SIXTEENTH

ANNUAL REPORT

OF THE

FISHERY BOARD FOR SCOTLAND,

Being for the Year 1897.

IN THREE PARTS.

PART I.—GENERAL REPORT.
PART II.—REPORT ON SALMON FISHERIES.
PART III.—SCIENTIFIC INVESTIGATIONS.

PART II.—REPORT ON SALMON FISHERIES.

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X. SOME ADDITIONS TO THE INVERTEBRATE FAUNA OF LOCH FYNE.

By Thomas Scott, F.L.S., Mem. Soc. Zool. de France.

(Plates XII., XIII., XIV., XV.)

Contents.

INTRODUCTORY REMARKS.

In the paper on "The Marine Fishes and Invertebrates of Loch Fyne," published in Part III. of the Fifteenth Annual Report of the Fishery Board for Scotland, it is distinctly stated that the catalogue then published could "only be considered as preliminary to further research." It would have shown unwarranted presumption on the part of the compiler of that catalogue had he pretended that it could have in any sense been considered exhaustive: it was, as explained in the preliminary remarks, neither more nor less than a compilation from the recorded results of past investigations, so far as these were known to the writer, to which he added certain information that had been obtained as the result of personal study. And though the number of additions that now fall to be made, and the recording of which forms the subject of the present paper, is very considerable, this simply shows that the time when an exhaustive catalogue can be prepared is not yet; and that, notwithstanding all that has already been done, the study of the Loch Fyne invertebrata will yield, for some time to come, profitable and interesting results to the student who has sufficient opportunities and enthusiasm to engage in it.

The species that fall to be recorded in the present paper as additions to the previous catalogue of Loch Fyne invertebrates number in all about one hundred, and include representatives of the following groups:—(1st) The Schizopoda (one species). (2nd) The Isopoda (one species new to Britain). (3rd) The Amphipoda (four species). (4th) The Ostracoda (fourteen species). (5th) The Copepoda (twenty-three species, five of which are apparently undescribed, and two have required new genera to be instituted for them).* (6th) The Annelida (one species, new to the Clyde district). (7th) The Foraminifera (fifty-six species and varieties, or double the number recorded in the first catalogue).

* In the Appendix there are also descriptions of a new genus and species of Copepoda from Kilbrannan Sound, Firth of Clyde.

I have, as formerly, to acknowledge my indebtedness to several friends for kind assistance in various ways, amongst whom are Prof. G. S. Brady, F.R.S., and Rev. T. R. R. Stebbing, F.R.S.; Dr. G. W. Chaster, of Southport; J. T. Marshall, Torquay; Mrs. Robertson, of Millport; and Fred. G. Pearcey. My son, Mr. Andrew Scott, prepared the series of drawings necessary for the elucidation of new and obscure species.

Since the publication of the catalogue of "The Marine Fishes and Invertebrates of Loch Fyne" no additions have been made to the following groups:—The Fishes, the Tunicata, the Mollusca, the Branchiopoda, the Polyzoa, the Echinoderma, the Actinozoa, the Hydrozoa, and the Spongozoa.

ADDITIONS TO THE CRUSTACEA OF LOCH FYNE.

(1) The Schizopoda.

Erythrops serrata, G. O. Sars. This species was obtained in Upper Loch Fyne at Stations XIII. and XV. *E. serrata* was recorded last year for the first time as a member of the Clyde fauna, from specimens obtained in different parts of the seaward portion of the estuary.

(2) The Isopoda.

Paramunna bilobata, G. O. Sars. This is a small species, but very distinct from any other Isopod recorded from the Clyde. The form of the caudal segment, with its strongly toothed lateral margins, and the bilobed front part of the head, are characteristic. This, which is an addition to the British fauna, was dredged at Otter-Spit during last October by F. G. Pearcey, while at work on board the s.s. *Garland*.

(3) The Amphipoda.

Lilljeborgia kinahani (Spence Bate). This Amphipod was obtained amongst some dredged material from Otter Spit, Loch Fyne. Though this is apparently the first record of it in Loch Fyne, it has already been recorded for the Clyde by the late Dr. Robertson, of Millport, under Spence Bate's name of *Phœdra kinahani*. *Lilljeborgia kinahani* need not be mistaken for *L. pallida* (which has also been recorded for the Clyde by Dr. Robertson); not only because it is much smaller, but also because of the distinct difference in the form of the metasome segments.

Podocerus herdmani, Walker. This was obtained in the same gathering as the last, and is apparently not only an addition to the Loch Fyne fauna but also to the Clyde. *P. herdmani* is distinguished chiefly by the peculiar form of the claw of the posterior gnathopods in the male, and without male specimens it is somewhat difficult to differentiate the species. This Amphipod has been recorded from Norway by Prof. G. O. Sars, and its British distribution seems to be extensive, having been observed in the Liverpool district, where it was first discovered by A. O. Walker, the describer of the species, and also in the Firth of Forth.

Podocerus cumbrensis, Stebbing and Robertson. This Amphipod, though previously reported for the Clyde—viz., from the vicinity of the Clach Rock, Cumbrae—has not so far apparently been observed in Loch Fyne.

Specimens of *Podocerus cumbrensis* were obtained in the same Otter Spit gathering with *P. herdmani*. This is a small species, and the armature of the posterior gnathopods in the male varies a good deal; but, so far as I could observe, the males of this Amphipod, notwithstanding the variation referred to, could in every instance be distinguished from *P. herdmani*.

Protella phasma (Montagu). This curious species has been recorded from several parts of the Clyde area by the late Dr. Robertson, and may also have been obtained in Loch Fyne, but I can find no reference to its occurrence in that district amongst the published records within my reach.

(4) The Ostracoda.

Bairdia inflata, Norman. This Ostracod was obtained in dredged material from Tarbert Bank, in 20 to 25 fathoms. It has also been obtained from other parts of the Clyde area, but there does not appear to be any previous record of it from Loch Fyne.

Cythere tenera, Brady. I am indebted to Mrs. Robertson, of Millport, for the record of this species from Loch Fyne. It is one of a group of Ostracods usually found in water that is more or less brackish, and is less frequent in the open sea.

Cythere quadridentata, Baird. A few specimens were obtained in material dredged at Tarbert Bank in the spring of last year (1897).

Cythere emaciata, Brady. Was found with the last species. It does not appear to be very rare: the shells, however, were frequently coated with mud, which may cause them at times to be overlooked; but other species—those with rough or spiny tests—found here were, many of them, also more or less covered with mud.

Cythere emarginata (G. O. Sars). Was obtained at Tarbert Bank with the other species mentioned. Mrs. Robertson, of Millport, has also favoured me with a MS. record of the same species for Loch Fyne. It is probable that the Loch Fyne specimens are fossil, as the species, though not rare in some glacial deposits, is apparently, as a recent species, more or less restricted in its distribution to arctic or sub-arctic regions.

Cythere dunelmensis (Norman). This also was obtained at Tarbert Bank. It is probable that *Cythere dunelmensis* is not infrequent in Loch Fyne, as it has a wide distribution—not only generally but throughout the Clyde area; but if the species has previously been obtained in Loch Fyne, it is somewhat inexplicable that Loch Long, Rosneath, and Rothesay Bay should be mentioned as Clyde habitats for the species, while Loch Fyne, which is at least as important a locality as any of these, should be omitted.

Cythere whitei (Baird). This is another of the species obtained at Tarbert Bank, and which may be distinguished by the peculiar sculpture of the shell. It does not appear to be a very common species.

Cytherura simplex, Brady and Norman. I am indebted to Mrs. Robertson, of Millport, for the record of this species for Loch Fyne. A "local variety" of this species had been previously known as *Cytherura sarsi*,

but Drs. Brady and Norman, in their recent monograph on this group of Crustaceans, have redescribed and named it as above.

Cytherura clathrata, G. O. Sars. This pretty species was dredged at Tarbert Bank, Loch Fyne. Though generally distributed, it is not very common.

Cytheropteron arcuatum, Brady, Crosskey, and Robertson. I am indebted to Mrs. Robertson for the record of this species. *Cytheropteron arcuatum* was frequent in the post-tertiary clays of Garvel Park, Greenock, and is apparently a true arctic or sub-arctic species ; still, the limits of its distribution may extend beyond these regions.

Cytherois fischeri (G. O. Sars). It is to Mrs. Robertson that I am also indebted for the record of this species. Though *Cytherois fischeri* has not been specifically recorded for Loch Fyne before this time, it is so generally distributed that there are comparatively few marine districts where it may not be found.

Paradoxostoma normani, Brady. I have obtained this very distinct species of *Paradoxostoma* in one or two portions of the Clyde area, including Tarbert Bank, Loch Fyne, but it does not appear to be at all common.

Paradoxostoma ensiforme, Brady. This was one of the more frequent species found at Tarbert Bank, as it also is in other parts of the Clyde.

Paradoxostoma obliquum, G. O. Sars. This, which is comparatively a rare species, was likewise obtained in the material dredged at Tarbert Bank.

