VII. NOTES ON RECENT GATHERINGS OF MICRO-CRUSTACEA FROM THE CLYDE AND THE MORAY FIRTH. By Thomas Scott, F.L.S., Mem. Soc. Zool. de France.

(Plates X–XIII.)

In the following notes my remarks refer chiefly to the rarer forms that have been observed in gatherings of Microcrustacea submitted for examination during 1898. The gatherings examined have been collected in the Moray Firth and the Firth of Clyde, and therefore the notes refer chiefly to these localities. I am indebted to Mr. F. G. Pearcey, naturalist on board the s.s. "Garland," for most of the gatherings forwarded for examination.

Copepoda.

Paracalanus parvus (Claus).

1863. *Calanus parvus*, Claus. Die frei-lebenden Copopoden, p. 173, Pl. XXVI., figs. 10-14; Pl. XXVII., figs. 1-4.

This Copepod, which was observed in the Firth of Clyde for the first time in September 1897, has occurred in several of the tow-net gatherings collected during 1898, both at the surface and bottom. It was obtained at Stations IX. and XIII. in August, and at Stations VII. and VIII. in September. Station XIII. is one of the Upper Loch Fyne stations, and its occurrence there makes it an addition to the Loch Fyne fauna. It is a small species, and may therefore have been previously passed over as a young *Calanus*. It has also been observed in the Moray Firth and in the Firth of Forth.

**Bradyidius armatus* (Brady).

1878. *Pseudocalanus armatus*, G. S. Brady, Mon. Brit. Copep., vol. i., p. 46 (non *P. armatus*, Boeck—see Giesbrecht, *Zool. Anzeiger*, 1897, p. 25).

This species is referred to because its distribution appears to be somewhat restricted. Though not very plentiful, it is one of the more widely diffused of the Clyde Copepoda, and it has been known for many years as a Clyde species. It is usually obtained in gatherings collected with the bottom tow-net, and much less frequently in surface gatherings. Though the species has been recorded from the East Coast of Scotland, it seems to be of rare occurrence there. I do not find a single reference to it in any of the descriptions of tow-net gatherings collected on the East Coast during the past year.

Euchæta norvegica, Boeck.

1864. *Euchæta prestandreæ*, Boeck, Overs. Norg. Kyster iagt. Copep., *Forh. Vid. Selsk. Christiania*, p. 236.
1872. *Euchæta norvegica*, Boeck, Nye Slaegt. og Art. af Saltvandscopep, *Forh. Vid. Selsk. Christiania*, p. 40.

I have no record of this species for the Moray Firth; but it has, as in previous years, been obtained in tow-net gatherings from various

* See "Additional Notes" at the end of this paper.

parts of the Clyde and Loch Fyne. *Euchæta* appears to be even more restricted in its distribution than *Bradyidius*. According to Sars ("Norw. North Sea Exped.," Crust., Part I., p. 284), this species was at first ascribed by Boeck to *Euchæta prestandreæ*, Philippi, but was afterwards described by him under the name which it now bears.

Scolecithrix hibernica, A. Scott.

1896. *Scolecithrix hibernica*, A. Scott, Ann. and Mag. Nat. Hist., (6) vol. xviii., p. 362, Pl. XVII. and XVIII.

This species, though only recently discovered, is at times not very rare in the Clyde and Loch Fyne tow-net gatherings. The following records of its occurrence will indicate sufficiently the wide distribution of the species in the Clyde district. During August last year it was obtained at Stations III. and IV. (in Kilbrennan Sound), and at Stations XIII., XIV., XV., and XVII. (Upper Loch Fyne), and in September at Stations VII. and VIII. (4 or 5 miles south of Ailsa Craig).

I have now to record its occurrence for the first time in the Moray Firth, having obtained it in a tow-net gathering collected in June last year at Station XVI. (vicinity of Smith Bank) from a depth of about forty fathoms, but it was apparently rare in this gathering. The opinion expressed by the describer of the species that *Scolecithrix hibernica* was really a deep-water form, and that its being so would partly account for its having been so long overlooked, is more or less confirmed by what is observed regarding its distribution in the Clyde and in the Moray Firth.

Scolecithrix pygmæa, sp. n. (Pl. X., figs. 1–9).

Description of the Female.—Somewhat like *Scolecithrix hibernica*, A. Scott, in general appearance but smaller, the length of the specimen figured is, exclusive of tail setæ, ·95 mm. (about $\frac{1}{27}$ of an inch). The rostrum is small. The last segment of the thorax is produced on each side into a hook-like process (fig. 1). The antennules are scarcely as long as the thorax; they are twenty-four jointed; the first two joints are moderately large; the third to the seventh are smaller; but the eighth is about twice as long as the preceding joint, and sub-equal in length to the first and second. The joints that immediately follow the eighth are shorter, but the others gradually increase in length, so that several of the last joints are about as long as the eighth. The end joint is very small. The antennules are only sparingly setiferous, but the terminal joints are furnished with a few plumose hairs as shown by the figure. The formula gives approximately the proportional lengths of all the joints, as follows:—

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

The antennæ, mandibles, and maxillæ are all somewhat similar to those of *Scolecithrix hibernica*. The anterior foot-jaws are furnished with several lobes on the inner aspect as in *Scolecithrix dubia*, Giesbrecht. The distal lobe is armed with a long slender spine, but the others are setiferous. The special joint of each of the anterior foot-jaws carries a number of the long slender worm-like hairs which form one of the principal characters of the genus (fig. 3). The posterior foot-jaws are elongate, and somewhat like those of *Scolecithrix hibernica* (fig. 4). The first four pairs of swimming feet are also somewhat similar to those of *Scolecithrix hibernica*, except that the marginal spines of the outer

branches of the fourth pair are stouter than those of the outer branches of the same pair in that species. The terminal spines are also slightly different (figs. 5, 6). The fifth pair appears to be wanting in the female. The abdomen is, proportionally, scarcely so long as that of *Scolecithrix hibernica*. The first segment is about equal to the combined length of the next two, and is rather more dilated; the second segment is somewhat shorter than the third; but the length of the third and fourth is about equal. The caudal furcæ, which are about as long as broad, are somewhat longer than the segment to which they are articulated, and the furcal setæ are long and plumose (fig. 8).

Description of the Male.—The male of *Scolecithrix pygmæa* resembles that of *Scolecithrix hibernica* in several aspects, but differs particularly in the structure of the fifth pair of thoracic feet. In this pair the basal joint is stout, and armed with several curved spines as in *Scolecithrix hibernica*, but the right branch is more slender, and the first joint of that branch is not so irregular in outline. In the present species the first joint of the right branch becomes gradually but only slightly dilated towards the distal end, and is not produced into a large lobe as in *Scolecithrix hibernica*; the second joint is smaller, and proportionally much more slender than in that species; the marginal thumb-like process is small, and situated near the middle of the joint. The left branch of the present form (fig. 7 l.) is also rather more slender than that of *Scolecithrix hibernica*, but the process at the distal end of the second joint is somewhat more produced and attenuated. The abdomen consists of five segments. The second, which is rather longer than the first, is about one and a half times the length of the following segment; the third and fourth segments are sub-equal, but the last is very small; the furcæ are about equal in length to the penultimate segments of the abdomen (fig. 9). Figure 10 represents the fifth thoracic feet of the male of *Scolecithrix hibernica* for comparison with those of the species now described. The figures of both are of the same magnification.

Habitat.—Firth of Clyde and Loch Fyne. Not very rare.

Remarks.—This *Scolecithrix* has been under observation for a considerable time. At first I was inclined to regard it simply as a form of *Scolecithrix hibernica*, but as it continues to turn up both alone and in company with that species, and as all of the specimens are characterised by the same distinctive features, I think it will be more satisfactory to describe it under a separate name. It is distinctly a smaller species than *Scolecithrix hibernica*, being scarcely a millemetre in length. If male and female specimens of the two species be placed side by side—the males together and the females together—the difference in size is readily noticed. The structure of the fifth thoracic feet of the male, and the structure and armature of the anterior foot-jaws of the female, are characters by which the species may be distinguished; the lengths of the abdominal segments in both male and female are also proportionally different.

Centropages typicus, Kroyer.

1849. *Centropages typicus*, Kroyer. Nat. Tidskr., (2) ii., p. 588, t. 6.

This species appears to be much rarer in the Clyde than *Centropages hamatus*, for while the latter form occurs in nearly all gatherings collected in August and September last year, I have only three records for *Centropages typicus*. On the East Coast of Scotland *Centropages typicus* appears to be more common. In a series of gatherings from the

Moray Firth collected during May and June last year, both species were nearly equally frequent, *Centropages hamatus*, however, was even here rather the more common of the two species.

Isias clavipes, Boeck.

1864. *Isias clavipes*, Boeck. Overs. Norg. Copep., Forh. Vid. Selsk, Christiania, p. 18.

This fine species has been obtained in several of the Clyde tow-net gatherings, both surface and bottom. But though occurring now and again in various parts of the Clyde, it seems to be always a scarce species. The following are a few of the more recent records of *Isias* from the Clyde—at Station II. (Kilbrennan Sound), in surface and bottom tow-nets, at Station XII. (between Arran and the Heads of Ayr), in the bottom tow-net in August, and in the surface tow-net at Station VII. in September 1898.

