of minute hairs along the interior edge, while another at the end of the second joint is lancet-shaped, and has both margins of the distal half minutely serrated (fig. 7).

The thoracic feet.—The first four pairs of thoracic feet are each composed of two branches, and both branches are three-jointed. The outer branches of the first pair are considerably more elongated than the inner branches, and they are also more robust, they are armed with moderately elongated, stout, and spiniform marginal and terminal setae; a single and somewhat slender plumose seta also springs from the inner margin of each of the three joints of the outer branches, as shown in the figure (fig. 8). The inner branches are not much more than half the length of the outer ones, they are composed of three subequal and sparingly setiferous joints; the inner distal angles of the first and second joints are continued into

tooth-like projections. A strong spine with ciliated edges extends downwards from the interior distal angle of the second basal joint of the first pair. The second, third, and fourth pairs are very similar to the same appendages in *Canuella*, in each pair the length of the inner and outer branches is subequal and both are slender and elongated (fig. 9). The fifth pair are somewhat like those of *Longipedia*, in each foot the basal joint is almost rudimentary, and consists of a narrow plate which extends laterally outwards into a small cylindrical lobe, bearing at its apex an elongated and slender plumose seta; the secondary branch is elongate-narrow and sub-cylindrical, about four times longer than broad, and furnished with one long and plumose terminal seta and a sub-terminal and shorter one; a small seta also springs from near the middle of the outer margin. Interiorly the basal joint is not produced, nor does it appear to carry either spines or setae (fig. 10).

Habitat.—Found in the stomach of a small Haddock captured about sixty-five miles south-eastward of Sumburgh Head, Shetland, September 4th, 1900. Obtained also in some bottom material collected with a tow-net about fifty miles south-eastward of the Fair Island, between Orkney and Shetland, October 19th, 1900. The tow-net had touched the bottom, and when hauled up was found to contain a quantity of sand, amongst which were several rare Crustaceans. The vessel on which these collections were made was the steam trawler "St. Andrew," of Aberdeen.

Remarks.—The species described above, while agreeing in some respects both with *Longipedia*, Claus, and *Canuella*, T. and A. Scott, presents too many points of difference to permit of its being ascribed to either of these two genera. I have already drawn attention to the fact that the secondary branches of the antennae in *Eucanuella* are only four-jointed, whereas in *Canuella* and *Longipedia* the secondary branches are composed of six joints; and it has also been shown that the second maxillipedes in *Eucanuella* are more fully developed than they are in either of these two genera. It has also to be noted that whereas in *Eucanuella* in the branches of the second pair of thoracic feet the inner and outer branches are about equal in length, the inner branches of the same pair in *Longipedia* are remarkably elongated; and, further, in *Eucanuella* the fifth pair of feet have the secondary joint moderately developed and somewhat similar in form and armature to the fifth pair in *Longipedia*, but in *Canuella* the fifth pair are quite rudimentary. There are other points of difference, but these are quite sufficient to distinguish *Eucanuella* from either *Canuella* or *Longipedia*, to which it is no doubt closely allied.

Bradya typica, Boeck.

This species was obtained in material dredged in the Moray Firth, and examined during last year.

Bradya hirsuta, T. and A. Scott.

One or two specimens of this distinct species were obtained in the same gathering as the last; it is a moderately large species with strongly divergent caudal furca.

Bradya elegans, T. and A. Scott.

This species has not only been observed in the Moray Firth along with the others just referred to, but it has also been obtained in material dredged by the "Garland" in Loch Eil, at the head of Loch Linne, in 10 to 15 fathoms, on the 3rd of April last year.

Bradya similis, T. and A. Scott.

Bradya similis has been obtained during the past year in material dredged by the "Garland," both in the Moray Firth and in 45 fathoms off Aberdeen; this species is considerably smaller than *Bradya hirsuta*, but the caudal furca are, as in that species, distinctly divergent.

Tachidius littoralis, Poppe (1881). [= *T. crassicornis*, T. Scott (1892).]*

This small species, distinguished at first sight from *T. brevicornis* by its short, stout antennules, which terminate so abruptly that they appear as if the ends had been broken off, was found in the store-pond of the Sea-Fish Hatchery at Bay of Nigg. It is a littoral species, and its presence in the store-pond seems to indicate that it may also occur in the Bay. It was observed in the pond on November 29th, 1900.

Zosima typica, Boeck.

This species was obtained in some material dredged in Loch Eil, at the head of Loch Linnhe, on April 3rd, 1900. It has also been obtained during the past year in a gathering of Crustacea from the Moray Firth forwarded from the "Garland."

Stenelia hispida, G. S. Brady.

This fine species occurred in the same gathering from Loch Eil in which the *Zosima* was obtained; although the species appears to have a fairly extensive distribution, and is occasionally obtained in moderate numbers, it seems nevertheless to be somewhat local.

Stenelia intermedia, T. Scott.

This species, which was described in Part III. of the Fifteenth Annual Report from specimens obtained in Kilbrennan Sound, Firth of Clyde, has been obtained also in the Moray Firth, having occurred very sparingly in some dredged material sent from the "Garland."

Ameira longipes, Boeck.

This does not appear to be a very common form, and I have only occasionally met with it. Its distribution, however, seems to be moderately extensive; it was obtained in a gathering of dredged material collected at 72 fathoms in the Sound of Mull, March 31st, 1900, and forwarded from the "Garland" to the Laboratory at Bay of Nigg.

Laophonte intermedia, T. Scott.

A number of *Laophontes* have been observed during the past year. *L. intermedia* is a distinct and moderately rare species, and I have now to record its occurrence in the Bay of Nigg, near Aberdeen, where it was obtained on October 1st, 1900.