(5) The Copepoda.

The Copepoda that fall to be recorded at this time include several apparently undescribed forms, and it has also been necessary to institute new genera for two of them ; but before proceeding to record and describe these additions to the Loch Fyne Copepod fauna, I propose to give the following definition of a species previously recorded, which has, along with the others, been the subject of special study. The species referred to was recorded in the former catalogue of Loch Fyne Invertebrata under the name of "(?) *Pseudocalanus armatus*, Boeck," but it has since been removed from the genus *Pseudocalanus* of Boeck to *Bradyidius*, Giesbrecht. The following is a definition of this genus and species :—

Bradyidius armatus (G. S. Brady), (Pl. XII., figs. 1-19).

1878. *Pseudocalanus armatus*, Brady (not Boeck). 'Mon. Copep. Brit. Isl.,' vol. i. p. 46.

1897. *Bradyidius armatus* (Brady), Giesbrecht. 'Zool. Anzeiger,' No. 536.

Description of the female.—Length, 2·54 mm. ($\frac{1}{10}$ of an inch). Body, robust, somewhat resembling *Ætidius armatus* (Brady) in general appearance ; rostrum, distinctly bifid, but not so strongly produced as that of *Ætidius* (figs. 19-20) ; last thoracic segment produced at both sides into

strongly-pointed processes; abdomen, small; caudal furca, short (fig. 11); antennules, scarcely reaching to the end of the thorax, and composed of twenty-four joints, the proportional lengths of which are shown by the formula (see also figure 2)—

7	6	3	4	4	4	5	6	4	5	5	6	7	7	6	6	6	5	4	4	4	5	5	3
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

The antennæ are somewhat similar to those of *Pseudocalanus elongatus*, but the secondary branches are scarcely so elongate (fig. 3). The mouth-organs and swimming feet are all more or less similar to the same appendages in *Pseudocalanus elongatus* as shown by the figures (figs. 4-10).

Description of the male.—The structure of the male of *Bradyidius* exhibits a greater amount of divergence from that of the nearly-related *Pseudocalanus* than the female does. The number of joints of the male antennule (fig. 12) is twenty-two on the left side, the eighth and tenth joints being each apparently composed of two coalesced joints. The right antennule is similar to the left, except that the seventeenth and eighteenth joints appear to be joined together so as to form only one joint. The proportional lengths of the joints of the left antennule are shown in the formula—

6	5	3	3	3	3	3	7	4	8	5	6	7	2	2	2	6	6	5	6	5	3
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

The mandibles are more or less rudimentary, and they are without the usual apical teeth; they resemble the mandibles of *Pseudocalanus elongatus*, but are not so elongate (fig. 13). The maxillæ are more robust than those of *Pseudocalanus*, and more nearly resemble those of *Ætidius*, but are somewhat dissimilar in certain details of structure and armature, as shown by the figure (fig. 14). The anterior foot-jaws, which are to some extent rudimentary, are considerably stouter than those of *Pseudocalanus*, and the armature of the marginal lobes is peculiarly modified (fig. 15). The fifth pair of thoracic feet differ in structure from both *Pseudocalanus* and *Ætidius*. In *Pseudocalanus* both feet are developed, but each consists of a single branch; in *Ætidius* only one single-branched foot is developed, the other being entirely obsolete; in the present species, which in the structure of the fifth pair more nearly resembles *Ætidius*, one of the single-branched feet is developed, while the other is very rudimentary, but is nevertheless quite distinct, as shown by the figure (fig. 16). Fig. 17 is a drawing of the fifth foot of an immature male.

Habitat.—Firth of Clyde, Loch Fyne, and West Coast; frequent (rare on the East Coast).

Remarks.—This Copepod has occupied our attention for a considerable time. It was felt that it could not be retained in the genus to which it had been ascribed, but, owing to the structural details being somewhat difficult to work out, the study of it was delayed. Last year Dr. W. Giesbrecht, the eminent zoologist of Naples Marine Station, published a preliminary note on the species. He described a few of its more important characters, and at the same time instituted the new genus—*Bradyidius*—for its reception. Previous to that, however, the series of drawings included in the present paper had all been prepared, but the pressure of other work had delayed their publication. We are very

pleased that Dr. Giesbrecht has so far settled the question as to the value which should be placed on the structural difference observed in this species, and referred to in the above description, and has given to it a more satisfactory position in the group to which it is related.

Stephos minor, T. Scott. This species, first described from specimens obtained in the Firth of Forth, was observed among some dredged material from Otter Spit. One of the specimens from this locality was a male, the structure of the fifth thoracic feet of which cannot be confounded with any allied form.

Stephos fultoni, T. and A. Scott (Pl. XV. figs. 5-16).

1898. *Stephos fultoni*, T. and A. Scott, 'Ann. and Mag. Nat. Hist.,' ser. 7, vol. i. p. 185, Pl. X., figs. 1-8, and Pl. XI., figs. 1-4.

This fine species, which was first noticed in 1896 amongst some washings of trawl-net refuse from Kilbrannan Sound, has been obtained a second time in a small quantity of dredged material collected in 1897 near Otter Spit, Loch Fyne. *Stephos fultoni* differs from the other two described members of the genus in the fifth thoracic feet in the female being scarcely symmetrical; and it may be remarked that, so far, this Clyde species shows a departure from the normal characters of the genus. The antennules of *Stephos fultoni* (fig. 6) are twenty-four-jointed, and they resemble those of *Stephos minor* in the arrangement of the joints, but the proportional lengths of the joints are rather different (*see* fig. 6). The antennæ and mouth-organs (figs. 7-9) are somewhat similar in structure to those of *Stephos minor*. The second, third, and fourth pairs of swimming feet are proportionally rather more slender and elongate than those of that species. As already stated, the fifth pair in the female (fig. 13) are scarcely symmetrical, the end-joint of the right foot (?) is of a broad, knife-like form, and has the posterior half of the outer margin finely serrated, but the end-joint of the left foot (?) assumes somewhat the form of a "tap-root," being dilated at the base, and then, after suddenly contracting to a small extent, it tapers gradually to the pointed apex.

In the male the chief distinctive feature is the remarkable and powerful development of the fifth thoracic feet (fig. 14). The structure of the left foot is cumbrous and complicated: it terminates in a strongly dilated appendage that is armed with a large and dark-horn-coloured movable claw distinctly bifid at the extremity, while in addition to the claw there are several flexuous appendages of moderate length and stoutness. The right foot is slender, and is somewhat similar to the same foot in *Stephos minor*, but the end-joint is quite different, being curved like a reaping-hook, and with the basal part slightly produced in a direction opposite to that of the hook-like process. It may be noted that the left foot somewhat resembles the same appendage in *Stephos gyrans* (Giesbrecht), but besides other differences *Stephos gyrans* wants the strong bifid claw which gives such a marked character to the left foot of *Stephos fultoni*.

The name adopted for this remarkable species is that of the Superintendent of the Scientific Investigations of the Fishery Board for Scotland—T. Wemyss Fulton, M.D., F.R.S.E.

Pseudocyclopia crassicornis, T. Scott, was dredged in the vicinity of Otter Spit, Upper Loch Fyne. This species, which is moderately frequent in some parts of the Firth of Forth, is apparently less common in the Clyde.

Pseudocyclopia caudata, T. Scott, is smaller than the last species, and is distinguished at first sight by its longer caudal stylets; it was dredged at Otter Spit with the other.

Ectinosoma erythrops, G. S. Brady, was obtained in the vicinity of Otter Spit. Besides differing in structural details from its congeners, it is furnished with a lateral red eye-spot, to which it owes its name. The eye-spot is situated on the lateral aspect of the cephalic segment, and near the anterior margin. (A second species of *Ectinosoma* with lateral red eye-spots has been described.)

Jonesiella fusiformis, G. S. Brady. A number of specimens of this species were dredged at Tarbert Bank in 1896, but not satisfactorily identified till later. *Jonesiella fusiformis* is rather more slender than *Jonesiella spinulosa*, and with less spinous appendages; the fifth thoracic feet are also dissimilar.

Pseudotachidius coronatus, gen. et sp. nov. (Pl. XIII., figs. 12-26, and Pl. XV., figs. 1-4).

