SECTION B.—BIOLOGICAL INVESTIGATIONS.

I.—ADDITIONS TO THE FAUNA OF THE FIRTH OF FORTH. —PART VII. By Thomas Scott, F.L.S. (Plates III., IV.)

Owing to continued efforts being made to work up what remains of dredged and other material collected in various parts of the Firth of Forth during recent years, and also to still further extend our investigations of the fauna of the Forth estuary, a considerable number of organisms have, as the result of these efforts, been added to those described in the Annual Reports of previous years. The additions this year comprise one species of Pisces, twenty-eight species of Copepoda, and one species of Trematoda.

Descriptions of most of these have been already published,* descriptions of others are in course of publication,† while several others are described here for the first time.

I am again indebted to my son, Mr Andrew Scott, Fisheries Assistant, University College, Liverpool, for the drawings that illustrate this memoir. My friend, Mr William Eagle Clark, identified for me the fish that is here recorded; Dr R. Blanchard, the eminent French naturalist, kindly favoured me with the name of the Trematode fish parasite referred to above, while Dr. T. Wemyss Fulton, F.R.S.E., Superintendent of Scientific Investigations, by his uniform and kindly interest in our work, has done much to make our work successful. I have also to acknowledge my indebtedness to Captain Robert Campbell of the Fishery Cruiser 'Garland, for the assistance he is always, whenever possible, so ready and willing to give.

Pisces.

Triglops Murrayi, Gunther (1885).

Triglops Murrayi, Gunther, Proc. Roy. Soc. Edin., vol. xv. p. 209, Pl. IV. fig. A (1885).

Triglops Murrayi, W. Eagle Clark, Ann. Scot. Nat. Hist., No. 13, p. 23 (Jan. 1895).

Habitat.—A few miles west of May Island (28th Nov. 1890).

Though *Triglops Murrayi* was obtained in 1890, the species was unknown to us at that time; the specimen was therefore put aside till an opportunity should occur for a study being made of its peculiar features. It was thus allowed to stand over till last year, when it was sent to Mr Eagle Clark of the Museum of Science and Art, Edinburgh, who identified it as *Triglops Murrayi*, Gunther. In the *Annals of Scottish Natural History* for January 1895, Mr Eagle Clark gives a summary of all the known records of the occurrence of this fish since its discovery on the west coast of Scotland by Dr Murray in 1885. It does not appear to have been observed in the Firth of Forth previous to 1890.

* In *Ann. and Mag. Nat. Hist.* for January 1895, and in *Ann. Scot. Nat. Hist.* for the same month.

† In the *Trans. of the Linnean Society of London.*

CRUSTACEA.

Copepoda.

Genus *Bradya*, Boeck (1872).

A revision of the British Copepoda belonging to the genera *Bradya* and *Ectinosoma*, by myself and my son, Mr A. Scott, is in course of publication by the Linnean Society of London. The following species belonging to these two genera are from the Firth of Forth, and are additions to previous records :—

Bradya typica, Boeck.

1872. *Bradya typica*, Boeck, Nye Slægter og Arter, Saltsvands copepoda, p. 15.

Habitat.—West of May Island.

Bradya elegans, T. and A. Scott.

Habitat.—Largo Bay.

Bradya hirsuta, T. and A. Scott.

Habitat.—Largo Bay.

Bradya fusca, T. and A. Scott.

Habitat.—Largo Bay.

Bradya minor, T. and A. Scott.

Habitat.—Off St. Monans.

Genus *Ectinosoma*, Boeck (1864).

Ectinosoma propinquum, T. and A. Scott.

Habitat.—Off Musselburgh, Firth of Forth.

Ectinosoma gracile, T. and A. Scott.

Habitat.— Off St Monans, Firth of Forth.

Ectinosoma curticorne, Boeck.

1885. *Ectinosoma curticorne*, Boeck, Abhandl.'d. Natur u. Vereins zu Bremen, IX. Band, p. 194, t. vi. figs. 1–12.

Habitat.—Off Burntisland, Firth of Forth.

Ectinosoma Herdmani, T. and A. Scott.

Habitat.—Off St. Monans, Firth of Forth.

Ectinosoma pygmæum, T. and A. Scott.

Habitat.—Firth of Forth.

Ectinosoma armiferum, T. and A. Scott.

Habitat.—West of May Island, Firth of Forth.