Laophonte denticornis, T. Scott.

This species, which is also moderately rare, was dredged from 72 fathoms in the Sound of Mull, March 31st, 1900. The specimens from which the species was described were dredged off St. Monans, Firth of Forth, in 1893.

* Tenth Ann. Rept. Fishery Board for Scotland, Part III., p. 250, Pl. VIII., figs. 14-27 (1892).

Cletodes linearis, Claus.

This was contained in a gathering of Clyde Crustacea dredged between Sanda and Bennan Head on November 3rd, 1896, but only recently examined. The species seems to be rare in the British seas.

Cletodes monensis, I. C. Thompson.

This somewhat curious species was first made known to science by Mr. I. C. Thompson, of Liverpool, in 1893.* Some time afterwards, but also in the same year,† I recorded its occurrence in the Moray Firth, where, along with some other rare Crustaceans, it had been obtained by washing lumps of *Filograna implexa*, which had been brought up in the net of the shrimp-trawl from a depth of about 40 fathoms, about five to seven miles to the northward of Rosehearty. On the present occasion I have again to record *Cletodes monensis* from the Moray Firth, but this time at about thirteen or fourteen miles north-east of Buckie; it occurred along with some other interesting Crustaceans in a gathering collected by tow-net which had touched bottom at 50 to 55 fathoms, November 3rd, 1900. (This gathering was from the steam trawler "St. Andrew.") I have also to record the same interesting species from the head of Loch Eil (at the upper end of Loch Linnhe), where it was dredged by the "Garland" in 8 to 10 fathoms on April 3rd last year. This is the first time *Cletodes monensis* has been recorded from the West of Scotland.

Cletodes hirsutipes, T. Scott.

This species was described in Part III. of the Fifteenth Annual Report (1897), from Clyde specimens. I have now to note its occurrence in the Moray Firth in some dredged material collected off Nairn in 1898, but only recently examined. One peculiarity by which this species may be distinguished is the character of the fifth thoracic feet, the secondary joints of which are lamelliform, and of a narrow-oblong outline; their outer edges are fringed with a dense border of short hairs, but this fringe is frequently so coated with mud that it becomes necessary to clean it ere it can be clearly made out.

Cletodes perplexa, T. Scott.

This is a small species, but of so marked a character as to be readily distinguished without dissection; it was described in 1899 in Part III. of the Seventeenth Annual Report from specimens dredged by the Fishery steamer "Garland" at Smith Bank, Moray Firth. I have now to record the species from the head of Loch Eil; it occurred in the same gathering in which *Cletodes monensis* was obtained. It was collected on April 3rd, 1900.

Cletodes irrasa, T. and A. Scott.

This appears to be a somewhat rare species in the Copepod fauna of Scotland, and I have obtained it in only one or two localities; it was described from specimens obtained near the Bass Rock, Firth of Forth, in 1893. It has more recently been obtained in the Clyde, and I have now

* Revised Report on the Copepoda of Liverpool Bay (*Trans. L'pool. Biol. Soc.*, vol. vii., 1893), p. 26, Pl. XXXIV.

† *Ann. and Mag. Nat. Hist.*, (6), vol. xii., p. 243 (Oct. 1893). (*Cletodes monensis* was here by a slip recorded as *Laophonte monensis*, but the error was rectified in a paper published in the *Ann. and Mag. Nat. Hist.* in the following February.)

to add another station for it—viz., Loch Eil (off Loch Linnhe)—where it was dredged along with *Cletoles monensis* and *Cletoles perplexa* on April 3rd, 1900.

Pseudothalestris major (T. and A. Scott).

This somewhat rare species was obtained in the store-pond of the Sea-Fish Hatchery at Bay of Nigg in August, 1900.

Cervinia bradyi, Norman.

This interesting and well-marked species was obtained in the same gathering with *Cletoles monensis* referred to above, collected 13 or 14 miles north-east of Buckie, Moray Firth, in 50 to 55 fathoms, November 3rd, 1900. This is the second time that *Cervinia* has been taken in the Moray Firth; it was taken the first time about five to seven miles off Roseheart, in 1893, and at that time it was also associated with *Cletoles monensis*.

Zaus goodsiri, G. S. Brady.

This fine species was collected in 45 fathoms off Aberdeen, on November 7th last year, by the Fishery steamer "Garland." The gathering in which the *Zaus goodsiri* occurred contained a remarkable assemblage of rare and interesting Crustacea; they comprised nearly fifty species, and included many genera, and nearly all the more important groups were represented—viz., the Copepoda, Amphipoda, Isopoda, Sympoda, Schizopoda, and the Macrura.

Peltidium purpureum, Philippi.

This species was added to the British fauna in 1886; it was obtained at Tarbert, Loch Fyne, during some investigations carried on there under the direction of the Fishery Board for Scotland. Though *Peltidium purpureum* has since that time been observed in one or two other parts of Loch Fyne and the Clyde estuary, it does not appear to have been recorded from any other district of Scotland. In the present paper, however, I am able to add two new stations for this *Peltidium*, both of which are on the West Coast—viz., Loch Etive, off Abbot's Island, in a gathering dredged at 9 fathoms on March 30th, 1900, and in a gathering collected a few days later at from 8 to 10 fathoms near the head of Loch Eil (off Loch Linnhe). Both these gatherings were collected by the "Garland," and forwarded to the Laboratory at Bay of Nigg.

Alteutha purpurocineta, Norman.

This fine species was collected in Lerwick Harbour, Shetland, by the steam trawler "St. Andrew," October 14th, 1900. Rev. A. M. Norman collected this species at Hillswick, Shetland, in 1868.*

Idya cluthæ, T. Scott.