**Eurytemora lacinulata* (Fischer).

1853. *Cyclopsina lacinulata*, Fischer, Beitr. z. Kenntn. d. Cyclopiden, Bull. Soc. Imp. Natur., Moscow, XXVI., p. 86–90, Pl. II., figs. 4–17, 34.

This species has been obtained during the past year in brackish water-pools at Hunterston, Firth of Clyde. *Eurytemora lacinulata* has been recorded from the Clyde district on one or two former occasions, but not previously from Hunterston.

**Metridia hibernica* (Brady and Robertson).

1873. *Paracalanus hibernicus*, Brady and Robertson, Ann. and Mag. Nat. Hist. (4), vol. xii., p. 126, Pl. VIII., figs. 1–3.

This species has already been recorded from Loch Fyne, and seems to be distributed, though very sparingly, all over the Clyde estuary. *Metridia hibernica* somewhat resembles *Metridia longa* (Lubbock), but is smaller than that species. It may be difficult to discriminate between the young of the two species; but there need be little difficulty in distinguishing the adult forms, especially if males are present. *Metridia hibernica* has also been observed both in the Moray Firth and in the Firth of Forth.

**Candace pectinata*, Brady.

1878. *Candace pectinata*, Brady, Mon. Brit. Copep., vol. i. p. 49, Pl. VIII. figs. 14, 15; Pl. X. figs. 1–12.

Though this species has been obtained both in the Firth of Clyde and the Moray Firth, as well as in the Firth of Forth, it has not been observed within recent months.

Labidocera wollastoni (Lubbock).

1857. *Pontella wollastoni*, Lubbock, Ann. and Mag. Nat. Hist. (2), vol. xx., p. 406, Pl. X. fig. 13; and Pl. XI. figs. 9–11, 18.

The only records of this species I have for the past year are two, and both are for the Clyde. They are as follows:—In a bottom tow-net gathering collected at Station IX. on August 31st, rare; and in a surface gathering collected at Station VIII. on September 23rd (only one specimen was observed in this gathering).

* See "Additional Notes" at the end of this paper.

Anomalocera patersonii, Templeton.

1837. *Anomalocera patersonii*, Templeton, Trans. Entom. Soc., vol. ii. p. 35, Pl. V., figs. 1–3.

This species, which is one of the most richly coloured of the British Copepoda, was occasionally observed during the past year in tow-net gatherings both from the Firth of Clyde and the Moray Firth, but it seldom occurred in any quantity.

Parapontella brevicornis (Lubbock).

1857. *Pontella brevicornis*, Lubbock, Ann. and Mag. Nat. Hist. (2), vol. xx., Pl. XI., figs. 4–8.

Though *Parapontella* may occasionally be found moderately common more frequently one or a few specimens only are obtained in any single gathering—such, at least, is my experience in regard to the distribution of this species in the Scottish seas. *Parapontella brevicornis* has during the past year occurred sparingly both in the Firth of Clyde and in the Moray Firth. Living specimens are readily distinguished, even amongst crowds of *Calanus*, *Pseudocalanus*, *Temora*, etc., by their peculiar dark or blackish colour, but much of this colour is lost when the specimens are preserved in spirit.

Acartia clausii, Giesbrecht.

1889. *Acartia clausii*, Giesbrecht, *Rendiconti R. Accad. d. Lincei*, vol. v., fasc. 11.

This is the only species of *Acartia* I have hitherto observed in the Clyde district. The spines, with which the fifth pair of feet of the female are armed, are short and very stout, and therefore very different from those of *Acartia longiremis*, Lilljeborg. In the Moray Firth district both *Acartia clausii* and *Acartia longiremis* are met with; the first is frequent in the open sea, but it has also been observed inshore. On June 6th, 1898, both species occurred in a gathering collected at Station III. (Cromarty Firth), where there is usually a more or less admixture of fresh water, and also at Stations I. and II. (off the Nairn Coast) on the 7th of the same month. Neither *Acartia bifilosus*, Giesbrecht, nor *Acartia discaudata*, Giesbrecht, have been observed in the Moray Firth district, but it is quite possible that they may yet be found there—especially in that part of the district known as the Beauly and Cromarty Firths, where the conditions seem to be favourable for these two species.

Cervinia bradyi, Norman.

1878. *Cervinia bradyi*, Norman; Brady, Mon. Brit. Copep., vol. i., p. 86, Pl. XXIVA., figs. 3–13.

A single specimen of this curious species was obtained in a small gathering of Microcrustacea washed from a quantity of mud brought up in the bottom tow-net at Station XII. (Firth of Clyde) on 29th August 1898, from a depth of from forty to forty-three fathoms. *Cervinia* was discovered at Oban by the Rev. A. M. Norman in 1877. It has also been recorded from the Irish Sea by I. C. Thompson, of Liverpool; but this appears to be the first time the species has been observed in the Clyde. It is quite distinct from any other species of the British Copepoda.

Ectinosoma curticorne, Boeck.

1864. *Ectinosoma curticorne*, Boeck, Overs. Norg. Copep. Forh. Vid. Selsk. Christiania.

This species has been obtained during the past year at Hunterston, Firth of Clyde.

Ectinosoma herdmani, T. and A. Scott.

1896. *Ectinosoma herdmani*, T. and A. Scott, Rev. Brit. Copep. belonging to the gen. *Bradya* and *Ectinosoma*, p. 432, Pl. XXXVI., &c.

This species was obtained during the past year at Hunterston, Firth of Clyde, and also in a gathering from Cromarty Firth, collected 4th November 1897. The last is a new record for this species.

Ectinosoma gracile, T. and A. Scott.

1896. *Ectinosoma gracile*, T. and A. Scott, Rev. Brit. Copep. belonging to the gen. *Bradya* and *Ectinosoma*, p. 429., Pl. XXXVI., &c.

Several specimens of this apparently rare species were obtained in a shore gathering collected on 4th November 1897, a little to the east of Invergordon, Cromarty Firth. This is the only time I have obtained *Ectinosoma gracile* since it was discovered in the Firth of Forth in 1896. It is a very small species and easily overlooked. One of the Cromarty Firth specimens with ova measured only 0·43mm. ($\frac{1}{58}$th of an inch).

Bradya typica, Boeck.

1872. *Bradya typica*, Boeck, Nye Slægt. og Art. of Saltv. Copep., Forh. Vid. Selsk. Christiania, p. 14.

This species occurred in a gathering collected at Station XVI. (Moray Firth), 10th July 1898, but only one or two specimens were obtained. It has also been obtained in a gathering from Station XII. (Firth of Clyde), collected 29th August 1898; in one from Station XV., collected 22nd August; and in another from Station XVII. (both in Upper Loch Fyne), collected on the 24th of the same month.

Bradya hirsuta, T. and A. Scott.

1896. *Bradya hirsuta*, T. and A. Scott, Rev. Brit. Copep. belonging to the gen. *Bradya* and *Ectinosoma*, p. 423, Pl. XXXV., &c.

This species was obtained in a gathering collected at Station XVI. (Moray Firth), 10th July, 1898, but only a few specimens were observed.

Misophria pallida, Boeck.

1864. *Misophria pallida*, Boeck, Overs. Norg. Copep., p. 24.

This is a somewhat rare species. It has already been recorded for Loch Fyne, and has also been found in Kilbrennan Sound, though not previously recorded. It occurred during the previous year in a bottom tow-net gathering from Station XVII. (Upper Loch Fyne), collected on 7th December, but only two specimens, however, were obtained in this gathering.

Robertsonia tenuis (G. S. Brady and Robertson).

1875. *Ectinosoma tenue*, B. and R., "Proceed. of the Brit. Ass.," p. 196.

A few specimens of this well-marked species occurred in a small gathering of Microcrustacea from Station XVI. (Moray Firth), depth 30 to 40 fathoms, collected on 10th June 1898. The gathering consisted of the washings of some dredged material.

Delavalia mimica, T. Scott.

1897. *Delavalia mimica*, T. S., Fifteenth Ann. Rep. Fish. Board Scot., Pt. III., p. 150, Pl. I., figs. 1–9.

This species was obtained in a gathering from Station XVI. (Moray Firth), collected on 10th June 1898, but was somewhat rare.

Delavalia æmula, T. Scott.

1893. *Delavalia æmula*, T. S., Eleventh Ann. Rep. Fish. Board Scot., Pt. III., p. 204, Pl. IV., figs. 36–47.

This species was obtained in some dredged material collected a little to the west of Invergordon, and was also somewhat rare.

Delavalia giesbrechti, T. and A. Scott, var. (Pl. XIII., figs. 20–22).

1890. *Delavalia giesbrechti*, T. and A. S., Ann. Scot. Nat. Hist., p. 225, Pl. IV., figs. 1–10.

A form of *Delavalia* has been obtained at Hunterston, Firth of Clyde, which resembles *Delavalia giesbrechti* very closely, but it wants the peculiar broad tail setæ that constitute such a marked feature in that species (fig. 22); there is also a slight difference in the arrangement of the four marginal setæ on the inner portion of the basal joints of the fifth thoracic feet (fig. 21). In other respects the two forms appear to be similar. Fig. 20, which represents the first pair of swimming feet, shows the second joint of the inner branches to be rather more slender than the same joint in typical *D. giesbrechti*.

Psyllocamptus, gen. nov.

Similar to *Canthocamptus*, but the inner branches of the first pair of swimming feet, which are about equal in length to the outer branches, are two-jointed, while the inner branches of the next three pairs are all three-jointed. Moreover, the antennules in spirit specimens are distinctly bent at the second joint as in *Nitochra*.