Description of the female.—Length about ·9mm. ($\frac{1}{28}$ of an inch). Seen from above, the thorax (fig. 22, Pl. XIII.) is moderately broad and sub-cylindrical, the breadth being equal to about three-fifths of the length; abdomen distinctly separate from the thorax, and consisting of five segments; caudal stylets very short. The rostrum is produced, and moderately broad and rounded at the apex, and furnished with two minute apical setæ. The antennules (fig. 23, Pl. XIII.) are six-jointed, very short and stout, and strongly setiferous; the first two joints are subequal, and much larger than any of the others. The formula shows the approximate proportional lengths of the joints—

Proportional lengths of the joints	11 · 12 · 6 · 4 · 4 · 5
Numbers of the joints,	1 · 2 · 3 · 4 · 5 · 6

The antennæ (fig. 24, Pl. XIII.) are stout and setiferous; the primary branches are two-jointed, but the secondary branches, which are articulated to the end of the first joint of the primary, are three-jointed, and reach somewhat beyond the extremity of the branches to which they are appended; the middle joint of the secondary branches is small. The mandibles (fig. 25, Pl. XIII.) are elongate, moderately stout, and have the obliquely truncate apex armed with a series of irregular but moderately stout teeth; the basal joint of the palp is somewhat dilated, and carries two small setiferous branches; the inferior branch is composed of two subequal joints, but the superior branch is one-jointed, and slightly longer and stouter than the other branch; the branches are submarginal on the basal joint, which is also furnished with four moderately stout and plumose apical setæ. The maxillæ (fig. 26, Pl. XIII.) are small but moderately robust; the biting part, which is situated on the lateral aspect of the basal joint, is armed with a few short, stout setæ and elongate, narrow, bifid teeth; immediately posterior to the biting part is a bilobed marginal process, the lobes of which are unequal, the smaller lobe being

next to the biting lobe, and both are setiferous; a small supplementary joint bearing three terminal plumose setæ springs at right angles from the base of the bilobed process. Posterior foot-jaws small and two-jointed; the second joint is somewhat dilated, and bears on the inner aspect a series of minute spines, as shown by the drawing (fig. 1, Pl. XV.); a short and stout setiferous spine springs from near the middle of the inner margin, and a stout plumose seta arises from the distal end of the inner margin of the first joint; the terminal claw is moderately stout, but considerably shorter than the joint to which it is articulated. In the first pair of swimming feet (fig. 2, Pl. XV.) both branches are three-jointed; the inner branches, which are elongate, have the first joint longer and considerably stouter than the second and third, being about double the breadth and nearly equal to the entire length of these two joints. The first joint is also furnished on the exterior aspect with one or two obliquely transverse rows of small spines, while a stout seta springs from the distal half of the inner margin; the second and third joints are also each provided interiorly with a marginal seta and with several small spiniform hairs on the outer edge; moreover, the third joint, instead of being armed with a terminal claw, is provided with two stout setæ, one being fully twice the length of the other; the outer branches are small, being little more than half the length of the inner branches; the first joint is rather longer than either the second or third, but the second and third are subequal. The second, third, and fourth pairs have both branches also three-jointed; the inner branches are somewhat shorter than the outer, and both are moderately stout and setiferous (fig. 3, Pl. XV.). The fifth pair (fig. 4, Pl. XV.) are small; the basal joint is of considerable width, but it is short except interiorly, where it is produced into a somewhat conical prolongation that terminates in an elongate and stout seta which is coarsely plumose; a long and stout seta also springs from the exterior angle of the basal joint, as shown by the figure; the secondary joint is very small and subquadrangular, and bears two moderately long setæ—one on each of the interior and exterior angles; intermediate between these are two small spines. No male specimens have been obtained.

Habitat.—Off Skate Island, Lower Loch Fyne, in 105 fms.; rare.

Remarks.—This curious Copepod does not seem to fit with any described genus known to us. In some respects it resembles *Tachidius*—hence the generic name that has been adopted for it; but the combined peculiarities in the structure of the antennules, antennæ, mandibles, and first and fifth pairs of feet do not fit in with the characters of any known genus.

Tetragoniceps consimilis, T. Scott. This species, like *Tetragoniceps bradyi*, has the fifth pair of thoracic feet remarkably broad and leaf-like. It was rare in the dredged material from Otter Spit.

Laophonte longicaudata, Boeck. Was dredged at Otter Spit, but was apparently rare.

Cletodes similis, T. Scott. This species, though moderately small, is robust, and may be distinguished by the form and armature of the first pair of swimming feet; the outer branches and the basal joints to which they are articulated are more or less ciliated. This species was also dredged at Otter Spit.

Dactylopus pectinatus, T. and A. Scott (Pl. XV., figs. 17-24).

1898. *Dactylopus pectinatus*, T. and A. Scott, 'Ann. and Mag. Nat. Hist.,' ser. 7, vol. i. p. 187, Pl. X., figs. 9-16.

This *Dactylopus* somewhat resembles *D. stromii* in general appearance; it is moderately robust, and measures about ·7 mm. ($\frac{1}{36}$ of an inch) in length. *Dactylopus pectinatus* has seven-jointed antennules, the first four joints being stout and subequal, while the other three are comparatively small (see fig. 18, Pl. XV.). The secondary branches of the antennæ are wo-jointed. The mandibles and maxillæ of this species, as well as some other of its structural details, resemble the same parts in *D. rostratus*. The somewhat remarkable characters that chiefly distinguish *Dactylopus pectinatus*, and which suggested the specific name applied to it, are the striking comb-like series of marginal spinules on the terminal claws of the posterior foot-jaws and inner branches of the first pair of swimming feet. This character of the terminal claws referred to, especially those of the inner branches of the first pair of swimming feet, arrested the attention at the time this Copepod was first observed, being readily noticed without resorting to dissection. But besides this peculiar characteristic of the species, it is well that another divergence in the structural details of the same inner branches should also be noticed. These inner branches are apparently only two-jointed, and in this respect differ from the normal structure of *Dactylopus*, and there is also a slight difference in the structure of the outer branches. This difficulty was felt when the species was first described, but as it possessed so many of the characters of a true *Dactylopus* it was considered preferable meanwhile to ascribe it to that genus. No males have been observed.

This species was discovered early in 1896 amongst some refuse trawled between Lowburn and Cairndow, Upper Loch Fyne.

Thalestris peltata (Boeck). Several specimens of this *Thalestris* were obtained amongst some dredged material from the vicinity of Otter Spit. *Thalestris peltata* is so unlike most of the other species of the genus that it may readily be passed over as some other form, but the structure of the mouth organs and of the first pair of swimming feet clearly indicate its relationship with the genus in question.

Thalestris rufocincta, Norman. This species is also from the Otter Spit. The spinous armature of the swimming feet readily characterises this *Thalestris*, which is one of the more common species of the genus.

Harpacticus flexus, Brady and Robertson. This *Harpacticus* was frequent in a gathering of Entomostraca collected in East Loch Tarbert in 1885, but was somehow overlooked until recently. It is a comparatively small species, but quite distinct.

Zaus goodsiri, G. S. Brady. This fine species was obtained at Otter Spit and one or two other places. It appears to be somewhat local, but where it does occur it is not unusual to find it more or less common.

Lichomolgus albens, Thorell, was another of the species found at Otter Spit, and this is also the first time it has been obtained in the Clyde district.

Hermanella arenicola (Brady)—*Lichomolgus arenicolus* (Brady). In this species all the four pairs of swimming feet have both branches three-jointed. It therefore differs from *Lichomolgus* as now restricted, which has the inner branches of the fourth pair only two-jointed. This *Lichomolgus* agrees better with the genus *Hermanella* (Canu), to which I have transferred it meanwhile, than with *Lichomolgus* proper. One or two specimens of this species were found in dredged material from Otter Spit.

Asterocheres echinicola (Norman). This Copepod has been obtained in various parts of Loch Fyne, living in the water-passages of a species of sponge (*Suberites*), and sometimes in considerable numbers.

Asterocheres violaceus (Claus). In dredged material from Otter Spit; apparently rare.

Asterocheres lilljeborgi, Boeck. This fine species has been found in one or two places in the Clyde district. In the previous catalogue of Loch Fyne fauna, male and female of *Artotrogus orbicularis*, Boeck, are recorded from Tarbert Bank, but it has since been ascertained that the supposed male of *Artotrogus orbicularis* was a male specimen of *Asterocheres lilljeborgi*, while the other belonged to *Artotrogus orbicularis;* and this other, which was supposed to be a female, was afterwards found to be a true male. (See *post.*)

(?) *Ascomyzon simulans* sp. n. (Pl. XIII., figs. 1-9, and Pl. XIV., fig. 22).

Description of the female.—Length, 1·1 mm. ($\frac{1}{23}$ of an inch). Body robust; the thoracic segments are laterally rounded off. The abdomen is composed of three segments; the first segment is dilated and twice the length of the next, while the last is rather smaller than the penultimate one; the caudal furca are very small (fig. 1, Pl. XIII.). The antennules are comparatively short and twenty-one jointed. The basal part of the antennules, which is distinctly stouter, consists of eight joints, and all the eight joints are, with the exception of the first, very short; the ninth and tenth are small and contracted; the remaining joints are comparatively slender, and longer than the basal joints, except the last three, which are small (fig. 2, Pl. II.). The formula shows approximately the proportional lengths of all the joints—

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

The secondary branches of the antennæ are very small, and furnished with two minute setæ (fig. 3, Pl. XIII.). The mandibles are long, slender, and pointed at the apex, and are armed at the extremity with several minute lateral teeth; the palp is slender, and rather more than a third of the length of the mandible; it is two-jointed, the end-joint shorter than the other, and furnished with two slightly plumose setæ (fig. 4, Pl. XIII.). The maxillæ are moderately large, and the one lobe is scarcely half the length of the other; both are provided with several long plumose hairs (fig. 5, Pl. XIII.). The foot-jaws are as in *Cyclopicera* (figs. 6, 7, Pl. V.). Both branches of all the swimming feet are three-jointed. The setæ of the last joint of the outer branches number 4 · 4 · 4 · 4 ·, and of the last joint of the inner 6 · 6 · (?) 6 · 4 ·; the marginal branches of the outer spines are small, but the terminal spines of both branches, where present, are broad and sabre-like (figs. 8-9, Pl. XIII.). The fifth pair are broadly ovate, and have three apical setæ (fig. 22, Pl. XV.). Male unknown.