This species, which appears to be a deep-water form, was described in 1899 from specimens which had been obtained in Loch Fyne at from 50 to 70 fathoms, and in the Clyde at over 40 fathoms.† The same species of *Idya* was recently observed in a tow-net gathering from the Moray Firth

* Report Brit. Assoc., 1868, p. 293.

† Nineteenth Annual Report of the Fishery Board for Scotland (1899), Part III., p. 200, Pl. XII., figs. 2-6.

collected about thirteen to fourteen miles north-east of Buckie, in 50 to 55 fathoms, November 3rd, 1900. *Idya cluthæ* is quite distinct from any other species of *Idya*. The difference in the armature of the first thoracic feet and of the form of the fifth pair is marked, and are of themselves sufficient for distinguishing the species.

Idya minor, T. and A. Scott.

A few specimens of this *Idya* were obtained in a gathering of Copepods collected in the store-pond of the Sea-Fish Hatchery at Bay of Nigg, in August, 1900. They occurred amongst crowds of *Idya furcata*, and were readily distinguished by their small size. The same species was obtained in a gathering collected by hand-net in the Bay of Nigg on October 1st.

Idya longicornis, T. and A. Scott.

This species was obtained in Lerwick Harbour, Shetland, in the same gathering with *Alteutha purpurocineta* already referred to. The occurrence of *Idya longicornis* here extends the distribution of the species considerably.

Synatiphilus luteus, Canu and Cuénot.

1892. *Synatiphilus luteus*, Canu and Cuénot, Comptes rendus. Echinod., Rev. Biol. du Nord de la France, Oct. 1872, p. 19, Pl. T., figs. 6, 7.

1893. *Remigulus tridens*, T. and A. Scott, Ann. and Mag. Nat. Hist. (6), vol. xii., p. 242, Pl. XI., figs. 15-20; Pl. XII., figs. 1-3.

This species occurred in some dredged material collected near the head of Loch Eil (off Loch Linnhe), in 10 to 15 fathoms, April 3rd, 1900. *S. luteus* was added to the British fauna in 1893 as a new species under the name of *Remigulus tridens*, from specimens collected near the mouth of Loch Spelve, Island of Mull, in 1892 (but not recorded till the following year). As the species, however, had already been described by Canu and Cuénot, as indicated above, the name *Remigulus tridens* necessarily becomes a synonym. So far as I know, *Synatiphilus luteus* has not been obtained anywhere else in Scotland than in the district of Loch Linnhe. It seems to be a rare species.

CORYCEIDÆ.

Coryceus anglicus, Lubbock. (Pl. XVIII., fig. 11.)

In my paper on tow-net gatherings published in the Eighteenth Annual Report, Part III., I recorded *Coryceus anglicus* from the Firth of Clyde, and submitted a description of the species, which was illustrated by a number of figures; these figures were prepared from a female specimen, as no males had been observed. One of the gatherings which were collected during the investigations carried out on board the steam trawler "St. Andrew" was obtained while the vessel was proceeding along the south-east coast of Shetland between Lerwick and Sumburgh Head, and about seven miles off shore; the gathering was collected by passing the water from the donkey-pump through a fine tow-net. In this gathering, collected on October 16th, three specimens of a *Coryceus* were found, which I at first thought might be *C. obtusus*, Dana, as the genital segment of the abdomen possessed a small but distinct ventral hook at its proximal end,

similar to the hook observed in the male of that species (fig. 11); a further examination of the specimens showed, however, that they were the males of *C. anglicus*, Lubbock (fig. 11). *Corycaeus anglicus* has also been obtained in a gathering from the Moray Firth, collected thirteen to fourteen miles north-east from Buckie, in 50 to 55 fathoms, on November 3rd, and in a gathering collected off Aberdeen in 45 fathoms on the 7th of the same month, but the specimens were females.

LICHOMOLGIDÆ.

Lichomolgus fucicolus (G. S. Brady).

One or two specimens of *L. fucicolus* occurred in a gathering collected in 72 fathoms in the Sound of Mull, March 31st, 1900.

ASTEROCHERIDÆ.

Collocheres gracilicauda (G. S. Brady).

This species was obtained in some dredged material collected near the head of Loch Eil in 10 to 15 fathoms, April 3rd, 1900. *C. gracilicauda* is a moderately rare species, but it has apparently an extensive distribution. It has been recorded off the Yorkshire coast by Dr. Brady, from the Liverpool Bay district by Mr. I. C. Thompson, and also from the Firth of Forth; Dr. Canu has obtained it in the neighbourhood of Boulogne, and Dr. Giesbrecht in the Bay of Naples.

INCERTA SEDIS.

Cancerina, T. Scott (gen. nov.)

Description of the genus.—Antennules short, six-jointed. Antennæ small, and simple in structure, not fitted for grasping. Mandibles narrow and of moderate length, toothed on the distal half of the inner margins, and somewhat like the mandibles of *Lerneopoda*. First maxillipedes somewhat rudimentary, unprovided with terminal spines or claws. Second maxillipedes large and strong, armed with stout but very short terminal claws. Thoracic feet, two pairs, they both are somewhat alike, and each foot consists of a single biarticulated branch. As there is but the one species a detailed description will be found in the specific definition.

Cancerina confusa, T. Scott (sp. n.). (Pl. XVIII., figs. 12–20.)