Ectinosoma Normani, T. and A. Scott.

Habitat.—Off Burntisland, Firth of Forth.

Ectinosoma tenuipes, T. and A. Scott.

Habitat.—Off St. Monans, Firth of Forth.

Ectinosoma longicorne, T. and A. Scott.

Habitat.— Off St. Monans, Firth of Forth.

Ectinosoma tenuicorne, T. and A. Scott.

Habitat.—Off St. Monans, Firth of Forth.

Genus *Stenhelia*, Boeck (1864).

Stenhelia reflexa, n. sp. (Pl. III. figs. 1–9).

Description of the species.—Female, length 1·2 mm. ($\frac{1}{21}$ of an inch). Body slender, somewhat similar to *Stenhelia ima*, Brady, but considerably

more elongate. Antennules short, eight-jointed, the first two joints dilated, second joint longer than any of the others, the fifth, sixth and seventh short, terminal joint about half the length of the second. The proportional lengths of all the joints are shown in the formula—

Proportional lengths of the joints,	21 · 26 · 16 · 21 · 8 · 9 · 6 · 13
Numbers of the joints,	1 · 2 · 3 · 4 · 5 · 6 · 7 · 8

Antennæ stout, secondary branch of moderate length, three-jointed (fig. 3). Basal joints of the mandible-palp dilated, both branches two-jointed, but the end joints are small (fig. 4). Posterior foot-jaws somewhat like those of *Stenhelia ima*,—a plumose seta springs from the inner distal angle of the first joint, a longitudinal and slightly curved row of small hairs extends along the side—interiorly—of the second joint, while the inner margin of the same joint bears two slender setæ on the distal half; two small supplementary setæ also spring from the base of the terminal claw (fig. 5). First pair of swimming feet elongate, the last joint of the inner branches is about twice the length of the second, while the entire length of the second and third joints is only about two-thirds the length of the first joint. The outer branches are rather more elongate than the first joint of the inner branches (fig. 6). The other four pairs somewhat similar to those of *Stenhelia ima*, but the secondary joint of the fifth pair is proportionately less elongate, so that the inner portion of the basal joint extends to about two-thirds the length of the secondary joint (fig. 8). Caudal stylets very short, the principal seta of each is interiorly gibbous at the articulation near the base (fig. 9).

Habitat.—Shore near Dunbar, Firth of Forth. Rather rare.

Remarks.—This species may be distinguished from *Stenhelia ima*, Brady, which appears to be its nearest ally, not only by its greater length, but also by the length and structure of the antennules, and by the proportionally longer inner branches of the first pair of swimming feet.

Genus *Mesochra*, Boeck (1864).

Mesochra spinicaudata, T. and A. Scott.

1895. *Mesochra spinicaudata*, T. and A. Scott, Ann. and Mag. Nat. Hist., ser. 6, vol. xv. p. 52, Pl. V. figs. 12–25.

Habitat.—In pools near low-water on the shore at Musselburgh, Firth of Forth. Frequent.

Remarks.—The posterior foot-jaws, with their extremely long terminal claws, form a prominent character in this species, and one by which it was readily distinguished from the other Copepoda among which it occurred in the shore gathering from Musselburgh.

Mesochra MacIntoshi, T. and A. Scott (Pl. IV. fig. 22).

1895. *Mesochra MacIntoshi*, T. and A. Scott, Ann. and Mag. Nat. Hist., ser. 6, vol. xv. p. 53, Pl. VI. figs. 1–7.

Habitat.—In pools near low-water mark on the shore at Musselburgh, Firth of Forth. Not uncommon.

Remarks.—Though this species is more slender than the typical *Mesochra*, it is nevertheless in the structure of its various appendages, a true member of that genus. The first pair of swimming feet closely resemble those of *Mesochra Lilljeborgii*, differing only in the proportionally greater length of the end joint of the inner branches.

Genus *Laophonte*, Philippi.

Laophonte intermedia, n. sp. (Pl. III. figs. 10–20).

Description of the species.—Female, length ·7 mm. ($\frac{1}{36}$ of an inch). Body robust and slightly arcuate, rostrum short and broadly rounded. Antennules short, stout and five-jointed; the fourth joint very short, the others subequal in length. The proportional lengths of the joints are nearly as follow:—

Proportional lengths of the joints,	18	20	20	6	18
Numbers of the joints,	1	2	3	4	5

The first joint of the antennæ is somewhat dilated, but the second joint is narrow,—both are of nearly equal length; secondary branch very small, one-jointed (fig. 13).