Psyllocamptus fairliensis, sp. n. (Pl. XIII., figs. 12–19).

Description of the Female.—Length about ·6 mm. ($\frac{1}{41}$ of an inch). Body slender and elongate, and resembling *Canthocamptus* in general appearance (fig. 12). Antennules moderately short and setiferous, eight-jointed; the first two robust, the penultimate joint smaller than the others (fig. 13); the formula shows approximately the proportional lengths of all the joints—

Number of the joints, $\frac{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7 \cdot 8}{\text{Proportional lengths of the joints,}\ 24 \cdot 24 \cdot 7 \cdot 9 \cdot 6 \cdot 7 \cdot 4 \cdot 6}$

Antennæ short, three-jointed; secondary branch small, one-jointed, and furnished with three setæ (fig. 14).

Mandibles as in *Canthocamptus*, mandible-palp one-branched, and furnished with a few setæ; the basal joint is armed with a moderately stout apical spine (fig. 15). Other mouth organs as in *Canthocamptus*. First pair of swimming feet with both branches moderately short, and of nearly the same length; the outer branches are three-jointed, but the inner are composed of only two joints, as in *Attheyella*; the first joint of the inner branch is about equal in length to the first two joints of the outer branches, and is also somewhat stouter; the second joint is little more than half the length of the first one (fig, 16).

The second, third, and fourth pairs of swimming feet have both branches three-jointed; the outer branches are considerably longer than the inner; in the fourth pair the inner branches are only about a third of the length of the outer branches (fig. 17); the first joint of the inner branches of the fourth pair are very small; the outer branches are furnished with long terminal setæ. The fifth pair are small and foliaceous; and the inner portion of the basal joint is considerably produced, and is subcylindrical in outline; the apex is subtruncate and bears four setæ, the two inner ones being small, while the other two are elongate; the secondary joint is ovate, and furnished with several setæ on the outer margin and apex. All the setæ are of considerable length, except a small one near the base of the outer margin (fig. 18). Caudal furca short, and about as broad as long (fig. 19).

Habitat.—Shore between Fairlie and Hunterston, Firth of Clyde. Rather rare. No males have been observed.

Remarks.—The Copepod just described resembles more or less closely not only *Canthocamptus*, but also *Attheyella* and *Mesochra*. It differs from the typical *Canthocamptus* in having the inner branches of the first pair of swimming feet only two-jointed, while the inner branches of all the next three pairs are three-jointed. It also differs from *Attheyella* and *Mesochra* in having the inner branches of the second, third, and fourth pairs three-jointed, though agreeing with these two genera in the structure of the first pair. Moreover, it somewhat resembles *Nitochra* in the antennules being distinctly bent at the second joint; but in that genus all the first four pairs of swimming feet have the inner branches three-jointed.

Psyllocamptus fairliensis seems to form one of the links in a chain of Copepods that at the one end terminates in *Mesochra*, which has the inner branches of all the four pairs of swimming feet two-jointed, and at the other end in *Nitochra*, which has the same branches all three-jointed. The generic name is derived from the two Greek words *psylla*—a flea, and *kamptos*—flexible.

Huntemannia jadensis, S. A. Poppe.

1884. *Huntemannia jadensis*, Poppe, Abhandl. d. nat. Ver. Bremen, Bd. IX., p. 59.

1885. *Huntemannia jadensis*, Poppe, Die freilebenden Copep. des Jadebusens, op. cit., Bd. XI., p. 167, Pl. VII., figs. 10-20

1895. *Huntemannia jadensis*, T. and A. Scott, Ann. and Mag. Nat. Hist. (6), vol. xv., p. 57, Pl. VI., figs. 21, 22.

This species was described by Dr. Poppe in 1884. It was first detected in Scotland in 1894, in brackish water pools, at the head of West Loch Tarbert (Cantyre), and a record of its occurrence there was published in the "Annals and Magazine of Natural History" for 1895, but up till the present time this appears to be the only record of its occurrence in Scotland. On 4th November 1897, Mr. F. G. Pearcey collected a gathering of

small crustacea, on the shore near low-water mark, to the east of Invergordon, in the Cromarty Firth; this he afterwards sent to me for examination. Several rare Copepods have been obtained in this gathering, and one of them—*Ectinosoma gracile*—has already been referred to; another of these rare forms is the species under consideration. Only four specimens of *Huntemannia* were obtained in this gathering from Cromarty Firth, so that the species, which is very well marked, is probably rare. The first pair of thoracic feet are stout, the outer branches are three, and the inner one-jointed. They are armed with strong marginal spines. The basal joint of the first feet carry each, interiorly, a comparatively large thumb-like process, instead of a spine. This process was quite conspicuous, even without dissection, in each of the four specimens obtained. Probably the species is local as well as rare.

Pseudotachidius coronatus, T. Scott.

1898. *Pseudotachidius coronatus*, T. Scott, Sixteenth Ann. Rep. Fish. Board for Scot, Pt. III., p. 267, Pl. XIII., figs. 12-26; Pl. XV., figs. 1-4.

This somewhat remarkable species was described in 1898 from one or two specimens obtained amongst some small Crustacea sent to me from Lower Loch Fyne by Mr. F. G. Pearcey. They had been dredged from 105 fathoms. I have now to record the species from other two localities in the Clyde district, and from moderately deep water—viz., from Station XII., 40-43 fathoms, washed from mud brought up in the tow-net, 29th August 1898; and from Station XVII., Upper Loch Fyne, washed from trawl refuse, 7th December 1898. Only one specimen was obtained in each of these two gatherings.

Tetragoniceps macronyx, T. Scott.

1892. *Tetragoniceps macronyx*, T. Scott, Tenth Ann. Rep. Fish. Board for Scot., Pt. III., p. 253, Pl. X., figs. 19, 28.

This well-marked and somewhat rare species was described from specimens obtained in the Firth of Forth. I have now to record its occurrence in the Cromarty Firth, having obtained it in a gathering of material dredged in the vicinity of Invergordon in 1896, but only recently examined.

Laophonte thoracica, Boeck.

1863. *Laophonte thoracica*, Boeck, Overs. Norg. Copep., p. 54.

What appears to be two forms of this species have been observed in the Moray Firth district, one a deep-water form, which appears to be the typical one. This was obtained in a gathering from Station XV. (vicinity of Smith Bank), depth 24-49 fathoms, collected 20th November 1897. The other was obtained in the Cromarty Firth, and a little to the west of Invergordon, where the depth of water is only a few fathoms, and where there is usually a certain admixture of fresh water.

Laophonie serrata (Claus).

1863. *Cleta serrata*, Claus, Die frei-lebenden Copep., p. 123, Pl. XV., figs. 13–20.

Laophonte serrata, which appears to be a rare species, occurred in the same gathering in which the *Huntemannia* was obtained, and is now for the first time recorded for the Cromarty Firth district.

Cletodes tenuipes, T. Scott.

1897. *Cletodes tenuipes*, T. Scott, Fifteenth Ann. Rep. Fish. Board for Scot., Pt. III., p. 170, Pl. I., figs. 19–27.

This species, which is apparently rare, was also obtained in the same gathering from Cromarty Firth in which the *Huntemannia* occurred. *Cletodes tenuipes* was described from Clyde specimens, and it is interesting now to find it also on the East Coast.

Cletodes perplexa, sp. n. (Pl. XI., figs. 12–20; Pl. XII., fig. 1).

Description of the Female.—Length of the specimen figured ·67mm. ($\frac{1}{37}$ of an inch). The body is stout anteriorly but tapers gradually towards the posterior end; in spirit specimens the tail is generally incurved as shown in the figure (fig. 12, Pl. XI.). Rostrum short and slightly recurved. Antennules very short, moderately stout, and composed of five joints; the first and second joints are large; the third is about half the size of the second; the fourth is very small; and the last is about one and a half times the length of the third (fig. 13, Pl. XI.). The approximate proportional lengths of the various joints are shown in the formula—

Numbers of the joints,	1 · 2 · 3 · 4 · 5
Proportional lengths of the joints,	21 · 25 · 12 · 4 · 19

There are a number of coarsely plumose setæ on the distal half of each antennule, and a small asthetask springs from the end of the third joint. Antennæ three-jointed; secondary branches small, each furnished with two coarsely plumose setæ and a small hair (fig. 14, Pl. XI.). Mouth organs nearly as in *Cletodes linearis* (Claus); figs. 15 and 16, Pl. XI., show the form of the anterior and posterior foot-jaws. The inner branches of the first four pairs of swimming feet, which are all two-jointed, have the first joint small, while the second is slender and elongate. The inner branches of the first pair have the first joint somewhat dilated, while the principal terminal seta of each is fully three times the entire length of the inner branches; these branches are also somewhat shorter than the three-jointed outer branches (fig. 17, Pl. XI.). The inner branches of the second, third, and fourth pairs are comparatively shorter than those of the first pair, and the terminal setæ of both the inner and outer branches of these three pairs are long and plumose (fig. 18, Pl. XI.). The fifth pair of feet differ from those usually observed in *Cletodes;* the basal joint, which is proportionally much dilated, is produced into a large and strong spine-like process which is slightly curved at the end and bordered with minute spinules; the secondary joint is rudimentary, and bears three small setæ at its truncate apex; two setæ spring from the opposite margin of the large basal joint (fig. 19, Pl. XI.). The caudal furcæ are long and slender; two small setæ spring from near the middle of the outer margin of each of the furcæ, and they each bear a long spiniform terminal seta (fig. 1, Pl. XII.).