Habitat.—Kilbrannan Sound, 1886 ; Otter Spit, Loch Fyne, 1887.

Remarks.—This Copepod, though closely allied to *Ascomyzon*, differs in one or two points from the characters which distinguish that genus. The mandible palp is comparatively short, and the hairs of the mandible palp and maxillæ are plumose. The number of setæ on the last joint of the outer and inner branches of the swimming feet is probably also dissimilar, but otherwise it appears to agree with the genus to which it is, for the present, ascribed.

Neopontius angularis, gen. et sp. n. (Pl. XIV., figs. 1-11).

Description of the female.—Length, 1·36 mm ($\frac{1}{19}$ of an inch). The thorax, seen from above, is moderately broad and sub-angular, the third and fourth segments are produced laterally and posteriorly almost to the distal end of the narrow fifth segment, causing the posterior part of the thorax to terminate somewhat abruptly ; the forehead is also broadly rounded. The abdomen is long and slender, and composed of four segments ; the anterior portion of the genital segment is scarcely broader than it is posteriorly ; this segment is fully equal to the combined length of the next three. The caudal stylets are elongate and comparatively broad ; they are rather longer than the last two abdominal segments (fig. 1). The antennules are short and twelve-jointed ; the first two and last joints are longer than the others ; the third to the sixth are very short, while the last four joints are distinctly narrower than the basal joint ; the æsthetask springs from the end of the last joint (fig. 2). The formula shows the proportional length of the joints—

$$\frac{27 \cdot 27 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 10 \cdot 8 \cdot 18 \cdot 12 \cdot 15 \cdot 30}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7 \cdot 8 \cdot 9 \cdot 10 \cdot 11 \cdot 12}$$

The antennæ are small, and the secondary branches consist of a single small joint, having two minute hairs (fig. 3). The mandibles are stylet shaped, being very long and slender ; there appears to be an intermediate joint, but somewhat nearer the distal than the proximal end ; the mandibles are also armed with a few minute lateral teeth that extend a short distance back from the apex (fig. 4). The maxillæ are moderately large ; the principal branch is cylindrical and about four times longer than broad, the other is narrower and slightly tapering and equal to about two-thirds of the length of the larger ; the smaller branch is provided with three, the larger with four plumose setæ (fig. 5). The foot-jaws somewhat resemble those of *Dispontius*, but the claws of the anterior pair are strong and powerful, and have a stout seta on the inner aspect, also a small spine exteriorly (fig. 6) ; the claws of the posterior pair are more slender (fig. 7). All four pairs of swimming feet have both branches three-jointed ; the inner branches of the first pair have no terminal spines ; the marginal spines of the outer branches are short and stout ; the end-joint of the inner branches has three setæ on the inner margin, two at the apex, and one on the outer margin, while the end-joint of the outer branches has four setæ round the inner margin and apex (fig. 8). In the fourth pair both branches are armed with broad, sword-like spines ; the inner branches are rather narrower than the outer, and the last joint bears two setæ on the inner margin and one on the outer margin ; there is also a small supplementary apical seta ; the end-joint of the outer branches is provided with five setæ on the inner margin (fig. 9). Fifth pair of feet moderately large, sub-quadrate in outline, the outer margin straight, inner margin

curved from the somewhat narrow basal part to the broad truncate extremity of the foot, where it terminates in a small thumb-like process; two setæ spring from the truncate apex and one from the lateral aspect of the distal half; an elongate seta also springs from the outer angles of the thoracic segment to which the fifth pair are attached (fig. 10).

Description of the male.—The male appears to be similar to the female in every respect except in the structure of the antennules, and even in this respect the difference is not apparently very great. The male antennules are twelve-jointed, the proportional lengths of the first eight being similar to those of the female; the ninth is considerably longer than the same joint in the female antennule, while it is also of a different form, and carries a long, stout seta at the distal extremity; the last joint is shorter than the same joint in the female antennule, and is hinged to the preceding joint (fig. 11).

Habitat.—Otter Spit, Loch Fyne.

Remarks.—Two or three specimens of this somewhat curious species were obtained in a gathering of micro-crustacea sent to me from Loch Fyne by F. G. Pearcey, of the Fishery Board. It seems undoubtedly to belong to the sub-family of Dyspontiinæ of Dr. Giesbrecht, but I am unable to place it under any of the described genera of that group. It has certain points of resemblance with *Myzopontius*, but the structure of the mouth organs excludes it from that genus. Meanwhile I have decided to institute a new genus for its reception, and as there is but one species, the description includes both the generic and specific characters.

Artotrogus orbicularis, Boeck (Pl. XIV., figs. 12-21).

Description of the male.—Length, 1·34 mm. ($\frac{2}{3\,7}$ of an inch). Seen from above, the thorax is almost circular, being about as broad as it is long; the segments are somewhat produced laterally into angular processes. The abdomen is small and apparently only (?) three-jointed, the first two being very short. Caudal stylets short and broad (fig. 12). The antennules are short, and eight-jointed; the first and second joints are large, the others smaller; an æsthetask springs from the end of the last joint (fig. 13). The proportional lengths of the joints are shown by the formula—

$$\frac{24 \cdot 23 \cdot 9 \cdot 5 \cdot 9 \cdot 6 \cdot 7 \cdot 15}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7 \cdot 8}$$

Antennæ three-jointed and bearing three terminal hairs; secondary branches very small (fig. 14). Maxillæ large, lobes unequal, outer lobes elongate, broad at the base, but tapering gradually to the narrow apex, from which springs a long, moderately stout, and slightly plumose seta; inner lobe about half the length of the other, and bearing three terminal setæ, two of which are long and moderately stout and one small (fig. 15). The anterior foot-jaws are provided with moderately short but stout and strongly-curved claws (fig. 16). The posterior foot-jaws are also armed with stout, though short, terminal claws, the structure of which resembles generally those of the same appendages in other species of Ascomyzontidæ (fig. 17). The first and second pairs of swimming feet are large, and both branches are three-jointed; in the first pair the marginal spines are small but stout, there are no terminal spines on either the outer or inner

branches ; the end-joint of the outer branches bears five setæ round the inner margin and apex, so does the end-joint of the inner branches, but this joint bears a seta also on the outer margin (fig. 18). The second pair are somewhat larger than the first, and the outer branches are armed with a terminal spine. The third pair are similar to the second ; in both, the end-joints of the outer branches are provided with five setæ on the inner margin and apex ; the end-joints of the inner branches bear also five setæ as shown by the figure (fig. 19) ; the fourth pair appear to be entirely absent. The fifth pair are rudimentary, and consist of a slightly produced and rounded portion of the thoracic segment furnished with three short and stout plumose hairs (fig. 20). The appendages to the first abdominal segment resemble the fifth pair of thoracic very nearly, and are provided with a similar number of setæ (fig. 21).

Habitat.—Tarbert Bank, Loch Fyne ; very rare.

Remarks.—In the paper on the "Marine Fishes and Invertebrates of Loch Fyne," published in the Fifteenth Annual Report of the Fishery Board for Scotland, a male and a female of *Artotrogus orbicularis* are recorded from Tarbert Bank. The supposed male has since been ascertained to belong to another genus, *Asterocheres* (see the record under that name), while the supposed female was really a male as described above. The only British specimen of a female known to me is that obtained by I. C. Thompson, of Liverpool, in the Irish Sea. The remarkable circular form of this species is very characteristic.

ADDITION TO THE VERMES OF LOCH FYNE.

Panthalis oerstedi, Kinberg. This annelid has lately been obtained in Loch Fyne by Mr. F. G. Pearcey, of the Fishery Board. Unable at first to identify the annelide that had gathered around itself such a huge, unsightly mass of slimy mud, I afterwards remembered having had the privilege of listening to a very interesting description by Professor Herdman of the habits of *Panthalis oerstedi*, and of the interesting researches of Arnold T. Watson, of Sheffield, who had so successfully settled the question that had been raised as to whether this annelid formed its own tube or not, and concluded that this also was *Panthalis*. The surmise proved correct, and I am therefore now able to make this interesting addition to the Loch Fyne fauna. The patient and successful researches of Arnold T. Watson are fully described in a paper published by him in the Transactions of the Liverpool Biological Society for 1894-95. The species seems to be restricted in its distribution to water of considerable depth, and with a bottom of fine mud.