Description of the female.—The length of the specimen represented by the figure is fully 1 mm., from the forehead to the end of the caudal furca. The cephalothorax, seen from above, is sub-rhomboidal in outline. The cephalic segment is small, but moderately distinct; it is very short, being scarcely half as long as it is broad. The thorax, which appears to be unsegmented, is widest at about one-fourth of its length from the anterior end; from the widest part, the thorax, on each side, tapers towards both ends, the front slope is short and terminates at the cephalic segment, the posterior slope, which is longer and slightly sinuate, extends to the genital segment of the very short abdomen; this segment is moderately broad, rather more so than the posterior part of the thorax to which it is adjacent; the remaining segment of the abdomen is very small, and the caudal furca, which are short, are placed

somewhat widely apart. The ovisacs are very large, and the point at which they are attached to each side of the genital segment is nearer their posterior than their anterior ends; they thus occupy a rather peculiar position in relation to the body of the Copepod; the ovisacs are of an elongate-oval form, and from the peculiar manner in which they are attached to the genital segment, they extend forward along each side of the body of the Copepod instead of backwards, as in the majority of Copepods which carry two ovisacs. It was the peculiar position of the ovisacs that attracted my attention to this specimen, (fig. 12).

The antennules are short and six-jointed, the second joint is considerably longer than any of the others; the formula shows the proportional lengths of all the joints:—

Numbers of the joints,	1	2	3	4	5	6
Proportional lengths of the joints	14	24	17	12	13	10

The joints are sparingly setiferous, and taper very gradually from the proximal to the distal end (fig. 14).

The antennæ are very small, they each consist of a single two-jointed branch, armed with about six terminal setæ; the three middle setæ are moderately elongated, but the others are short; the joints of the antennæ are sub-equal and nearly three times longer than broad (fig. 15).

The mandibles have a remarkable resemblance to those of the Lerneopodidæ; they are moderately elongated, narrow, and somewhat cylindrical; they taper slightly from about the middle of the distal extremity, the inner margin is denticulate from about the middle to the apex of the mandible (fig. 16).

The maxillæ are very rudimentary; they are somewhat papilliform, and furnished with about four moderately stout spines (fig. 17).

The first maxillipedes are moderately stout, but of a somewhat rudimentary structure; they appear to be each composed of two joints, the first is comparatively tumid, the second is smaller and terminates in a boldly rounded apex finely serrated on the margin (fig. 18).

The second maxillipedes are large and strong; they are each composed of two joints, the basal joint is considerably larger than the other, the second is armed with a short but stout claw, the margin of which is convex and fits into a corresponding hollow in the joint to which it is articulated (fig. 19).

Thoracic feet.—There appear to be only two pairs of thoracic feet, which are similar to each other in size and structure. They appear to be each composed of a single two-jointed branch of moderate length, furnished with two somewhat elongated and two or three very small setæ (fig. 20). The position of the thoracic feet is somewhat abnormal; one pair is almost in line with, and outside of the second maxillipedes, the other pair occupy a somewhat intermediate position and somewhat further forward, as shown in figure 13.

Habitat.—Dredged at Tarbert Bank, Lower Loch Fyne, in 17 to 20 fathoms, October 28th, 1899. One specimen only—a female—was observed.

Remarks.—This somewhat curious Copepod, which I have now tried to describe, is in some respects not very unlike *Cancerilla tubulata*, Dalyell. It has a somewhat similar squat form, large ovisacs, and short six-jointed antennules; while, as regards the form of the mandibles and maxillæ, and especially of the latter, the disparity is not very great; it is only in the structure of the antennæ, the maxillipedes, and the thoracic feet that the most marked differences are observed. The antennæ are

simple in structure and do not form grasping organs as in *Cancerilla*; the maxillipedes are more rudimentary; and the thoracic feet, of which there appear to be only two pairs, are each composed of two moderately stout basal joints and a single biarticulated branch; in *Cancerilla* the first and second pairs of feet, though two-branched, are more rudimentary than those of *Cancerina*, and the third and fifth pairs, though present, are also rudimentary.

In consequence of these differences I have considered it necessary to institute a new genus for this Copepod, and, from its general resemblance to the *Cancerilla* of Dalyell, have given to it the name of *Cancerina*.

NICOTHOIDE.

Nicthoë astaci, Aud. and M.-Edw. (Pl. XVII., figs. 35-39; Pl. XVIII., figs. 21-26.)

1826. *Nicthoë astaci*, Aud. and M.-Edw., Ann. Sci. Nat., (1), vol. ix., p. 345, Pl. 49, figs. 1-9.

1850. *Nicthoë astaci*, Baird, Entom., p. 307, Pl. XXXIII., fig. 11.

Description of the female.—The length of the specimen represented by the drawing is 1.5 mm. (about $\frac{1}{16}$ of an inch), exclusive of the caudal setae. The body is cyclopid in its general outline, but the two great wing-like lateral expansions of the posterior part of the thorax destroy the symmetrical appearance of the animal. These expansions appear to be the result of an extraordinary development of the fourth segment of the thorax. The three segments intermediate between this one and the cephalic segment are very narrow; they are represented on the dorsal aspect by more or less distinct articulations as shown in the drawing, while in front of the cephalic segment two distinct eyes can be observed. The abdomen is composed of four segments, the genital segment is somewhat dilated and rather longer than the combined lengths of the next two segments. The caudal furca are very short, and each is furnished with an elongated and moderately stout terminal seta and a few minute hairs. The two ovisacs are very large. (Pl. XVII., fig. 39, and Pl. XVIII., fig. 21.)

The antennules are of moderate length and sparingly setiferous, they are composed of eleven joints, but, with the exception of the second and last, all the joints are small (Pl. XVIII., fig. 35). The formula shows approximately the proportional lengths of all the joints:—

Numbers of the joints,	1	2	3	4	5	6	7	8	9	10	11
Proportional lengths of the joints,	11	33	13	10	10	10	10	10	10	10	20

The antennae are small but moderately stout, and appear to be composed of four joints, the basal joint is considerably larger than the others; each antenna is armed with two moderately strong apical spines, and as the end-joint to which they are attached is hinged at nearly a right angle to the preceding joint, the antennae become, with the assistance of the apical spines, effective grasping organs; the third joint is provided with a curved and somewhat lamelliform plate, which may be a sensory appendage (Pl. XVIII., fig. 36).