Mandible-palp narrow, elongate and hirsute, and furnished with three terminal setæ (fig. 14). Posterior foot-jaw stout, armed with a powerful terminal claw strongly hooked at the end (fig. 15). The first joint of the inner branch of the first pair of swimming feet is of great length, being about six times longer than broad; second joint short, and armed with a strongly hooked claw, scarcely twice the length of the joint from which it springs. Outer branch moderately stout, two-jointed; a stout short spine springs from the upper half of the outer margin of the second basal joint; a considerable portion of the integument of this joint and of the outer branches is densely hirsute on the outer aspect, as shown in the drawing (fig. 16). Inner branches of the fourth pair short, two-jointed, joints subequal (fig. 17). Fifth pair foliaceous, somewhat resembling those of *Laophonte hispida*; the produced portion of the basal joint is furnished with four moderately long and stout setæ on the inner distal margin and apex; the setæ on the secondary branch are shorter—at the apex there is one stout, plumose and very long slender seta; other three setæ spring at irregular intervals along the outer edge (fig. 18). Caudal stylets as long as the last abdominal segment, robust, sub-conical, strongly notched near the middle of the outer margin, and provided each with a stout conical, terminal spine; the integument of the abdominal segments and caudal stylets is more or less covered with minute setæ, as shown in the drawing (fig. 20). *Male.*—The male closely resembles the female except in the structure of the antennules, the fourth joint of which is considerably dilated, while the next three are narrow, and together form a hooked claw (fig. 12). The fifth pair of thoracic feet in the male are very small (fig. 19).

Habitat.—In shore pools at Musselburgh, Firth of Forth, and at Port Erin, Isle of Man.

Remarks.—This species appears to be intermediate between *Laophonte lamellata* and *Laophonte hispida*, but is quite distinct from both; it could easily be distinguished by the peculiar form of the caudal stylets alone, though mixed up with numbers of other Copepoda.

Genus *Cletodes*, Brady (1892).

Cletodes similis, n. sp. (Pl. III. figs. 22–26; Pl. IV. figs. 1–3).

1892. *Cletodes lata*, T. Scott, variety (?), Tenth Annual Report of the Fishery Board for Scotland, Part III. p. 257, Pl. X. fig. 18.

Description of the species.—Female, length ·65 mm. ($\frac{1}{38}$ of an inch). Resembling *Cletodes lata*, T. Scott, in general appearance. Antennules

six-jointed, sparingly setiferous; the fourth joint is considerably shorter and the end joint longer, than the others, as shown by the formula—

Proportional lengths of the joints,	18 · 10 · 18 · 5 · 9 · 22
Number of the joints,	1 · 2 · 3 · 4 · 5 · 6

Antennæ somewhat similar to those of *Cletodes lata* (Pl. V. fig. 1). Posterior foot-jaw short, stout, and armed with a stout curved terminal claw; the claw is fringed with hairs on the distal half of the inner margin; a setiferous spine springs from the upper distal angle of the first joint; the second joint, which is somewhat dilated and gibbous below, is fringed with small hairs on both margins (Pl. III. fig. 24). The first joint of the outer branches of the first pair is nearly equal to the combined length of the second and third joints; the outer branches are also armed with long slender marginal spines and small spiniform setæ,—the end joint bears two marginal and one long slender terminal spine; the same joint is also furnished interiorly with two very long and plumose subterminal setæ, and a moderately long setæ, also plumose, springs from the lower distal half of the inner margin of the second joint; the inner branches, which are two-jointed, and reach to about the end of the second joint of the outer branches, have the first joint short but moderately stout, while the second joint is slender and more elongate, the first joint bears four short plumose setæ on the inner distal angle, and the second joint is furnished at the extremity with one short and one very long plumose setæ and a slender spine; a stout setiferous spine, which reaches to about the middle of the end joint of the inner branch, springs from the inner distal angle of the second basal joint, and a similar but rather more slender spine springs from the outer angle of the same joint (Pl. IV. fig. 2). The fourth pair are somewhat similar to the same pair in *Cletodes lata*, but the marginal spines of the outer branches are much shorter and stouter (Pl. IV. fig. 3). In the fifth pair the inner portion of the basal joint is produced into a subconical lobe bearing at its apex a long stout and coarsely plumose seta, while a smaller seta springs from the outer margin and close to the apical seta; secondary joint elongate, narrow and armed with one long terminal and three rather shorter marginal setæ; the setæ are all more or less curved, and the uppermost of the three marginal setæ is spiniform and setiferous (Pl. IV. fig. 25). Caudal stylets as in *Cletodes lata*.