ADDITIONS TO THE FORAMINIFERA OF LOCH FYNE.

A large number of additional records of Loch Fyne Foraminifera have been obtained since the publication of the previous list. I am indebted for several of these to Mrs. Robertson, of Millport, and to Mr. F. G. Pearcey, of the Fishery Board. Dr. G. W. Chaster, of Southport, has also aided me with this group. The species are arranged as in the previous paper.

Miliolidæ.

Spiroloculina planulata (Lamk.). Loch Fyne (Mrs. Robertson).

Miliolina oblonga (Montagu) = (*Triloculina oblonga*). Dredged at Tarbert Bank, 20 to 25 fms.

Miliolina auberiana (d'Orb). Loch Fyne (Mrs. Robertson). Dredged at Tarbert Bank, Loch Fyne, 20 to 25 fms.

Miliolina venusta (Karrer). Loch Fyne (Mrs. Robertson).

Miliolina bicornis (W. and T.). Loch Fyne (Mrs. Robertson). Dredged at Tarbert Bank in 20 to 25 fms.

Miliolina labiosa, d'Orb. Loch Fyne (Mrs. Robertson).

Miliolina fusca, Brady. Dredged at Tarbert Bank, Lower Loch Fyne; rare.

Sigmoilina tenuis, Czjzek. Dredged at Tarbert Bank; rare.

Cornuspira involvens, Reuss. Off East Loch Tarbert, Lower Loch Fyne; rare (collected 1886).

Astrorhizidæ.

Pelosina variabilis, H. B. Brady. Common below Inveraray in 70 fms. (Mrs. Robertson). F. G. Pearcey has also dredged this large and curious species in Loch Fyne. It is so large and unlike the organisms usually known as Foraminifera that the test may be passed over as a worm-tube of some kind.

Hyperammina arborescens, Norman. Loch Fyne (Mrs. Robertson). This is found attached to stones and the "roots" of sea-weeds, and though comparatively large it is necessary to have some familiarity with the group to which it belongs to be able to recognise it.

Tecnitella legumen, Norman. Loch Fyne (Mrs. Robertson). This is another peculiar species, and very unlike the usual Foraminifer.

Dendrophrya radiata, Strethil Wright. Ardlamont Point, at low spring tides (F. G. Pearcey).

Dendrophrya erecta, Strethil Wright. Ardlamont Point, at low spring tides, along with the other (F. G. Pearcey). These two interesting species of Foraminifera were found by Dr. Strethil Wright in Granton Quarry, and described by him in 1861 in the 'Annals and Magazine of Natural History.' *D. erecta* was afterwards found in the same quarry by the late Dr. Robertson, who also many years ago discovered both species in low-tide pools at Cumbrae.

Lituolidæ.

Reophax fusiformis (Williamson). Dredged at Tarbert Bank, in 20 to 25 fms.

Reophax deflugiformis, H. B. Brady. Dredged at Tarbert Bank.

Reophax moniliforme, Siddall. Dredged also at Tarbert Bank.

Reophax scottii, Chaster. East Loch Tarbert, 1886. The test of this species is slender and elongate, and composed of a considerable number of segments that become gradually larger; it is more or less flexible when moist. *Reophax scottii* is generally distributed in Upper Loch Fyne, in East Loch Tarbert, in Campbeltown Loch, and other parts of the Clyde area. It is also sparingly distributed throughout most of the estuary of the Forth, as well as in other places around the British coasts.

Ammodiscus charoides (Jones and Parker). This pretty species, which is of a brown colour, and somewhat resembling a seed capsule or "nucule" of *Chara*, but with the surface polished, was dredged at Tarbert Bank. It seems to be very rare in Loch Fyne.

Ammodiscus shoneanus, Siddal. Loch Fyne (Mrs. Robertson).

Trochammina inflata (Montagu). Off Skate Island, 105 fms.; very rare (F. G. Pearcey). Off Inveraray; rare (Dr. Robertson, in 'Notes on the Fauna and Flora of the West of Scotland,' p. 51).

Trochammina inflata var. *macrascens*, H. B. Brady. Loch Fyne; very rare (Mrs. Robertson).

Trochammina plicata, Terquem. Lower Loch Fyne, off East Tarbert; rare (collected 1886).

Trochammina robertsoni, H. B. Brady. Loch Fyne (Mrs. Robertson). I have also dredged this species at Tarbert Bank, but it appears to be rare in Loch Fyne.

Valvulina austriaca, d'Orb. Off Inveraray, Upper Loch Fyne; rare (Dr. Robertson, in 'Notes on the Fauna and Flora of the West of Scotland,' p. 51).

Textularidæ.

Textularia trochus, d'Orb. Dredged at Tarbert Bank; not common.

Textularia gramen, d'Orb. Dredged at Tarbert Bank; moderately frequent.

Verneuilina polystropha (Reuss). Loch Fyne (Mrs. Robertson). Off Skate Island, 105 fms. (F. G. Pearcey). I have also dredged this species at Tarbert Bank.

Sagrina dimorpha. Dredged at Tarbert Bank; rare.

Bulimina elegantissima, d'Orb. Off Minard Castle, in 28 fms. (F. G. Pearcey).

Virgulina schreibersiana, Ezjzek. Loch Fyne (Mrs. Robertson).

Bolivina punctata, d'Orb. Off Inveraray, Upper Loch Fyne; rare (Dr. Robertson, in 'Notes on the Fauna and Flora of the West of Scotland,' p. 52).

Bolivina plicata, d'Orb. Loch Fyne (Mrs. Robertson). I have dredged this species also at Tarbert Bank.

Bolivina dilatata, Reuss. Dredged at Tarbert Bank; not very rare.

Bolivina lævigata (Williamson). Off Minard Castle, Upper Loch Fyne, in 28 fms. (F. G. Pearcey).

Cassidulina crassa, d'Orb. Off East Loch Tarbert, Lower Loch Fyne (collected 1886).

Lagenidæ.

Lagena lævis var. *clavata*, d'Orb. Dredged at Tarbert Bank, Lower Loch Fyne.

Lagena lineata (Williamson). Off Minard Castle, Upper Loch Fyne, in 28 fms. (F. G. Pearcey).

Lagena williamsoni, Alcock. Dredged at Tarbert Bank, Lower Loch Fyne.

Lagena costata, Williamson. Dredged at Tarbert Bank with the other.

Lagena gracilis, Williamson. Off Skate Island, in 105 fms.; rare (F. G. Pearcey).

Lagena semistriata, Williamson. Loch Fyne (Mrs. Robertson).

Lagena lævigata var. *lucida*, Williamson. Dredged at Tarbert Bank, Lower Loch Fyne.

Lagena lyelli, Sequenza. Dredged also at Tarbert Bank.

Lagena orbignyana, Sequenza. This also was dredged at Tarbert Bank.

Lagena lagenoides, Williamson. Off Skate Island, in 105 fms. (F. G. Pearcey).

Nodisaria pyrula, d'Orbigny. Dredged at Tarbert Bank, Lower Loch Fyne.

Nodosaria obliqua, Linné. Dredged also at Tarbert Bank; apparently a rare species.

Nodosaria perversa, Schw. Dredged at Tarbert Bank ; rare.

Nodosaria (*Dentalina*) *pauperata* (d'Orbigny). Off Inveraray, Loch Fyne ; rare (Dr. Robertson, in 'Notes on the Fauna and Flora of the West of Scotland,' p. 52).

Vaginulina legumen, Linné. Dredged at Tarbert Bank ; rare.

Marginulina glabra, d'Orbigny. Dredged at Tarbert Bank ; rare.

Polymorphina oblonga, d'Orbigny. Off Skate Island, in 105 fms. ; very rare (F. G. Pearcey). Dredged also at Tarbert Bank.

Polymorphina lanceolata, Reuss. Loch Fyne (Mrs. Robertson).

Polymorphina compressa, d'Orbigny. Loch Fyne (Mrs. Robertson).

Polymorphina sororia, Reuss. Loch Fyne (Mrs. Robertson). Dredged also off East Loch Tarbert.

Polymorphina sororia var. *cuspidata*. Loch Fyne (Mrs. Robertson).

Uvigerina angulosa, Williamson. Dredged at Tarbert Bank, Lower Loch Fyne ; rare.

Discorbina orbicularis, Terquem. Off East Loch Tarbert, 20 fms. (F. G. Pearcey).

Truncatulina ungeriana, d'Orb. East Loch Tarbert (collected 1886) ; rare.

Pulvinulina auricula, Fichtel and Moll. Dredged at Tarbert Bank, Lower Loch Fyne ; rare.

Nonionina orbicularis, H. B. Brady. Loch Fyne (Mrs. Robertson).