The mandibles are long and slender, slightly incurved, and tapering to a point (Pl. XVII., fig. 22).

The maxillae are each composed of a moderately stout basal joint, and a

small and apparently two-jointed secondary branch, which is articulated to the inner edge of the basal joint; the basal joint is furnished with three strong terminal setae of moderate length, plumose on the distal half; the secondary branch is armed with a few small terminal spines (Pl. XVII., fig. 37).

The first maxillipedes are small and apparently composed of two joints, of which the end-joints are the smallest, each maxillipede is armed with two moderately strong terminal claw-like spines, and as they are slightly curved inwards, they form, with the end-joint, a moderately powerful hook (Pl. XVII., fig. 38).

The second maxillipedes, which are larger than the first pair, are each composed of five joints, the first and second joints are of moderate size but the three end ones are small, the terminal claw-like spine is longer than the entire length of the three end joints (Pl. XVIII., fig. 23).

The thoracic feet.—The first four pairs of thoracic feet are all somewhat similar, they are each composed of a stout two-jointed basal part, which bears two sub-equal three-jointed branches at its distal end; the outer branches are armed on the exterior margin with several small, slender spines, while the inner margins of both branches are furnished with plumose setae (Pl. XVIII., figs. 24 and 25). The fifth pair consist each of a single unarticulated lamelliform branch, about three times longer than broad; each branch is provided with six small plumose setae—one near the middle of the inner margin and five arranged round the apex (Pl. XVIII., fig. 26).

The ovisacs are very large and contain numerous ova. No males have yet been observed.

Habitat.—On the gills of a scarcely full grown Lobster, captured by Mr. H. C. Williamson in Bay of Nigg, near Aberdeen, June 30th, 1900.

Remarks.—Though *Nicthoë astaci* appears to be moderately frequent on the gills of Lobsters captured on various parts of the English coast, I do not know of any previous authentic record of its occurrence in Scottish waters; Edward of Banff, who was so successful a collector of Crustacea, though he records the common Lobster in his list of Moray Firth species, does not appear to have observed the Copepod parasite which is so intimately associated with that Crustacean. *Nicthoë astaci* is no doubt frequently overlooked, and if a careful examination were made of the lobsters captured on our shores the distribution of the parasite in the Scottish seas might be found to be co-extensive with its host.

The *Nicthoë* seems to be a remarkably sluggish animal. Milne-Edwards—quoted by Dr. Baird*—states that “they allowed themselves to be torn to pieces without making the least movement or quitting their hold,” and further, that though “taken carefully off the gills of the lobster with all possible precautions not to injure the animals, and placed in a glass of sea-water, though watched for several hours, and though they lived during that period, as might be seen by the peristaltic movement of the intestine, they made no attempt themselves at locomotion.” I may add that my son has kept specimens of *Nicthoë* alive for five weeks in ordinary sea water, which was changed about once a week, and though they were carefully watched during that time he never saw them make any attempt to move about, and the only indication that they were alive was the persistence of their semi-transparent pinkish colour and the peristaltic movement of the alimentary canal. The parasite is usually brightly coloured, and, as it is of moderate size, is readily observed *in situ* when that part of the lobster's carapace which covers the gills is removed.

*British Entomologica, p. 204.

CHONDRIACANTHIDÆ.

Lamippe proteus, Claparède.

This curious little species is common on the *Aleyonium digitatum*, or "Dead-man's Fingers," so frequently brought up in the trawl-net or on fishermen's lines. A number of specimens were recently obtained on pieces of *Aleyonium* trawled by the "Garland" off Aberdeen. *Lamippe proteus* was first recorded from the Scottish seas in 1895 from specimens observed in the Firth of Forth.

Lamippe forbesi, T. Scott.

1896. *Lamippe* sp., T. Scott, Fourteenth Ann. Rept. of the Fishery Board for Scotland, Part III., p. 164, Pl. IV. figs. 9-12.

This distinct form was first observed in the Firth of Forth in the early part of 1896, and the same species was almost immediately afterwards found by my son in Liverpool Bay. At that time it was thought it might be a species which was already described, and it was therefore recorded as "*Lamippe* sp." *L. forbesi* seems to be a rare species, for, although the portions of *Aleyonium* recently examined yielded between two and three hundred specimens of *L. proteus*, only two specimens of *L. forbesi* were observed after a careful search. *L. forbesi* is a distinctly larger species than *L. proteus*.

Change of Name.

Genus *Eurynotopsyllus*, nov. nom. [= *Eurynotus*, T. and A. Scott (1898) preoccupied.]

In 1898 a new Copepod from the Clyde was described and figured by T. and A. Scott in the "Annals and Magazine of Natural History," s. 7, vol. i., p. 188, under the name of *Eurynotus insolens*; it was also recorded under the same name in Part III. of the Sixteenth Annual Report of the Fishery Board for Scotland (1898), p. 279. I have now ascertained that *Eurynotus* has already been twice used—viz., by Kirby in 1817 for a genus of Coleoptera, and by Agassiz in 1835 for a genus of fishes; as, therefore, the name cannot be retained for this Copepod I propose to change it for the altered form *Eurynotopsyllus* (*Eurynotus* plus *psyllus*, a flea).

Order 2, OSTRACODA.

BAIRDIDÆ.

Genus *Bairdia*, McCoy (1849).*Bairdia inflata* (Norman).