The male differs little from the female, except that the antennules are modified in the usual way. The fifth pair of thoracic feet are nearly the same as those of the female (fig. 20, Pl. XI.).

Habitat.—Vicinity of Smith Bank, Moray Firth. Rare.

Remarks.—This very distinct species was obtained amongst some dredged material collected on the 6th October 1898, and sent to me by Mr. F. G. Pearcey. The fifth thoracic feet form one of the most striking characters of this species, not only because of their remarkable form, but also because in all the specimens examined they projected nearly straight out from the body of the animal instead of being adpressed, as is usually

the case. The incurved position of the posterior portion of the abdomen and caudal furca is also a more or less constant feature in this species so far as regards all the specimens examined. Except for the somewhat abnormal form of the fifth pair of feet, the species appears to be a typical *Cletodes*.

Dactylopus tenuiremis, Brady and Robertson.

1895. *Dactylopus tenuiremis*, Brady and Robertson, Brit. Assoc. Report, p. 197.

This apparently rare species occurred in the shore gathering collected to the east of Invergordon, Cromarty Firth, in November 1897. There is no previous record of *Dactylopus tenuiremis* from the Moray Firth district. It is a somewhat critical species, but appears to be distinct.

Dactylopus minutus, Claus.

1863. *Dactylopus minutus*, Claus, Die frei-lebenden Copep., p. 126, Pl. XVI., figs. 14-15.

This *Dactylopus* occurred amongst a number of other things in a gathering from Station VI. (Firth of Clyde) collected 1st September 1898. It is a comparatively small species and appears to be rare.

Thalestris helgolandica, Claus.

1863. *Thalestris helgolandica*, Claus, Die frei-lebenden Copep., p. 131, Pl. XVII., figs. 12-21.

This rare species was obtained in a bottom tow-net gathering from Station IV. (Kilbrennan Sound, Firth of Clyde) on 24th August 1898. The Rev. A. M. Norman has also obtained *Thalestris helgolandica* in the Firth of Clyde. This species of *Thalestris*, as well as *Thalestris hibernica*, has been found recently in some material dredged in 1886 a little to the west of Invergordon, Cromarty Firth, but both appear to be scarce.

Cylindropsyllus fairliensis, sp. n. (Pl. X., figs. 11-14; Pl. XI., figs. 1-4).

Description of the Female.—The body is elongate, slender, and cylindrical. The length of the specimen figured is 1·73mm. (nearly $\frac{1}{15}$ of an inch). The thorax is composed of five distinct segments, the first of which is rather longer than the combined lengths of the next two, but the second to the fifth are sub-equal. The abdomen is also composed of five distinct segments; the first to the fourth are of nearly the same length as the posterior thoracic segments, the last being about one and a half times the length of the penultimate segment. The caudal furcæ are short and broad; the interior half of the apex of each is somewhat produced and bears a long and moderately stout seta and two or three small hairs; the exterior portion of the apex is abruptly concave, the concavity being bounded externally by an acute angle, and interiorly by the produced setiferous portion just referred to and as shown in the figure (fig. 6, Pl. XI.). The rostrum is short. The antennules are moderately short and stout, eight-jointed; the first four joints are larger than the last four, a stout asthetask springs from the produced upper angle of the fourth joint; the fifth joint, which is smaller than any of the others, is only about half the length of the preceding one; the next three are sub-equal and somewhat longer than the fifth (fig. 1, Pl. XI.). The formula shows approximately the proportional lengths of all the joints—

Numbers of the joints,	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8
Proportional lengths of the joints,	22 · 15 · 16 · 12 · 6 · 10 · 11 · 10

Antennæ stout, three-jointed, with a very small secondary branch bearing a single seta (fig. 2, Pl. XI.). The mandibles are small and elongate; the palp is small and consists of a single slender branch bearing two short apical setæ (fig. 12, Pl. X.). Maxilla short and moderately stout, with the apex broadly truncate and armed with a number of strong teeth. The palp small, two-jointed, and furnished with a few terminal and subterminal hairs (fig. 13, Pl. X.). Posterior foot-jaws stout, armed with a stout terminal claw and two stout marginal processes (fig. 14, Pl. X.). The inner branches of the first four pairs of swimming feet are all two-jointed; those of the first pair are nearly equal in length to the three-jointed outer branches; but in the second, third, and fourth pairs the inner branches are considerably shorter than the three-jointed outer branches. All the four pairs are moderately stout and are furnished with elongate marginal spines, while the terminal setæ of both the outer and inner branches are long and plumose (figs. 3 and 4, Pl. XI.). The fifth pair of thoracic feet are small and provided with about two moderately long spiniform setæ and one or two small hairs (fig. 5, Pl. XI.).

Habitat.—Brackish water-pools near Fairlie, Firth of Clyde. Apparently rare.

Remarks.—This Copepod at first sight closely resembles *Cylindropsyllus lævis*, Brady, though of somewhat larger size; but even without dissection the caudal furcæ are seen to be distinctly different from those of that species, and if a specimen be dissected several other differences are noticed.

The antennæ, for example, are three-jointed, while in the typical *Cylindropsyllus* they are only two-jointed: the inner branches of the swimming feet are also more fully developed than they are in *Cylindropsyllus*. Such differences may yet render it necessary to remove this Copepod to another genus; but, meantime, as no males have yet been observed, I prefer to leave it in the genus to which for the present it is doubtfully ascribed.

Leptocaris, gen. nov.

The Female.—Body slender, somewhat resembling *Cylindropsyllus*. Secondary branches of the antennæ very small, one-jointed. Mandible-palp obsolete—in this respect, the mandibles are somewhat similar to those of *Maraenobiotus*. Maxillæ also somewhat similar to those of *Maraenobiotus*, but the palp is a small cylindrical process with a dilated base. Footjaws similar to those of *Cylindropsyllus*. Inner branches of first, second, third, and fourth pairs of swimming feet two-jointed, and considerably shorter than the three-jointed outer branches; fifth pair very small, one-branched.

The Male.—The male is similar to the female, except that the antennules are modified and hinged for grasping, and that each of the fifth pair of thoracic feet is armed with a stout spine on its inner aspect, in addition to a few small setæ.

Leptocaris minutus, sp. n. (Pl. X., figs. 15-21; Pl. XI., figs. 7-11).

Description of the Female.—Body elongate and slender. No distinction between the thorax and abdomen. Thorax composed of five, and the abdomen of four segments (fig. 15. Pl. X.). The first thoracic segment is somewhat longer than the entire length of the next two, the second to the third are subequal, the fourth and fifth—which are also subequal—are rather longer than the second and third. The first abdominal segment is about one and a half times longer than the next, the second and third are subequal, while the ultimate segment is rather longer than the

anterior one. Rostrum small. The antennules are very short, and moderately setiferous—seven-jointed. The first joint is considerably dilated; the second, which is only about half the length of the first, is also somewhat dilated. The third joint is nearly as long as the first. The fourth joint—which is furnished with a moderately long asthetask—and the last are of equal lengths, and are each as long as the second. The fifth and sixth joints are somewhat smaller than the others (fig. 16, Pl. X.). These differences are more clearly shown by the formula annexed—

Numbers of the joints,	1 · 2 · 3 · 4 . 5 . 6 . 7
Proportional lengths of the joints,	12 · 6 . 10 . 6 . 4 . 5 . 6

Antennæ small, three-jointed; secondary branches very small, one-jointed (fig. 18, Pl. X.). The mandibles are also small; the mandible palp is obsolete, being represented by a single small hair (fig. 19, Pl. X.). The maxillæ are very small, the biting part is moderately broad, and armed with a few comparatively elongate teeth. The palp is a small cylindrical process, arising from a moderately broad base, and furnished with a few hairs (fig. 20, Pl. X.). Posterior foot-jaws small. They somewhat resemble those of *Cylindropsyllus lævis* (fig. 21, Pl. X.). The inner branches of the first four pairs of thoracic feet are all two-jointed, and shorter than the three-jointed outer branches. The two joints that compose the inner branches are, in each of the four pairs, more or less subequal, but those of the first pair are rather stouter than the others. All the four pairs of feet are small (figs. 7 and 8, Pl. XI.). The fifth pair are minute. Each consists of a small semicircular appendage bearing three or four small setæ (fig. 9, Pl. XI.). The caudal furcæ, which are small and cylindrical, are scarcely twice as long as broad; but each carries a long terminal spiniform seta, and also a few small hairs (fig. 11, Pl. XI.).

The Male.—So far as can be made out, the male does not differ much from the female, except that the antennules are modified for grasping, as in other Harpactids. The fifth thoracic feet are also each provided with an elongate and stout spine, in addition to the setæ observed on the fifth pair of the female (fig. 10, Pl. XI.).

Habitat.—Brackish water-pools on the shore near Hunterston, Firth of Clyde. Rather rare.

Remarks.—This Copepod is somewhat like a *Moraria* or a *Maraenobiotus* in general appearance, as well as in some of the structural details; but it differs from these two genera, not only in the form of some of the mouth organs, and of the fifth pair of thoracic feet, but in other details of structure as well. Neither does it agree with *Cylindropsyllus*, although it has a general resemblance to the members of that genus. For these and other reasons, I have instituted for its reception the genus *Leptocaris* (Greek—*leptos*, slender; *karis*, a shrimp).