Nonionina scapha, Fichtel and Moll. Loch Fyne (Mrs. Robertson). Dredged also at Tarbert Bank ; rare.

The species and varieties of Foraminifera recorded in the preceding notes number 56, which, including those recorded in the previous list, brings up the total number to 111.

APPENDIX.—EXTRA NOTES ON SOME CLYDE CRUSTACEA.

Addition to the Amphipoda of the Firth of Clyde.

Dulichia monocantha, G. O. Sars. I have on one or two occasions observed specimens of what appeared to be *Dulichia monocantha*, but as the specimens were females their identification was somewhat doubtful, the females being much more difficult to differentiate than the males. Last summer, however, Mr. F. G. Pearcey forwarded to me the contents of a haddock's stomach from the Clyde, and while looking through this material I obtained a male specimen of this *Dulichia*. Though there may

be doubt as to the correct identification of female specimens of this species, there need be none as regards male specimens, the strongly-marked character of the first pair of coxal plates in the male being quite sufficient to identify the species. This species appears to be new to Britain.

Additions to the Copepoda of the Firth of Clyde.

Scottocheres elongatus (T. and A. Scott), (Pl. XIII., figs. 10-21).

1894. *Acontiophorus elongatus*, T. and A. Scott, 'Ann. and Mag. Nat. Hist.,' ser. 6, vol. xii. p. 145, Pl. IX., figs. 15-20; and T. Scott, Twelfth Ann. Rep. Fish. Board, Scot., Part III., p. 261.

1897. *Scottocheres elongatus*, W. Giesbrecht, 'Zool. Anzeig.,' Nos. 521, 522 (separate copy), p. 6.

This Copepod was partly described by Thomas and Andrew Scott in 1894 from one or two specimens obtained in the Firth of Forth. It was ascribed to *Acontiophorus*, Brady, as that was the genus to which it was apparently most closely related. Since that time Dr. Giesbrecht, the eminent crustaceologist of the Naples Zoological Station, has made a special study of this family of the Copepoda, and introduced certain necessary changes in the arrangement and nomenclature of the various genera and species comprised in it. One of these changes is the institution of a new genus for this Copepod, viz., *Scottocheres*—as indicated above. It is interesting to note that Dr. Giesbrecht has discovered *Scottocheres elongatus* in the vicinity of Naples. Till comparatively recently this species was known to me only from the Firth of Forth, but I am now able to record it also from the Clyde, a specimen of it having been obtained in the vicinity of Sanda Island. Its discovery in the Clyde enables me to give a fuller description of the species, and also figures showing additional structural details, as follow :—

An ova-bearing female has been figured by my son, and is represented in fig. 10. This specimen measured almost a millimetre in length, and carried two ovisacs, each apparently containing three large ova. The antennules are comparatively short, and are seventeen-jointed; but the eighth joint, counting from the base, ought, perhaps, to be reckoned two joints, as an indistinct suture is seen extending partly across it. The last joint is longer than any of the others except the basal joint, and an æsthetask springs from the end of the second-last joint (fig. 11). The antennæ are slender and three-jointed, but the last joint is very small and bears a moderately long claw-like spine; the secondary branches are also very small, and one-jointed (fig. 12). The mandibles are very long and very slender, being about as long as the siphon, which reaches to near the end of the cephalothorax (figs. 13, 14). The maxillæ are small and two-branched; one branch is stout and somewhat conical in shape, the other is small and somewhat cylindrical; both branches bear three setæ, two of the setæ of the larger branch being of considerable length and plumose (fig. 15). The foot-jaws are elongate and slender, and both pairs have moderately long terminal claws; the anterior pair are two-jointed, but the posterior pair are apparently four-jointed, as shown by the figures (figs. 16, 17). All the four pairs of swimming feet have both branches three-jointed (figs. 18 and 19 represent the first and fourth pairs); the fifth pair are broadly elliptical, and bear three terminal

setæ (fig. 20). The abdomen consists of three segments; the genital segment is large, while the third is shorter than the penultimate one; caudal stylets very short (fig. 21). We have not yet observed the male of this Copepod.

Eurynotus insolens, T. and A. Scott (Pl. XV., figs. 25-34).

1898. *Eurynotus insolens*, T. and A. Scott, 'Ann. and Mag. Nat. Hist.,' ser. 7, vol. i. p. 188, Pl. X., fig. 17; and Pl. XI., figs. 5-13.

This curious parasite—for that it is parasitic on some creature is evident by the structure of the mouth-organs—was discovered among some trawled refuse from Kilbrannan Sound, Firth of Clyde, in 1886. The thorax is broad and somewhat ovate, it is large in comparison with the abdomen, and seen from above is indistinctly divided into two segments, the junction of which is indicated by a slight constriction on each side (fig. 25). The antennules (fig. 26) are short and seven-jointed, and taper gradually from the moderately stout base; the second joint is much longer than any of the others, and bears a long plumose seta at the distal end of the lower margin. The antennæ (fig. 27) are stout, and apparently four-jointed, and furnished with a series of peculiar terminal hairs, some of which are distinctly hooked at the ends, and two of them terminate in what seem to be circular disks, as shown by the figure; the antennæ do not appear to possess secondary appendages. The mandibles (fig. 28) are simple, elongate, and slender organs, which terminate in hook-like extremities; they are each provided with two long marginal setæ near the middle (figs. 29 and 30 show the rudimentary structure of the maxillæ and anterior foot-jaws). The posterior foot-jaws (fig. 31) appear to be two-jointed; the first joint is dilated interiorly so as to assume a somewhat gibbous form, and a considerable portion of the gibbous surface is clothed with minute spines; the end-joint is very small, and bears three terminal setæ of unequal length. There are only three pairs of thoracic feet, the fourth and fifth being apparently obsolete; and while the first and second pairs are both three-branched, the third pair appears to be only one-branched (figs. 32, 33). There is a large and prominent circular disk-like appendage situated between and a little in front of the mandibles; this appendage is probably used by the Copepod as a sucker for adhering to the creatures that form its host. The male is so far unknown. *Eurynotus insolens* appears to be a rare species. The generic name—*Eurynotus*—which has been given to this Copepod was suggested by the broadly ovate form of the thorax, *eurynotus* being a slightly modified form of the Greek word signifying "having broad shoulders."

Choniostomatidæ.

Aspidœcia normani, Giard and Bonnier. Last year I recorded the curious *Erythrops* parasite *Aspidophryxus peltatus* from the Clyde. I have now to report the occurrence in the Clyde of another curious parasite of *Erythrops*—viz., *Aspidœcia normani*. I have on one or two previous occasions observed what looked like rounded tubercles on the back and sides of odd specimens of these Schizopods without knowing what they were. A perusal of Dr. H. J. Hansen's monograph of the *Choniostomatidæ*, however, showed at once their true character.

In concluding these notes, I may state that there are one or two crustacean species still unidentified, and that have consequently to stand over for the present.

DESCRIPTION OF THE PLATES.

Plate XII.

Bradyidius armatus (Brady).

Fig. 1.	Female—dorsal view,	×	26½	diameters.
Fig. 2.	Antennule of female,	×	40	,,
Fig. 3.	Antenna,	×	95	,,
Fig. 4.	Mandible and palp of female,	×	63	,,
Fig. 5.	Maxilla of female,	×	126	,,
Fig. 6.	Anterior foot-jaw of female,	×	190	,,
Fig. 7.	Posterior foot-jaw,	×	84	,,
Fig. 8.	Foot of first pair of swimming feet,	×	126	,,
Fig. 9.	Foot of second pair of swimming feet, female,	×	84	,,
Fig. 10.	Foot of fourth pair of swimming feet, female,	×	84	,,
Fig. 11.	Last thoracic segment and abdomen, female,	×	35	,,
Fig. 12.	Antennule of male,	×	54	,,
Fig. 13.	Mandible and palp of male,	×	126	,,
Fig. 14.	Maxilla of male,	×	190	,,
Fig. 15.	Anterior foot-jaw of male,	×	500	,,
Fig. 16.	Fifth pair of feet of male,	×	26	,,
Fig. 17.	Fifth pair of feet of male (immature),	×	90	,,
Fig. 18.	Abdomen of male,	×	64	,,
Fig. 19.	Rostrum,	×	380	,,

Ætidius armatus, Brady.

Fig. 20.	Rostrum (for comparing with that of *Bradyidius*),	×	300	diameters.

Plate XIII.

(?) *Ascomyzon simulans*, sp. n.

Fig. 1.	Female—dorsal view,	×	53	diameters.
Fig. 2.	Antennule of female,	×	190	,,
Fig. 3.	Antenna,	×	190	,,
Fig. 4.	Mandible and palp,	×	253	,,
Fig. 5.	Maxilla,	×	253	,,
Fig. 6.	Anterior foot-jaw,	×	190	,,
Fig. 7.	Posterior foot-jaw,	×	190	,,
Fig. 8.	Foot of second pair of swimming feet,	×	152	,,
Fig. 9.	Foot of fourth pair of swimming feet,	×	152	,,

Scottocheres elongatus (T. and A. Scott).