1862. *Cythere inflata*, Norman, Ann. and Mag. Nat. Hist., vol. xi., p. 49, Pl. iii., figs. 6-8.

1896. *Bairdia inflata*, Brady and Norman, "Mon. M. and F.-W. Ostrac. of the N. Atlantic and N.-W. Europe" (*Sci. Trans. Roy. Dublin Soc.*, vol. iv., s. ii., p. 112).

One whole specimen and a valve of this species occurred amongst some sand dredged in about 80 fathoms to the east of Fair Island in October last.

Genus *Macrocypris*, G. S. Brady (1868).*Macrocypris minna* (Baird).

1850. *Cythere minna*, Baird, Brit. Entom., p. 171, t. xx., fig. 4, 4a-d.

1868. *Macrocypris minna*, Brady, Mon. rec. Brit. Ostrac., p. 392, t. xxvii., figs. 5-8; t. xxxviii., fig. 4.

1889. *Macrocypris minna*, Brady and Norman, *op. cit.*, vol. iv., s. ii., p. 117.

This fine species was frequent in a tow-net gathering collected on the 19th October, 1900, in 80 to 85 fathoms, about fifty miles S.S.E. of Fair Island, between Orkney and Shetland. The tow-net had touched bottom, and when hauled up was found to contain a considerable quantity of mud, this was washed through the net and the material that remained in the net was preserved; mixed up in this material was a considerable number of *Macrocypris*. In the Monograph of the Marine and Fresh-water Ostracoda of the North Atlantic and North-Western Europe, the authors, referring to *Macrocypris minna*, say (*op. cit.*, p. 117) that "the only British locality for this species is Shetland, where a single specimen was dredged by MacAndrew forty years ago, and a second by A. M. N. on the outer Haaf in 1861."

CYTHERELLIDÆ.

Genus *Cytherella*, Jones (1849).*Cytherella abyssorum*, G. O. Sars.

1865. *Cytherella abyssorum*, G. O. Sars, Overs. of Norg. marine Ostrac., p. 127.

1865. *Cytherella beyrichi*, G. S. Brady, "On New or Imperfectly Known Ostrac.," *Trans. Zool. Soc.*, vol. v., p. 362, Pl. lviii., figs. 3 a, b.

1866. *Cytherella scotica*, G. S. Brady, Brit. Assoc. Rept. (1866), p. 211.

1896. *Cytherella abyssorum*, Brady and Norman, *op. cit.*, vol. v., s. ii., p. 716, Pl. lxxvi., figs. 1, 2, 5; Pl. lxxvii., figs. 13, 14.

A single perfect specimen and a valve of this species were obtained in the same material with the last; *Cytherella abyssorum* seems to be a rare species in our seas, as the only Scottish record for it hitherto appears to be that of G. S. Brady, who, in his "Monograph of Recent British Ostracoda," states that two or three specimens were obtained by himself and the Rev. A. M. Norman amongst sand dredged by Mr. Jeffreys in 60 fathoms in the Minch.*

It may be mentioned in passing that the Foraminifer *Saccamina sphaera* was very common in this gathering; a few other Foraminifera, such as *Astrorhiza arenaria*, *Pisammosphera fusca*, and *Placopsilina bulla*, were also observed.

* *Trans. Linn. Soc.*, vol. xxvi., p. 473, Pl. xxxiv., figs. 18-21.

On palls 259-279 no Copepods
(not reproduced)

Portunus arcuatus, Leach.

A specimen of this Crab was obtained in the stomach of a Cod captured in the salmon-nets at the Bay of Nigg on June 13th, 1900.

EXPLANATION OF THE PLATES.

PLATE XVII.

(?) Rhinocalanus gigas, G. S. Brady.

	Diam.
Fig. 1. Foot of fifth pair, female	x 51.
Fig. 2. Foot of fifth pair, male, slightly immature	x 51.
Fig. 3. Abdomen and last thoracic segment, female	x 25.
Fig. 4. Abdomen and last thoracic segment, male	x 38.

Cyclopius longicaudata, T. Scott (sp. n.).

Fig. 5. Female, dorsal view	x 51.
Fig. 6. One of the female antennules	x 63.
Fig. 7. One of the antennae	x 63.
Fig. 8. One of the mandibles	x 95.
Fig. 9. One of the maxillae	x 63.
Fig. 10. One of the first maxillipedes	x 63.
Fig. 11. One of the second maxillipedes	x 63.
Fig. 12. Foot of first pair	x 63.
Fig. 13. Foot of fourth pair	x 95.
Fig. 14. Foot of fifth pair	x 95.

Dotryllaphidius (?) ruber, Hesse.

Fig. 15. Female, dorsal view	x 46.
Fig. 16. Male, dorsal view	x 72.
Fig. 17. One of the female antennules	x 96.
Fig. 18. One of the female antennae	x 145.
Fig. 19. One of the first maxillipedes, female	x 145.
Fig. 20. One of the second maxillipedes, female	x 145.
Fig. 21. Foot of the first pair, female	x 145.
Fig. 22. Foot of the third pair, female	x 145.
Fig. 23. Foot of the fourth pair, female	x 145.
Fig. 24. One of the male antennules	x 160.
Fig. 25. Foot of the first pair, male	x 72.
Fig. 26. Foot of the third pair, male	x 160.
Fig. 27. Foot of the fourth pair, male	x 160.

(?) Enteropsis vivaricusis, T. Scott (sp. n.).

Fig. 28. Female, side view	x 61.
Fig. 29. One of the female antennules	x 580.
Fig. 30. One of the female antennae	x 290.
Fig. 31. One of the mandibles	x 580.
Fig. 32. One of the maxillae	x 580.
Fig. 33. One of the maxillipedes	x 195.
Fig. 34. Foot of the third pair	x 195.