Male.—The male differs little from the female, except in the structure of the antennules and fifth pair of thoracic feet. The antennules are apparently nine-jointed and rather more slender than those of the female, and are modified to form powerful grasping organs (Pl. III. fig. 23). The fifth pair in the male are scarcely half the size of those of the female, but somewhat similar in form; the two plumose setæ on the inner portion of the basal joint are much shorter; the secondary joint bears only two small marginal setæ, while the apical seta is of considerable length and plumose (Pl. III. fig. 26).

Habitat.—In shore pools, as well as in deep water, Firth of Forth, and Port Erin, Isle of Man.

Remarks.—This species has been known to us since 1891, and in the Tenth Annual Report of the Fishery Board for Scotland, Part III. p. 257, it is referred to as a doubtful variety of *Cletodes lata*. During recent months the same two forms, *Cletodes lata* and the species now described, have again been the subject of careful study, with the result that we are now satisfied that they are quite distinct. They differ in the structure of the antennules, and very markedly in the form of the posterior foot-jaws; they also differ in the proportional lengths, and in the armature of the

outer and inner branches of the first pair of swimming feet. The difference in the form of the fifth pair is also very marked.

Genus *Thalestris*, Claus (1863).

Thalestris mysis, Claus.

1863. *Thalestris mysis*, Claus. Die frei lebenden Copepoden, p. 130, Pl. XVII. figs. 12–16.

Remarks.—This very distinct species was observed for the first time in the Firth of Forth during the last summer.

Pseudothalestris, Brady (1883).

Pseudothalestris pygmæa (T. and A. Scott).

1895. *Pseudowestwoodia pygmæa*, T. and A. Scott, Ann. and Mag. Nat. Hist., ser. 6, vol. xv. p. 55, Pl. VI. figs. 8–16 (Jan. 1895).

Habitat.—Near Dunbar, at the mouth of the Firth of Forth. In the Annals and Magazine of Natural History for May 1895 we have shown that the genus *Pseudothalestris*, Brady, which was described in the Report on the 'Challenger' Copepoda (p. 100), from a single specimen—a male—obtained in a gathering collected at Betsy Cove, Kerguelen Island, in lat. 49° 16′ S., long. 70° 12′ E., is apparently identical with *Pseudowestwoodia*, T. Scott, described in the Twelfth Annual Report of the Fishery Board for Scotland. This is another instance of the remarkable similarity that exists among some of the lowly organisms that inhabit opposite sides of the globe.

Pseudothalestris major (T. and A. Scott).

1895. *Pseudowestwoodia major*, T. and A. Scott, *op. cit.* p. 56, Pl. VI. figs. 17–20.

Habitat.—Vicinity of Granton, and of Dunbar, Firth of Forth. Rare.

Genus *Harpacticus*, Milne-Edwards (1838).

Harpacticus obscurus, n. sp. (Pl. IV. figs. 4–12).

Description of the species.—Female, length ·8 mm. ($\frac{1}{31}$ of an inch). Antennules somewhat slender, nine-jointed; the first four joints are of nearly equal length, the sixth, which is about half the length of the third, is nearly twice as long as the last joint. The proportional lengths of the joints are as shown by the formula—

Proportional lengths of the joints,	13	·	13	·	14	·	13	·	5 · 7 · 3 · 2 · 4
Number of the joints,	1	·	2	·	3	·	4	·	5 · 6 · 7 · 8 · 9