Fig. 10.	Female, with ova—dorsal view,	×	70	diameters.
Fig. 11.	Antennule of female,	×	253	,,
Fig. 12.	Antenna,	×	253	,,
Fig. 13.	Mandible,	×	190	,,
Fig. 14.	Siphon,	×	190	,,
Fig. 15.	Maxilla,	×	337	,,
Fig. 16.	Anterior foot-jaw,	×	253	,,
Fig. 17.	Posterior foot-jaw,	×	253	,,
Fig. 18.	Foot of first pair of swimming feet,	×	253	,,
Fig. 19.	Foot of fourth pair of swimming feet,	×	253	,,
Fig. 20.	Foot of fifth pair,	×	380	,,
Fig. 21.	Abdomen and caudal stylets,	×	160	,,

Pseudotachidius coronatus, gen. et sp. nov.

Fig. 22. Female—dorsal view, ... × 80 diameters.
Fig. 23. Antennule of female, ... × 253 ,,
Fig. 24. Antenna, ... × 380 ,,
Fig. 25. Mandible and palp, ... × 253 ,,
Fig. 26. Maxilla, ... × 253 ,,

Plate XIV.

Neopontius angularis, gen. et sp. nov.

Fig. 1. Female—dorsal view, ... × 53 diameters.
Fig. 2. Antennule of female, ... × 190 ,,
Fig. 3. Antenna, ... × 253 ,,
Fig. 4. Mandible, ... × 253 ,,
Fig. 5. Maxilla, ... × 506 ,,
Fig. 6. Anterior foot-jaw, ... × 253 ,,
Fig. 7. Posterior foot-jaw, ... × 253 ,,
Fig. 8. Foot of first pair of swimming feet, . . . × 190 ,,
Fig. 9. Foot of fourth pair of swimming feet, . . × 190 ,,
Fig. 10. Foot of fifth pair, ... × 380 ,,
Fig. 11. Attenule of male, ... × 190 ,,

Artotrogus orbicularis, Boeck.

Fig. 12. Male—dorsal view, ... × 40 diameters.
Fig. 13. Antennule of male, ... × 190 ,,
Fig. 14. Antenna, ... × 190 ,,
Fig. 15. Maxilla, ... × 253 ,,
Fig. 16. Anterior of foot-jaw, ... × 80 ,,
Fig. 17. Posterior foot-jaw, ... × 106 ,,
Fig. 18. Foot of first pair of swimming feet, . . . × 190 ,,
Fig. 19. Foot of third pair of swimming feet, . . . × 190 ,,
Fig. 20. Foot of fifth pair, ... × 380 ,,
Fig. 21. One of the appendages of the first abdominal segment, × 380 ,,

(?) *Ascomyzon simulans*, sp. n.

Fig. 22. Foot of fifth pair, ... × 380 diameters.

Plate XV.

Pseudotachidius coronatus, g. et sp. n.

Fig. 1. Posterior foot-jaw, ... × 380 diameters.
Fig. 2. Foot of first pair of swimming feet, . . . × 190 ,,
Fig. 3. Foot of fourth pair of swimming feet, . . × 190 ,,
Fig. 4. Foot of fifth pair, ... × 380 ,,

Stephos fultoni, T. and A. Scott.

Fig. 5. Female—lateral view, ... × 53 diameters.
Fig. 6. Antennule of female, ... × 80 ,,
Fig. 7. Antenna, ... × 126 ,,
Fig. 8. Mandible and palp, ... × 94 ,,
Fig. 9. Posterior foot-jaw, ... × 190 ,,
Fig. 10. Foot of first pair of swimming feet, . . . × 167 ,,
Fig. 11. Foot of second pair of swimming feet, . . × 125 ,,
Fig. 12. Foot of fourth pair of swimming feet, . . × 125 ,,
Fig. 13. Foot of fifth pair—female, ... × 300 ,,
Fig. 14. Foot of fifth pair—male, ... × 253 ,,
Fig. 15. Abdomen and caudal stylets of female, . . × 80 ,,
Fig. 16. Abdomen and caudal stylets of male, . . × 80 ,,

Dactylopus pectinatus, T. and A. Scott.

Fig. 17. Female--dorsal view, ... × 80 diameters.
Fig. 18. Antennule of female, ... × 253 ,,
Fig. 19. Antenna, ... × 300 ,,
Fig. 20. Anterior foot-jaw, ... × 300 ,,
Fig. 21. Posterior foot-jaw, ... × 380 ,,
Fig. 22. Foot of first pair of swimming feet, . . . × 253 ,,
Fig. 23. Foot of fourth pair of swimming feet, . . × 200 ,,
Fig. 24. Foot of fifth pair—female, ... × 380 ,,

Eurynotus insolens (T. and A. Scott).

Fig. 25. Female—dorsal view, ... × 80 diameters.
Fig. 26. Antennule of female, ... × 253 ,,
Fig. 27. Antenna . . . . . × 300 ,,
Fig. 28. Mandible, ... × 380 ,,
Fig. 29. Maxilla, ... × 760 ,,
Fig. 30. Anterior foot-jaw, ... × 300 ,,
Fig. 31. Posterior foot-jaw, ... × 380 ,,
Fig. 32. Foot of first pair of swimming feet, . . . × 300 ,,
Fig. 33. Foot of third pair of swimming feet, . . . × 380 ,,
Fig. 34. Sucker-disk, ... × 200 ,,