Nicothoe astaci, And. and M. Edw.

Fig. 35. One of the female antennules	x 190.
Fig. 36. One of the mandibles	x 380.
Fig. 37. One of the maxillae	x 380.
Fig. 38. One of the first maxillipedes	x 253.
Fig. 39. Abdomen of the female	x 80.

PLATE XVIII.

Eucannella spinifera, T. Scott (gen. et sp. n.).

Fig. 1. Female, dorsal view	x 46.
Fig. 2. One of the female antennules	x 76.
Fig. 3. One of the antennae	x 116.
Fig. 4. One of the mandibles	x 116.
Fig. 5. One of the maxillae	x 116.
Fig. 6. One of the first maxillipedes	x 145.
Fig. 7. One of the second maxillipedes	x 145.
Fig. 8. Foot of the first pair	x 76.
Fig. 9. Foot of the fourth pair	x 63.
Fig. 10. Foot of the fifth pair	x 63.

Corycaeus anglicus, Lubbock (male).

Fig. 11. Male, side view	x 61.
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Cancerina confusa, T. Scott (gen. et sp. n.).

Fig. 12. Female, dorsal view	x 38.
Fig. 13. Portion of the same seen from the under-side to show the position of the maxillipedes and thoracic feet	x 38.
Fig. 14. One of the female antennules	x 145.
Fig. 15. One of the antennae	x 290.
Fig. 16. One of the mandibles	x 290.
Fig. 17. One of the maxillae	x 290.
Fig. 18. One of the first maxillipedes	x 195.
Fig. 19. One of the second maxillipedes	x 116.
Fig. 20. Foot of the first pair	x 116.

Nicothoe astaci, And. and M. Edw.

Fig. 21. Female, dorsal view	x 11.
Fig. 22. One of the antennae	x 380.
Fig. 23. One of the second maxillipedes	x 199.
Fig. 24. Foot of the first pair	x 152.
Fig. 25. Foot of the fourth pair	x 127.
Fig. 26. Foot of the fifth pair	x 199.

Maera loréni (Bruzelius).

Fig. 27. One of the first gnathopods	x 7.
Fig. 28. One of the second gnathopods	x 5.

Ischyrocerus anguipes, Kroyer.

Fig. 29. One of the second gnathopods, male	x 34.
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Leptognathia (?) longiremis (Lillj.), var.

Fig. 30. Female, dorsal view	x 26.
Fig. 31. Male, dorsal view	x 38.
Fig. 32. One of the female antennules (four-jointed)	x 154.
Fig. 33. One of the female antennules (five-jointed)	x 154.
Fig. 34. One of the male antennules	x 154.
Fig. 35. One of the female antennae	x 123.
Fig. 36. One of the female chelipedes	x 123.
Fig. 37. One of the male chelipedes	x 123.
Fig. 38. One of the uropods, female	x 73.

Macrostylis spinifera, G. O. Sars.

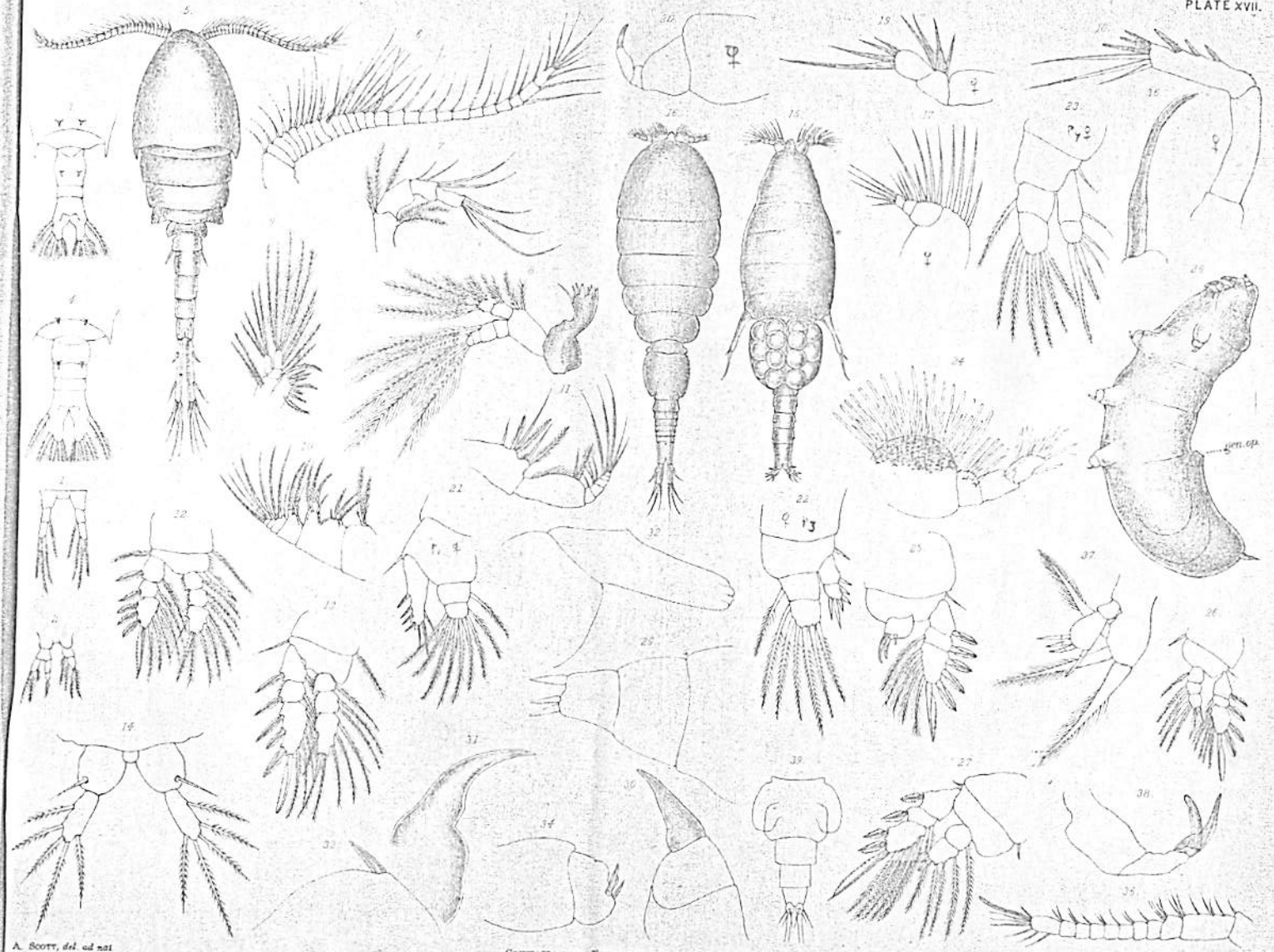
Fig. 39. Female, dorsal view (imperfect)	x 22.
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Echinopleura aculeata, G. O. Sars.