Idya cluthæ, sp. n. (Pl. XII., figs. 2-6).

Description of the Female.—Length of the specimen figured, 1·17mm. ($\frac{1}{22}$ of an inch). Somewhat like *Idya furcata* in general appearance, but rather more slender (fig. 2). The antennules are moderately short; being only about two-fifths of the length of the thorax, they resemble generally the antennules of *Idya furcata*, but the entire length of the first four joints is proportionally shorter. The first four joints are sub-equal in length; the fifth is rather shorter than the one next to it; while the seventh is distinctly smaller than either the fifth or sixth (fig. 3). The

proportional lengths of all the joints are nearly as in the annexed formula—

Number of the joints,	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8
Proportional length of the joints,	22 · 28 · 25 · 24 · 6 · 9 · 4 · 18

The antennæ and mouth organs are similar to those of *Idya furcata*. The first pair of thoracic feet resemble those of *Idya furcata*, but the seta that springs from the end of the first joint of the outer branches is short and straight, and none of the terminal or sub-terminal setæ bear secondary spine-like apical cilia so characteristic of *Idya furcata* and one or two other members of the genus. The second joint of the inner branches is proportionally stouter than the same joint in *Idya furcata*, and the terminal claws are long and slender instead of being short and moderately stout. Moreover, the spines on the inner and outer aspects of the second basal joint are also small and slender (fig. 4). The second, third, and fourth pairs of swimming feet are rather more slender than the same appendages in *Idya furcata* (fig. 5). The fifth pair of feet have the second joint long and slender, and the margins do not appear to be ciliated; the seta which springs from the inner angle, and also that which springs from the outer angle, of the basal joint are long and slender, while the terminal setæ of the secondary joint are also elongate (fig. 6). The abdomen is elongate, being equal to nearly two-thirds of the length of the thorax; the first and second segments appear to be, at least partly, coalescent; their combined length is equal to half the entire length of the abdomen; the last abdominal segment is very small. The caudal furca are short, and about as long as broad.

Habitat.—Loch Fyne and Firth of Clyde. Generally distributed, and apparently not very rare.

Remarks.—This distinct species of *Idya* appears to be unlike any previously described member of this genus. The two most prominent characters by which it may be distinguished from all closely allied species are—(1) The armature of the first pair of thoracic feet, and especially the long terminal spines of the inner branches, and (2) the long slender fifth feet. *Idya cluthæ* may by these two characters be distinguished at a glance even without dissection. Like other forms of *Idya*, this one bears a comparatively large ovisac. Both males and females have been obtained, and both are equally distinct. Hitherto this species has occurred only in moderately deep water.

Monstrilla danæ (?), Claparède.

Several specimens of *Monstrilla*, all of which appear to belong to the same species—viz., *Monstrilla danæ*, Claparède—have been obtained during the past year. They are all from the Clyde district, chiefly Upper Loch Fyne and Kilbrennan Sound. Usually one or two, rarely three or four, specimens were obtained in a single gathering.

The gatherings in which *Monstrilla* was observed were from the following stations:—Station II. (three specimens), Station III. (one specimen), Station IV. (two specimens), Station VI. (three specimens), Station XIII. (two specimens), Station XIV. (four specimens), Station XVII., two gatherings (one specimen each). These gatherings were all collected in August and November 1898.

Dermatomyzon nigripes (Brady and Robertson).

1875. *Cyclopicera nigripes*, Brady and Robertson, Brit. Assoc. Report p. 197.

This fine species occurred in only one of the gatherings at present under consideration—viz., in a bottom tow-net gathering from Station XV. (Moray Firth), collected 20th November 1897.

Rhynchomyzon purpurocinctum (T. Scott).

1893. *Cyclopicera purpurocinctum*, T. Scott, Eleventh Ann. Rep. Fish. Board for Scot., Part III., p. 209, Pl. III., figs. 29-40.

This well-marked species was obtained in the gathering from Station XV. (Moray Firth), in which *Dermatomyzon nigripes* occurred, and in another collected at Station II., also in the Moray Firth, 5th November 1897. In this species the last three thoracic segments are of a dark purple colour. Dr. W. Giesbrecht has found *Rhynchomyzon purpurocinctum* in Naples Bay.

Neopontius angularis (T. Scott).

1898. *Neopontius angularis*, T. Scott, Sixteenth Ann. Rep. Fish. Board for Scot., Part III., p. 271, Pl. XIV., figs. 1-11.

This species was described in 1898 from specimens obtained at Otter Spit, Upper Loch Fyne. I have now to record it from a bottom tow-net gathering from Station IV. (Kilbrennan Sound), Firth of Clyde, collected 24th August 1898 (27-29 fathoms).

Bradypontius papillatus (T. Scott) (Pl. XI., fig. 21; Pl. XII., figs. 7-15).

1888. *Artotrogus papillatus*, T. Scott, Sixth Annual Report of the Fishery Board for Scotland (Appendix), p. 232, Pl. VIII., figs. 7-12.

1895. (?) *Bradypontius chelifer*, Giesbrecht, Ann. and Mag. Nat. Hist., ser. 6, vol. xvi. p. 183 (August 1895).

This species, described in 1888 in the Sixth Annual Report of the Fishery Board for Scotland, has recently been re-examined, and some further details of structure have been elucidated which I now propose to notice by way of supplementing the original description.

The length of the specimen figured is 1·2mm. ($\frac{1}{21}$ of an inch). The first thoracic segment is equal to rather more than half the length of the thorax and abdomen combined; the abdomen is moderately elongate, and the furcæ are rather longer than broad. In general appearance this species somewhat resembles *Cribropontius normani* (B. and R.) (fig. 7, Pl. XII.).

The antennules are eight-jointed. The first and second joints are elongate; the third to the seventh are comparatively short; while the last is about twice the length of the penultimate joint (fig. 8, Pl. XII.). The proportional lengths of all the joints are approximately as shown by the formula—

Numbers of the joints,	1	2	3	4	5	6	7	8
Proportional lengths of the joints,	36	50	18	10	14	12	16	34

A moderately long asthetask springs from the end joint, as shown in the figure.

The antennæ are apparently four-jointed, and a very small secondary branch bearing two minute hairs springs from the end of the second joint

(fig. 9, Pl. XII.). The mandibles are long and slender (fig. 10, Pl. XII.). Figure 10A represents the apical portion of one of the mandibles greatly enlarged, which somewhat resembles the apical portion of the mandibles in *Bradypontius magniceps* (Brady). The maxillæ resemble very closely those of *Dyspontius striatus*, Thorell, but the inner lobe is slightly longer than the outer, and the terminal setæ appear to be shorter than those of the maxillæ of that species (fig. 11, Pl. XII.). The first joint of the anterior foot-jaws is large and robust, but the second is elongate and slender, somewhat dilated at the extremity, and armed with a short, stout, and finger-like subapical claw (fig. 12, Pl. XII.). The posterior foot-jaws have the first and second joints moderately robust, but the end joints are somewhat slender, and terminate in a short, stout claw, as shown in the figure (fig. 13, Pl. XII.)

In the first pair of swimming feet, which are moderately stout, the outer and inner branches are nearly of equal length. The outer branches are armed exteriorly with short, stout, dagger-like marginal spines, and the interior marginal setæ are one on the second and five on the last joint. The inner branches are furnished with one seta on the inner margin of the first joint, and two on the second joint; while the third joint has five setæ on the inner margin and apex, and a small one on the outer margin (fig. 14, Pl. XII.).

In the fourth pair the outer branches are stout and elongate; the first and second joints have each one marginal seta; the third joint bears five marginal setæ, and is also armed with a moderately large sabre-like terminal spine in addition to the small spines on the outer margin; the inner branches, which are three-jointed, and scarcely reach to the end of the second joint of the outer branches, are slender, and provided with only a few minute hairs on the margins and two small apical spines (fig. 15, Pl. XII.).

Fifth feet small, one-jointed, subquadrate, each of them furnished with one small marginal and two short apical setæ. There is also close to each foot exteriorly a long seta with a slightly dilated base which springs from the edge of the segment to which the fifth feet are attached (fig. 21, Pl. XI.).

Habitat.—Firth of Forth. Rare. No males observed.

Remarks.—As already stated, this specimen was first partly described and figured in the Appendix to the Sixth Annual Report of the Fishery Board for Scotland, published in 1888. It was described under the name of *Artotrogus papillatus*, but some doubt was expressed as to its being a true *Artotrogus*. No more specimens having been observed, the interest in the species passed away, and it was practically forgotten. Recently, however, my son got hold of the original specimen from which the species was described, and with the assistance of Dr. W. Giesbrecht's work on the "Diagnosis, Synonymy, and Distribution of the Ascomyzontidæ" made a careful examination of the characters by which the species is distinguished, as well as a series of delineations illustrating its principal appendages. The description given above is the result of this extra research. From the additional information that has been obtained by this re-examination, there can be no doubt that our species is a true *Bradypontius*. It agrees perfectly with Dr. Giesbrecht's definition of that genus. It may also be identical with the species described by Dr. Giesbrecht under the name of *Bradypontius chelifer* from the Bay of Naples, and, if so, the distribution of the species will be very considerably extended.