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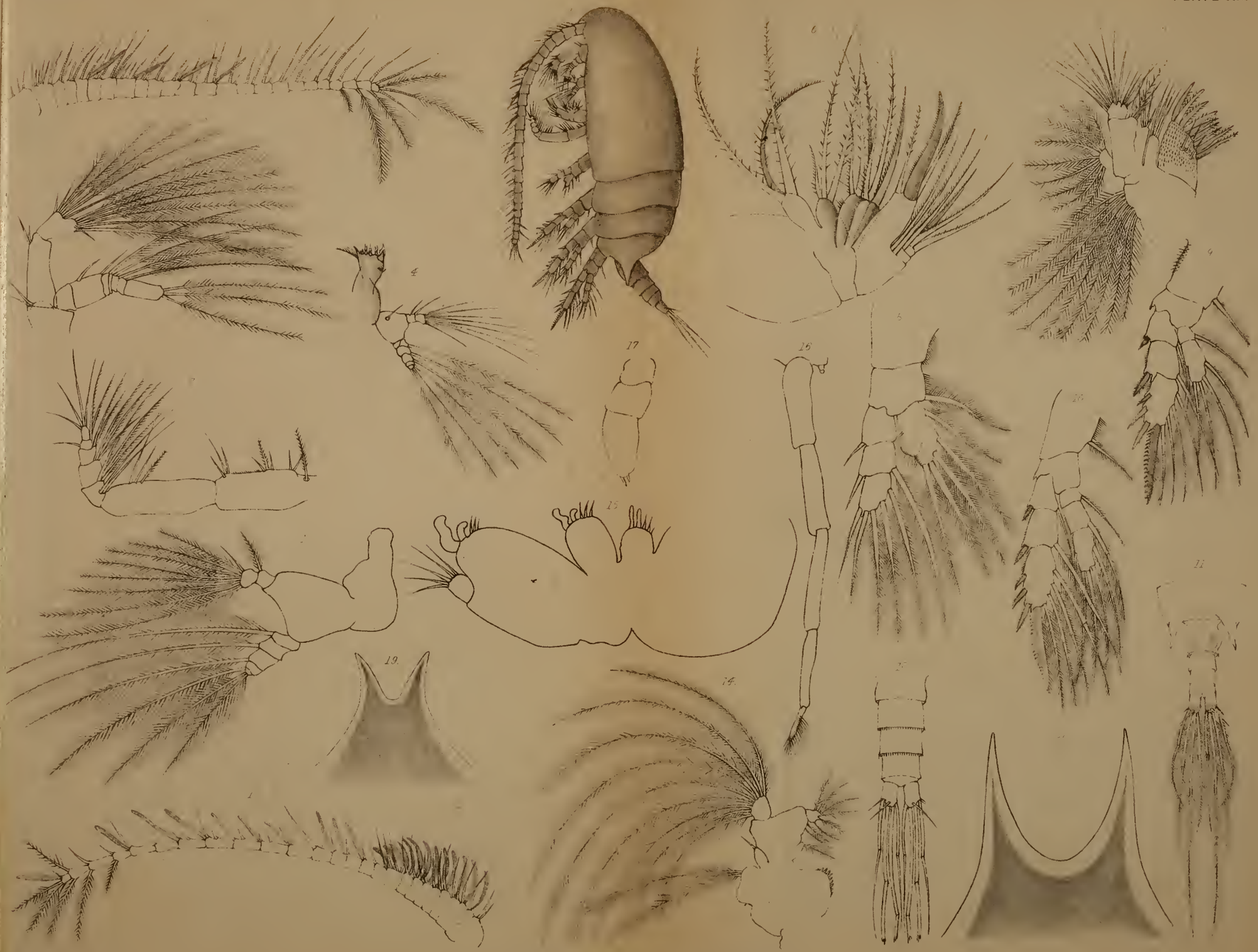
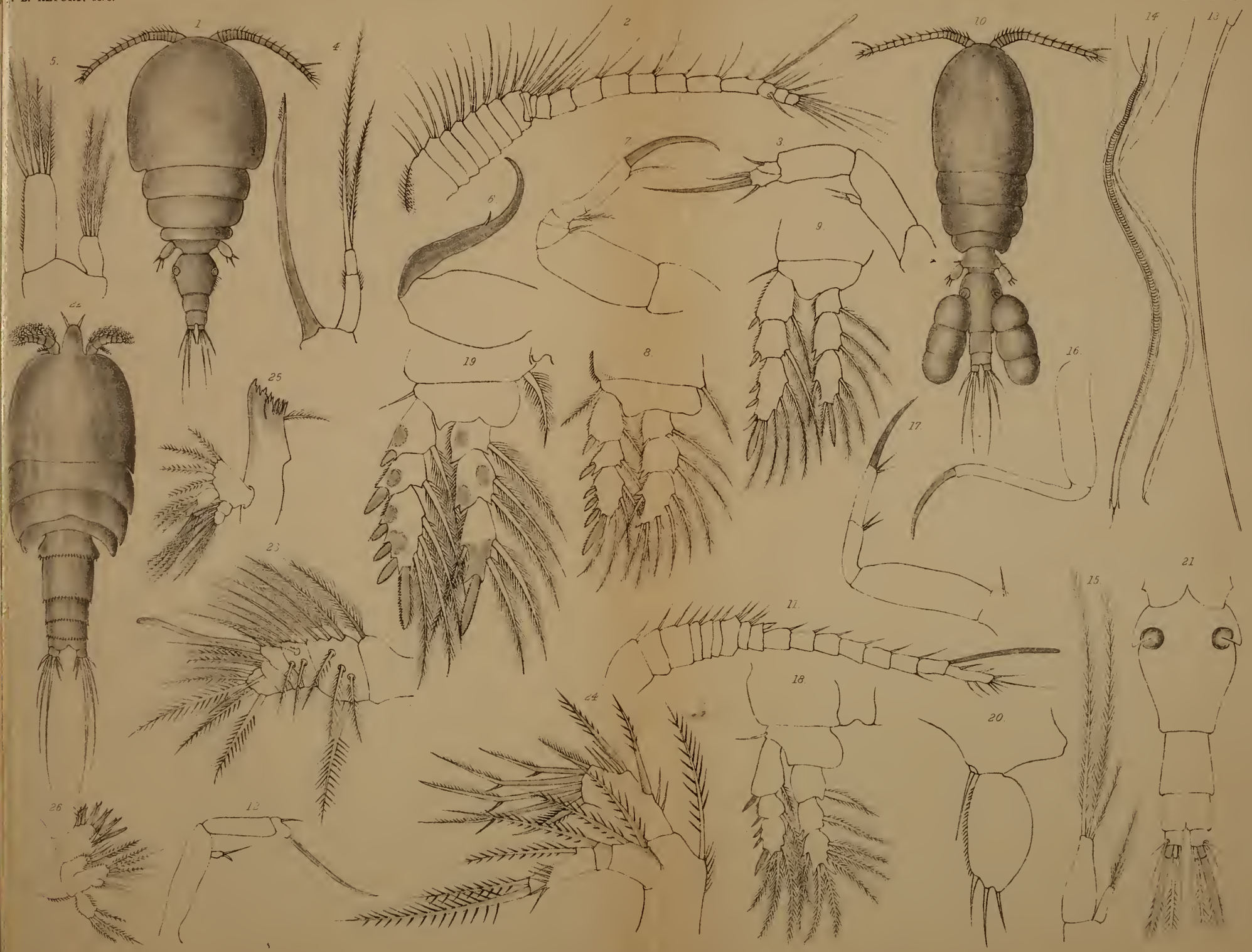


A. Scott, *del. ad. nat.*

Figs. 1-19.—*Bradyidius armatus* (Brady). Fig. 20.—*Ætidius*, sp.



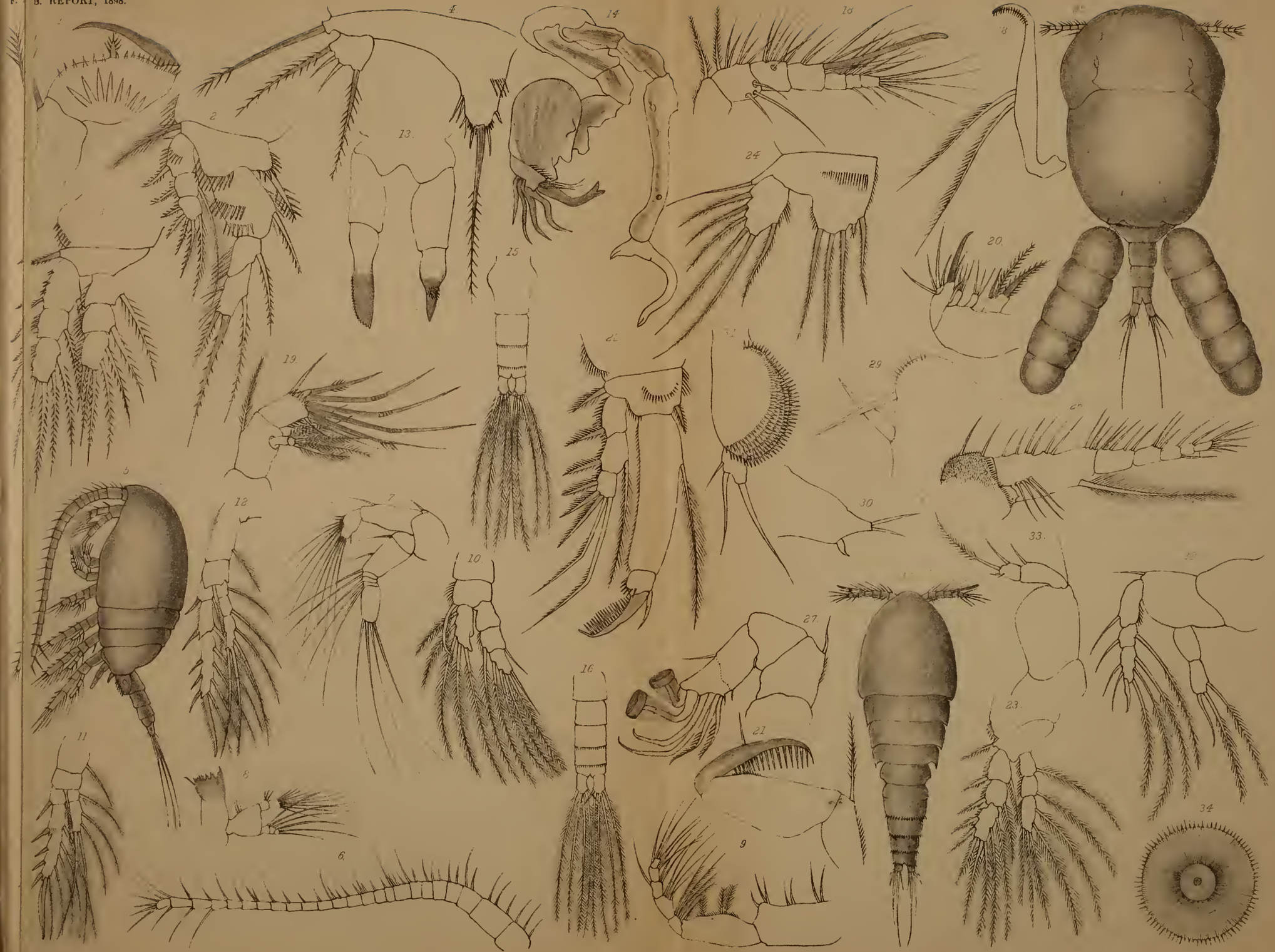
. Scott, *del. ad nat.*

Figs. 1-9.— (?) *Ascomyzon simulans*, n. sp. Figs. 10-21.—*Scottocheres elongatus* (T. and A. Scott). Figs. 22-26.—*Pseudotachidius coronatus*, n. g. et. sp.

A. Scott, *del. ad nat.*

Fig. 1-11.—*Neopontius angularis*, gen. et. sp. nov.

Figs. 12-22.—*Artotrogus orbicularis* (Boeck).



SCOTT, *del. ad nat.* FIGS. 1-4.—*Pseudotachidius coronatus*, g. and sp n. FIGS. 5-16.—*Stephos fultoni* (T. and A. Scott) FIGS. 17-24.—*Dactylopus pectinatus* (T. and A. Scott). FIGS. 25-34.—*Eurynotus insolens* (T. and A. Scott).