Fig. 40. Female, dorsal view (slightly imperfect)	x 48.
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Leptostylis villosa, G. O. Sars.

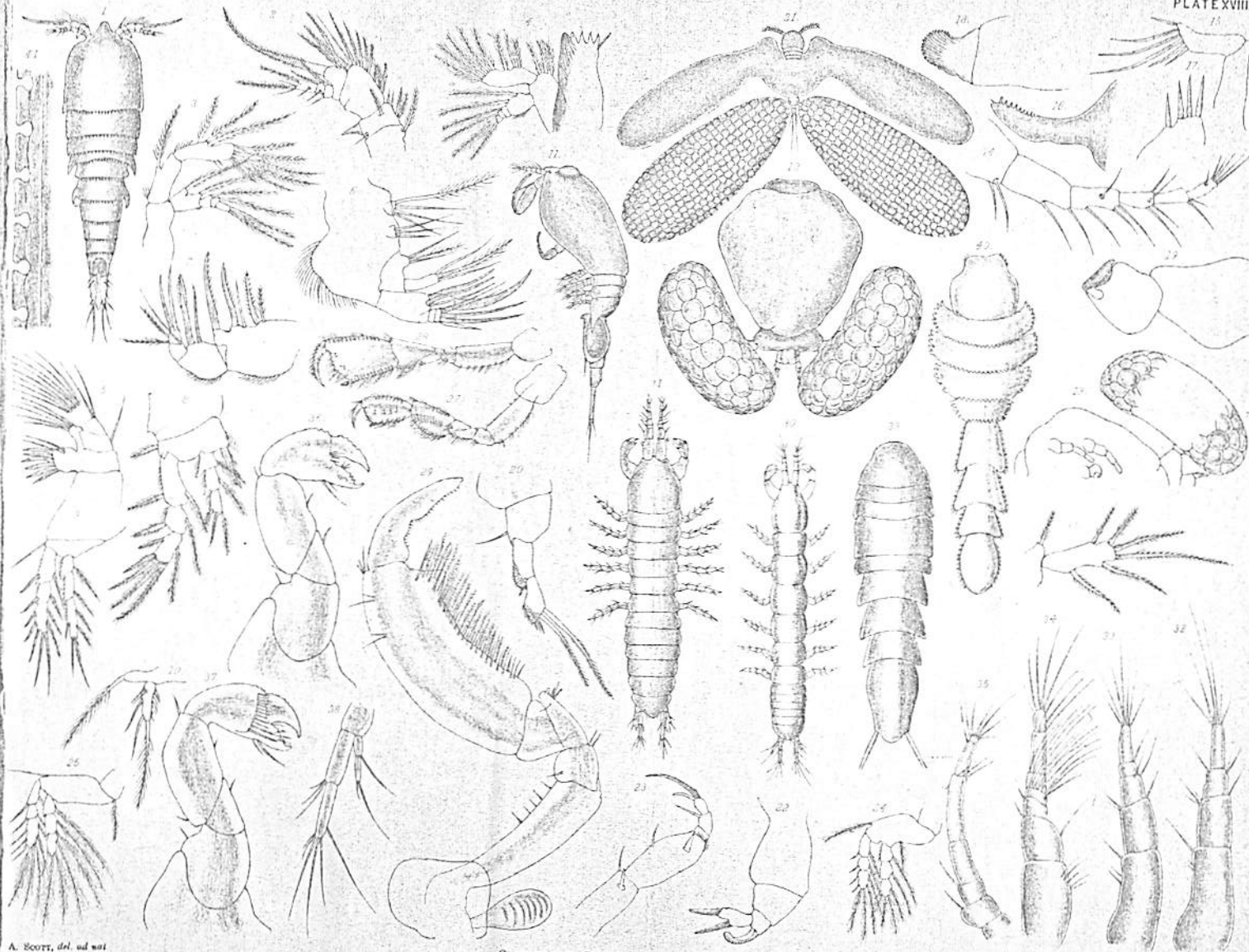
Fig. 41. Portion of serrated margin of cephalon	x 514.
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A. SCOTT, *del. et sculp.*

CRUSTACEA FROM TOW-NET AND OTHER GATHERINGS.





A. SCOTT, del. ad nat.

CRUSTACEA FROM TOW-NET AND OTHER GATHERINGS.