Amphipoda.

A few of the Amphipods observed in the tow-net and other gatherings forwarded to me from the "Garland" may now be referred to.

The Hyperiidæ were of rare occurrence in the tow-net gatherings forwarded from the Clyde or Moray Firth during the past year. *Hyperia galba* (Mont.), *Hyperoche tauriformis* (Bate), and *Parathemisto* were observed in one or two of the Moray Firth gatherings, but in those from the Clyde only *Hyperoche* and *Parathemisto* were observed, the one from Stations I. and VIII. in both the surface and bottom tow-net gatherings, and the other from Station VII.

The Orchestiidæ observed include *Orchestia mediterranea*, a species that appears to be of rare occurrence in the Clyde district. One or two specimens were obtained amongst decaying sea-weed, on the shore between Fairlie and Hunterston in September. *Orchestia mediterranea* is readily distinguished from the more common *Orchestia littorea* by the form of the hands of the second gnathopoda in the male; in these appendages the propodos are triangular instead of ovate; the palm, which is almost straight, extends from near the base of the propodos, and has a triangular tooth-like projection anteriorly near the origin of the claw. The claw is long and somewhat sinuate, and nearly of the same length as the palm (figs. 9-11, Pl. XIII., represent the anterior and posterior gnathopods and one of the posterior pereiopods).

Only two specimens of this species have been recorded from the Clyde district by the late Dr. Robertson in Part I. of his Catalogue of Clyde Amphipoda and Isopoda. One of these he discovered at the west end of Cumbrae; the other was sent to him by Mr. John Smith, Kilwinning, who obtained it at the mouth of the Garnock.

A number of Amphipods belonging to the Lysianassidæ have been observed. I will, however, refer to only one of them—viz., the curious *Normanion quadrimanus* (Bate and Westwood), a single specimen of which was obtained in a bottom tow-net gathering from Station I., Firth of Clyde (near Davaar Island), collected 15th December 1898. In Part II. of the late Dr. Robertson's Catalogue of the Clyde Amphipoda, that author records having, along with the Rev. Dr Norman, captured *Normanion* off Farland Point, Cumbrae, which seems to be the only previous record of its occurrence in the Clyde. Professor Sars has shewn that *N. quadrimanus* is parasitic in its habits, and states that he has found it in great abundance clinging to the skin of fishes (both living and dead) caught on a fishing line set in deep water. It may, therefore, be found to be more common in the Clyde than it has hitherto appeared to be if a careful examination were to be made of the fishes caught in the deeper parts of the estuary.

The Ampeliscidæ were represented in recent tow-net gatherings from the Clyde by one or two moderately rare forms, such as *Ampelisca lævigata*, Lilljeborg; *Ampelisca spinipes*, Boeck; and *Haploops tubicola*, Lilljeborg.

Amongst the Phoxocephalidæ the only species that need be referred to is *Harpina crenulata*, Boeck. Four specimens of this Amphipod were obtained in a gathering of Crustacea dredged in Campbeltown Loch (Cantyre) in 1897. This appears to be the first record of *H. crenulata* for the Clyde.

Argissa hamatipes (Norman)—one of the Pontoporeiidæ—occurred sparingly in tow-net gatherings from the Clyde district as well as from the Moray Firth. Both male and female specimens were observed.

The curious *Stegocephaloides christianensis* (Boeck) occurred in a bottom tow-net gathering collected in the Clyde at Station XVII. (Upper Loch Fyne) on 7th December 1898. This species appears to be somewhat rare in the Clyde district.

Amongst the Amphilochidæ the somewhat rare *Amphilochus tenuimanus*, Boeck, was obtained in a bottom tow-net gathering from Station VII., Firth of Clyde, collected at night on 23rd September 1898. *A. tenuimanus* is recorded in Dr. Robertson's Catalogue, Part I., page 28.

Amphilochoides odontonyx (Boeck).=*Amphilochoides pusillus*, Sars, was obtained in the Clyde at Stations III., IV., VII., and IX., but only in bottom tow-net gatherings; while *Gitana sarsi*, Boeck (another of the same family of Amphipoda), occurred in a gathering from Station VI. collected on 25th August 1898.

The family Stenothoidæ was represented in the tow-net gatherings from the Clyde by *Stenothoë marina* (Spence Bate), *Cressa dubia* (Spence Bate), and one or two other forms; and in a gathering from Station XV. Moray Firth, *Stenothoë marina*, *Metopa robusta*, G. O. Sars (a species recorded from the Moray Firth a few years ago in "Ann. and Mag. Nat. Hist.," ser. 6, vol. xiii., p. 148, February 1894), and *Cressa dubia* (Spence Bate). In *Metopa robusta*—the record of which in 1894 appears to be the first for Britain—the form of the first gnathopoda is quite distinct from that of the same appendages of any other British species except, perhaps, *Metopa polexiana*.

Monoculodes packardi, Boeck, occurred in a gathering from Station XVII. (Upper Loch Fyne) collected on 7th December 1898; and *Synchelidium brevicarpum* (Spence Bate) at Station IV. (Kilbrennan Sound, Firth of Clyde) on 24th August 1898.

Epimeria tuberculata, G. O. Sars. Two specimens of this fine species were obtained in a gathering from Station IV., Firth of Clyde, on 1st September 1898. *Epimeria tuberculata*, which appears to be a rare species in the Clyde, was added to the British fauna about two years ago.

Eusirus longipes, Boeck, was obtained from the Clyde in gatherings Stations VI., VII., and VIII. It occurred in one gathering from Station VI., collected on 25th August 1890; in two other gatherings from Station VII., collected on 3rd September and 24th September; and in one from Station VIII., collected on the 29th of the same month.

Guernea coalita (Norman). This curious little species was observed in washings of material dredged at Station VI., Firth of Clyde. The same species has been captured off Millport by the late Dr. Robertson, and is recorded in Part II. of his catalogue of Clyde Amphipoda and Isopoda; and his appears to be the only previous record of the occurrence of *G. coalita* for the Clyde.

Melphidippella macera (Norman). This Amphipod, though obtained occasionally in tow-net gatherings, is apparently scarce, as only one or a

very few specimens are found in any single gathering. It occurred in four of the series of gatherings at present under consideration, all the four being from the Clyde, viz. :—In a gathering from Stations III. and IV., collected on 24th August 1898; in a gathering from Station VII. collected on 24th September; and in one from Station VIII., collected on 29th of the same month.

Photis longicaudatus (Spence Bate) occurred sparingly in a gathering from Station IV., Firth of Clyde.

Amongst the Podoceridæ *Podocerus palmatus*, Stebbing and Robertson, and *Podocerus pusillus*, G. O. Sars, have been obtained in tow-net gatherings from the Clyde—the first in a gathering from Station VII. collected on 24th September 1898, and the other in a gathering from Station VI., collected on 1st September.

Unciola planiceps, Norman, was obtained in the same gathering from Station VI. in which *Podocerus pusillus* just recorded occurred. *Unciola* appears to be an addition to the Amphipod fauna of the Clyde.

Isopoda.

The following are a few of the more interesting of the Isopoda that have been observed in tow-net and other gatherings recently examined. Those from the Clyde are, *Leptognathia breviremis*, Lillejeborg, collected at Station XII., between the south end of Arran and the Ayrshire coast; *Leptognathia brevimana* (Lilljeborg), at Station VI., 1st September 1898. Another closely allied species—*Tanaopsis laticaudata*, G. O. Sars—was moderately frequent amongst a gathering of material from Campbeltown Loch (Cantyre) collected in May 1897. *Munna boecki*, Kroyer, which is larger than *Munna kroyeri*, Goodsir, and apparently more frequent in the Clyde, has been obtained at Whiting Bay, and one or two other places. Both *Munna boecki* and *Munna kroyeri* have been observed in the Moray Firth district.

Paramunna bilobata, G. O. Sars, recorded for the Clyde in 1894, by the Rev. A. M. Norman (Ann. and Mag. Nat. Hist. (6), vol. xii., p. 280, footnote), was obtained at Station IV. (Kilbrennan Sound). It has already been recorded for Loch Fyne in Part III. of the Sixteenth Annual Report of the Fishery Board for Scotland.

Pleurogonium rubicundum, G. O. Sars, was recorded by the Rev. A. M. Norman, for the Clyde, in 1894, in the same footnote in which *Paramunna* is recorded (see reference under that species), and is, so far as I know, the only record for the Clyde hitherto. *Pleurogonium inerme*, G. O. Sars, has been obtained in a gathering from Campbeltown Loch (Cantyre), collected in 1897, and in one from Station IV. (Kilbrennan Sound), collected on 24th August 1898. *Pleurogonium spinosissimum*, G. O. Sars, another of these minute Isopods, has been recorded for the Clyde by the late Dr. Robertson, of Millport.

Pseudione crenulata, G. O. Sars (a parasite of *Munida rugosa*), apparently new to Britain, and *Pseudione affinis*, G. O. Sars (parasite on *Pandalus montagui*), have both been observed in the Clyde, while *Bopyroides hippolytis* (Kroyer) has been obtained in the Moray Firth.

Micronisсus. The little parasite known by this name, and which, in the tow-net gatherings of the "Garland," is sometimes found clinging to *Calanus*, *Pseudocalanus*, and other Copepods, has just been shown by Prof. Sars ("Crustacea of Norway," vol. ii., p. 218-220, 1898) to be one of the post-larval stages of a species of *Phryxus*. In my paper on the "Marine Fishes and Invertebrates of Loch Fyne," published in the Fifteenth Annual Report of the Fishery Board for Scotland (p. 136, 1897), attention was directed to the close resemblance between *Micronisсus* and the young of *Phryxus fusticaudatus*, Spence Bate, but no definite opinion was expressed as to the relationship between them. Probably more than one kind of *Bopyrus* is represented by these *Micronisci*, but it may, at this stage, be difficult to distinguish the one kind from the other.

Cumacea.

Several interesting Cumaceans have been observed during the examination of tow-net gatherings recently collected, the following of which may be referred to:—

Lamprops fasciata, G. O. Sars, has been obtained sparingly in a gathering from the Cromarty Firth. *Hemilamprops rosea*, Norman, occurred in a gathering from Station IV. (Kilbrennan Sound), Firth of Clyde. *Leucon nasicus*, Kroyer, was obtained in a gathering from Station XII. (Firth of Clyde), depth 40-43 fathoms. *Eudorellopsis deformis* (Kroyer)—a curious little Cumacean—was taken at Stations VII. and VIII., Firth of Clyde, in moderately deep water. *Eudorella truncatula* (Spence Bate) occurred in gatherings from Clyde Stations VII. and VIII., and *Eudorella marginata* (Kroyer) in a gathering from Station XII.

Campylaspis rubicunda, Lillejeborg, was obtained in gatherings from Clyde Stations XII. and XVII. *Cumella pygmæa*, G. O. Sars, occurred in a gathering from Station IV. (Kilbrennan Sound), Firth of Clyde, 24th August 1898, and in one from Station XV. Moray Firth, 15th November 1897.

Cuma pulchella, G. O. Sars, though only recognised within recent years as a member of the British fauna, has apparently a wide distribution around our shores. It was obtained in the Firth of Forth in 1889-90, and recorded in Part III. of the Eighth Annual Report of the Fishery Board for Scotland, p. 329, and afterwards in the Liverpool Bay District (Eighth Annual Report of the Liverpool Marine Biological Committee, p. 25). I have now to record its occurrence in the Clyde, having obtained one or two specimens in some washings of dredged material from Station VI. As pointed out by Dr. Norman, the first joint of the seventh foot is furnished with a series of backward-directed tooth-like processes, by which character *C. pulchella* may be distinguished from its congeners.

Schizopoda.

The Schizopoda, though plentiful in some of the gatherings, were usually limited to a few species, amongst which the Euphausiidæ were the most numerous. The Schizopod usually of most frequent occurrence in the Clyde and Loch Fyne gatherings is *Boreophausia raschii*, but in

the Moray Firth *Thysanoessa neglecta*, Kröyer, is frequently the prevailing form. * *Nyctiphanes norvegicus*, which is also of frequent occurrence, and of large size, in Loch Fyne, is generally comparatively rare in the Moray Firth and in the Firth of Forth. This *Nyctiphanes*, though occasionally met with in considerable numbers in other parts of the Clyde district, seldom attains such a large size as it does in Loch Fyne.

Erythrops serratus and *Erythrops elegans* have been obtained in gatherings collected during the past year both in the Clyde and in Loch Fyne, but neither have been observed in the Moray Firth. *Erythrops serrata* formed part of the contents of a hake's stomach captured at Station XIV. (Loch Fyne). The Epicarid parasite *Aspidoecia Normanni*, Giard and Bonnier, was obtained on *Erythrops elegans* at Station VII., September 1898.

Siriella norvegica, G. O. Sars, was obtained at Station VII. (Firth of Clyde). The *Siriellæ*, though represented in the Clyde by at least four species, are usually of rare occurrence, so that even the commoner forms are worth recording. *Siriella norvegica* is one of the less familiar of the British *Siriellæ*.

Schistomysis ornatus, G. O. Sars, and *Hemimysis lamornæ* (R. Couch) has been occasionally met with in the Clyde tow-net gatherings during the past year. The first has been obtained in gatherings from Stations VII. and VIII., near the mouth of the estuary, and from Stations XIV. and XVII. in Upper Loch Fyne; the other was obtained in a gathering from Station VII.

Leptomysis gracilis, G. O. Sars, and *Leptomysis lingaura*, G. O. Sars, were also obtained in Clyde tow-net gatherings recently examined. *Leptomysis gracilis* occurred in a gathering from Station VIII., and *Leptomysis lingvura* in two different gatherings from Station VII., and in gatherings from Stations XIV. and XVII.

Mysidopsis gibbosa, G. O. Sars, *Mysidopsis didelphys* (Norman), and *Mysidopsis angusta*, G. O. Sars, have all occurred in gatherings recently collected in the Clyde and Upper Loch Fyne. *Mysidopsis gibbosa* was obtained in gatherings from three stations, viz., Stations VII., VIII., and XVII.; *Mysidopsis didelphys* in a gathering also from Station XVII., and *Mysidopsis angusta* in one from Station VIII.

Before concluding these notes on the tow-net gatherings collected on board the "Garland" and forwarded for examination, it may be of interest to refer to a young form of crustacean which is sometimes met with in these gatherings.

The study of the changes of form to be met with in the life-history of the Crustacea is a profoundly interesting one. The variations of form observed in the different species are sometimes so perplexing that they have occasionally puzzled even experienced students. Numerous larval and young forms are now and again captured in the tow-nets, but usually they belong to species that are fairly well known. It sometimes happens, however, that specimens are obtained which are not so easily disposed of, and I now draw attention to a curious form which is occasionally noticed

* *Thysanoessa neglecta* has recently been observed in the Clyde. It occurred in a tow-net gathering from Station X., collected on the 16th of January last. An exposition of the characters which distinguished this from the closely allied species, *T. longicaudata*, will be found in Rev. Dr. A. M. Norman's excellent "Revision of the British Schizopoda," published in the "Annals and Magazine of Natural History," June-September 1892.

in tow-net gatherings from the Clyde—the only Scottish locality where it has as yet been observed. The form referred to, which in general appearance is not very unlike the widely distributed crustacean known as *Lucifer*, has been known for a considerable period; it was described and figured under the name of *Trachelifer*, by the late Mr. George Brook in 1888*, but is evidently immature, and there is still some doubt as to the species to which it really belongs. The neck of this young form is long and slender; the thorax is small, and is furnished with more or less rudimentary appendages; the slender abdomen is more than twice the length of the neck, and the last abdominal segment is as long as all the other segments of the abdomen put together; the telson and uropods are comparatively short, and more or less rudimentary. Figure 16, Pl. XII., represents one of the Clyde specimens, which measured over all about 16·5 millemetres ($\frac{2}{3}$ of an inch). The specimens that have been observed vary in length to a small extent, but all possess the same slender *Lucifer*-like form.

Habitat.—Station VII., Firth of Clyde. (I have also a specimen from Loch Fyne collected in 1886.)

Additional Remarks.—Figures 17 to 20, Plate XII., exhibit on a somewhat enlarged scale portions of the Lucifer-like crustacean referred to above. In fig. 17, which represents the front part of the cephalic segment, the eyes are large and somewhat divergent; the triangular rostrum is slightly shorter than the eyes; both pairs of antennæ are slender and elongate; the antennal scales are also slender and rather shorter than the basal part of the antennules. Fig. 18 represents what appears to be one of the first peræopods. In the specimen dissected this was the only pair that had the extremities of the principal branches chelate; all the other trunk legs appear to be simple. Fig. 19 represents one of the first pair of abdominal appendages, which are all more or less rudimentary; each appendage consists of a single unjointed branch, with a furcated extremity. Fig. 20 represents the posterior end of the last abdominal segment, together with the uropods and telson; the appendages of the last abdominal segment form tapering and slightly curved processes; the uropods are foliaceous, and little more than half the length of the telson; the telson is comparatively of large size. In the specimen dissected for drawing, the telson was somewhat imperfect. The extremity is therefore indicated by dotted lines, but in another specimen in which the telson was fairly perfect the following characters were observed:—The terminal lateral processes had each two small teeth on the inner margin, and the part between the lateral processes was furnished with twenty-two short and slender marginal spines; the two middle spines were rather shorter than the others; and there was a slight but perceptible gradation in the length of those on each side of the two central ones, the spines nearer the centre being somewhat shorter than those more distant. The larva above referred to was described by Claus as *eine in vieler Hinsicht merkwürdigen Larve* in a paper *Zur Kenntniss der Kreislaufsorgane der Schizopoden und Decapoden*, in Arb. d. z. Inst. Univ. Wien. V. 1884, p. 302 (32), Pl. VIII., figs. 48-50. The same writer subsequently described a somewhat more advanced specimen as the larva of *Calliaxis adriatica*, Heller, ibid. VI. 1886, p. 63, Pl. V., fig. 45. The identity of Brook's *Trachelifer* with Claus's *Calliaxis*—larva is pointed out by Korschelt and Heider, Lehrb. d. vergl. Entwicklungsgesch. d. wirbell. Th., I., p. 471. *Calliaxis* is not yet known as a British form, being only known from the Adriatic and from Naples: at the latter station the larva is met with in the surface-fauna, but the adult has only been found once in 25 years (S. Lo Bianco, Mitth. Zool. Stat. Neapel. XIII., p. 503, 1899).

Additional Notes.

Shortly after the MS. of this paper had been sent to the printer I had the privilege of perusing the sixth portion of *Das Tierreich*, which has recently been published. This portion contains a revision of the Copepoda belonging to the sub-order Gymnoplea by Giesbrecht and Schmeil; several of the species of Copepoda mentioned in this paper belong to the same sub-order, and on comparing these with the revision referred to I find that the names of four of them have been somewhat altered, as follows:—

Bradyidius armatus (Brady).—Corrected name, *Bradyidius armatus* (Vanhöffen).

Eurytemora lacinulata (Fischer).—Corrected name, *Eurytemora velox* (Lillj), Brady.

Metridia hibernica (Brady and Robertson).—Corrected name, *Metridia lucens*, Boeck.

Candace pectinata, Brady.—Corrected name, *Candacia pectinata*, Brady

EXPLANATION OF THE PLATES.

PLATE X.

Scolecithrix pygmæa, sp. n.

Fig. 1. Female, lateral view . . . . . × 53.

Fig. 2. Antennule . . . . . × 126.

Fig. 3. Anterior foot-jaw . . . . . × 380.

Fig. 4. Posterior foot-jaw . . . . . × 380.

Fig. 5. Foot of first pair of swimming-feet . . . . . × 250.

Fig. 6. Foot of fourth pair . . . . . × 190.

Fig. 7. Fifth pair of feet, male (r., right; l., left branch) . . . × 127.

Fig. 8. Abdomen and caudal furca, female, dorsal view . . . × 190.

Fig. 9. Abdomen and caudal furca, male, dorsal view . . . × 190.

Scolecithrix hibernica, A. Scott.

Fig. 10. Fifth pair of feet, male . . . . . × 127.

Cylindropsyllus fairliensis, sp. n.

Fig. 11. Female, lateral view . . . . . × 53.

Fig. 12. Mandible . . . . . × 760.

Fig. 13. Maxilla . . . . . × 760.

Fig. 14. Posterior foot-jaw . . . . . × 760.

Leptocaris minutus, gen. et sp. n.

Fig. 15. Female, lateral view . . . . . × 107.
Fig. 16. Antennule, female . . . . . × 760.
Fig. 17. Antennule, male . . . . . × 760.
Fig. 18. Antenna . . . . . × 760.
Fig. 19. Mandible . . . . . × 760.
Fig. 20. Maxilla . . . . . × 760.
Fig. 21. Posterior foot-jaw . . . . . × 760.

PLATE XI.

Cylindropsyllus fairliensis, sp. n.

Fig. 1. Antennule . . . . . × 380.
Fig. 2. Antenna . . . . . × 380.
Fig. 3. Foot of first pair of swimming-feet . . . . . × 250.
Fig. 4. Foot of fourth pair . . . . . × 190.
Fig. 5. Foot of fifth pair . . . . . × 380.
Fig. 6. Last abdominal segment, and caudal furca . . . . × 380.

Leptocaris minutus, gen. et sp. n.

Fig. 7. Foot of first pair of swimming-feet . . . . . × 760.
Fig. 8. Foot of fourth pair . . . . . × 760.
Fig. 9. Foot of fifth pair, female . . . . . × 760.
Fig. 10. Foot of fifth pair, male . . . . . × 760.
Fig. 11. Last abdominal segment, and caudal furca . . . . × 253.

Cletodes perplexa, sp. n.

Fig. 12. Female, lateral view . . . . . × 760.
Fig. 13. Antennule . . . . . × 760.
Fig. 14. Mandible . . . . . × 760.
Fig. 15. Anterior foot-jaw . . . . . × 760.
Fig. 16. Posterior foot-jaw . . . . . × 760.
Fig. 17. Foot of first pair of swimming-feet . . . . . × 760.
Fig. 18. Foot of fourth pair . . . . . × 380
Fig. 19. Foot of fifth pair, female . . . . . × 760.
Fig. 20. Foot of fifth pair, male . . . . . × 760.

Bradypontius papillatus (T. Scott).

Fig. 21. Foot of fifth pair . . . . . × 260.

PLATE XII.

Cletodes perplexa, sp. n,

Fig. 1. Caudal furca . . . . . × 250.

Idya cluthæ, sp. n.

Fig. 2. Female, dorsal view . . . . . × 53.

Fig. 3. Antennule . . . . . × 190.

Fig. 4. Foot of first pair of swimming-feet . . . . . × 190.

Fig. 5. Foot of fourth pair . . . . . × 190.

Fig. 6. Foot of fifth pair . . . . . × 190.

Bradypontius papillatus (T. Scott).

Fig. 7. Female, dorsal view . . . . . × 53.

Fig. 8. Antennule . . . . . × 190.

Fig. 9. Antenna . . . . . × 380.

Fig. 10. Mandible . . . . . × 253.

Fig. 10A. Extremity of mandible . . . . . × 1520.

Fig. 11. Maxilla . . . . . × 380.

Fig. 12. Anterior foot-jaw . . . . . × 190.

Fig. 13. Posterior foot-jaw . . . . . × 190.

Fig. 14. Foot of first pair of swimming-feet . . . . . × 190.

Fig. 15. Foot of fourth pair . . . . . × 190.

Larva of *Calliaxis* (*Trachelifer*).

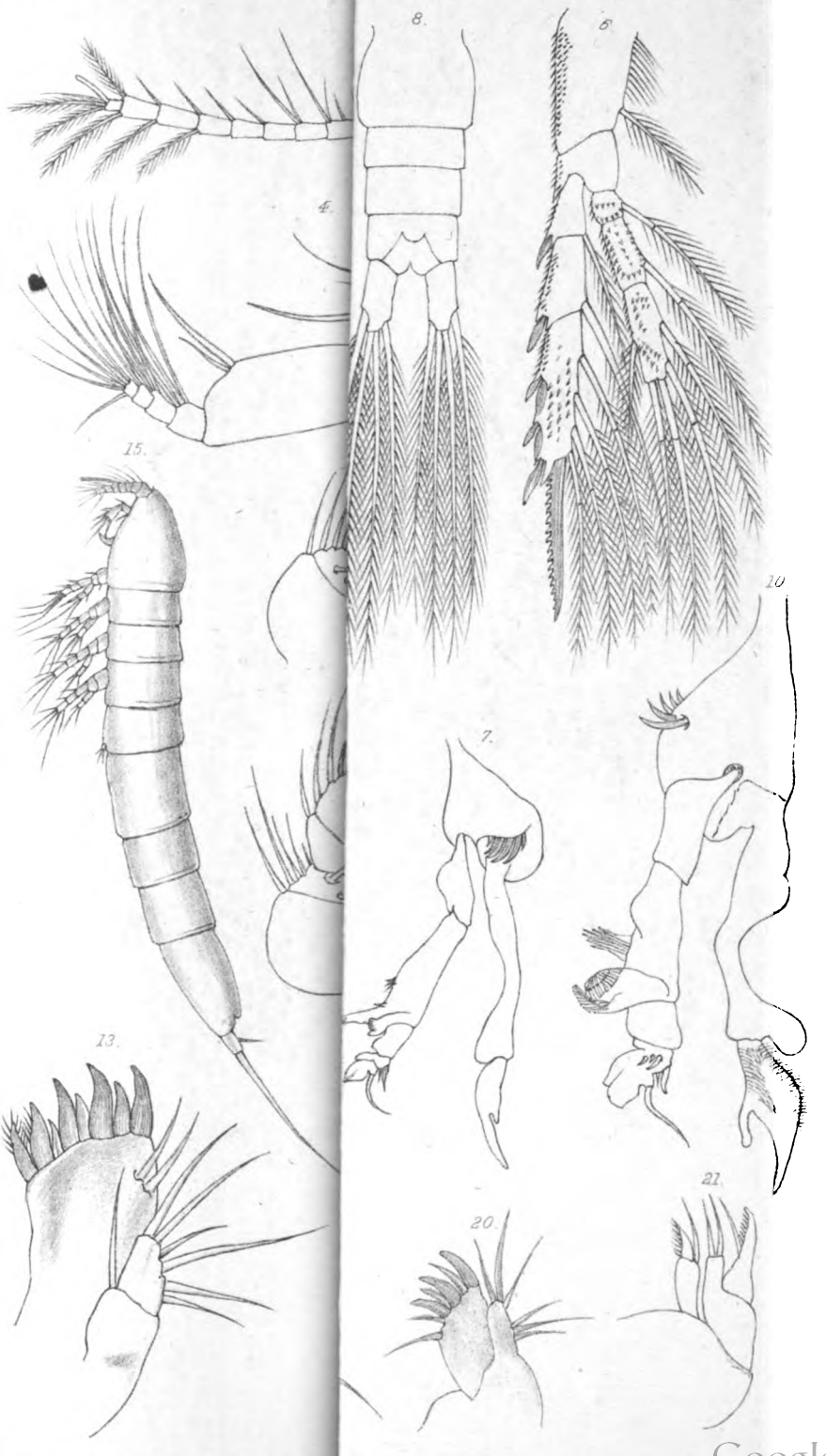
Fig. 16. Specimen, showing side view . . . . . × 10.

Fig. 17. Head, showing antennæ, etc. . . . . × 26½.

Fig. 18. One of first peræopods . . . . . × 26½

Fig. 19. One of the abdominal appendages . . . . . × 160.

Fig. 20. Telson and uropods . . . . . × 26½.



A. Scott, *del.*