Antennæ very robust; secondary branch equal to about three-fourths the length of the end joint of the primary branch, very slender and composed of two nearly equal joints (fig. 6). Mandible stout, basal joint of mandible-palp dilated at the end (fig. 7). End joint of the posterior foot-jaw broadly ovate; a row of small setæ extends obliquely across part of the inner aspect of the joint, while a few small setæ arranged in a transverse row spring from the vicinity of the outer margin, as shown by the drawing (fig. 8). Terminal claw stout and strongly curved, a slender supplementary seta springs from the inner aspect of the claw near the base; a small seta also springs from the inner distal angle of the first joint. Outer branches of the first pair of swimming feet elongate, moderately stout; first and second joints of nearly equal length, and fringed with minute hairs on the outer edge; third joint almost obsolete; the first joint bears two small setæ on the outer distal angle, and one small seta

springs from the distal half of the outer edge of the second joint; the outer branch is also armed with three stout and two very small spines, there is also a small subterminal and spiniform seta on the inner aspect; first joint of the inner branches nearly as long as the first joint of the outer branches, both margins fringed with short hairs, while a short plumose seta springs from near the distal end of the inner margin; other joints very short (fig. 9). The fifth pair has the basal joint broadly foliaceous and shortly produced interiorly, and furnished with four plumose setæ on the broadly rounded apex, the second seta from the outside being much longer than the others, while the innermost is the shortest; secondary joint subcylindrical, about twice as long as broad, and provided with five apical setæ, the two inner setæ being rather longer than the others and plumose; both margins of the secondary joint are ciliated (fig. 11). Caudal stylets very short (fig. 12).

Habitat.—Old quarry near Granton, into which the sea ebbs and flows.

Remarks.—This somewhat critical species may be distinguished from other species of *Harpacticus* by the structure of the antennules, by the form and armature of the posterior foot-jaws, the length of the first and second joints of the outer branches of the first pair of swimming feet, and by the form of the fifth pair. In all these characters it appears to be intermediate between *Harpacticus fulvus* and *Harpacticus flexus*.

Genus *Idya*, Philippi (1843).

Idya gracilis, n. sp. (Pl. IV. figs. 13–21).

Description of the species.—Female, length 1·4 mm. ($\frac{1}{18}$ of an inch). Body, seen from above, narrow and tapering gently towards the posterior end, length about three and a half times the breadth at the widest part, rostrum small (fig. 13). Antennules scarcely reaching to the end of the first cephalo-thoracic segment, eight-jointed; the second joint is rather more elongate than any of the others; the length of the fourth and the last is nearly equal, while the fifth, sixth and seventh are small, as shown by the formula—

Proportional lengths of the joints,	15	26	22	18	5	7	4	16
Numbers of the joints,	1	2	3	4	5	6	7	8

Antennæ slender, moderately elongate; secondary branches short, four-jointed, furnished with several short plumose setæ; second and third joints subequal and smaller than the others, first and fourth also subequal (fig. 15). Mandible rather slender, and the one-jointed branches of the palp are so arranged that there is a considerable distance between them (fig. 16). The basal joint of the anterior foot-jaw is dilated; the end joint is long and very slender, and furnished near the middle of the posterior margin with two setæ—the one plain and slender, the other spiniform and plumose (fig. 17). Posterior foot-jaw large; two small setæ spring from the inner distal angle of the first joint; the terminal claw is stout and elongate, and has a moderately long plumose setæ alongside of it interiorly; both the first and second joints are also provided with a few small marginal hairs, as shown by the drawing (fig. 18). The inner branches of the first pair of swimming feet are of considerable length and very slender; the second joint, which is nearly one and a half times longer than the first, is equal in length to about seven times the width at the broadest part; a plumose seta, extending to slightly beyond the end of the branch, springs from the lower half of the inner margin of the first joint; and a small seta, also

plumose, springs from the upper middle portion of the inner margin of the second joint; a fringe of minute hairs extends along the whole of the outer margin of both joints, and the inner margin is also partially fringed with small hairs; the first joint is nearly two-thirds the length of the second, a spiniform and coarsely plumose seta, rather longer than the joint, springs from its outer distal angle; a short, slender, setiferous spine springs from the lower half of the outer margin, and a short plumose seta from the inner margin of the second joint; the end joint is less than half the length of the second, and its armature is somewhat similar to that of the same joint in *Idya furcata* (fig. 19). The second, third and fourth pairs of swimming feet are somewhat similar to those of that species. The fifth pair are also somewhat similar to those of *Idya furcata*, but the secondary joint is narrower and more elongate, its extremity is subconical and the setæ are less crowded together at the apex (fig. 21). Caudal stylets rather longer than broad.

Habitat.—An old quarry near Granton, into which the sea ebbs and flows.

Remarks.—The elongate form of the animal, together with the difference in the proportional lengths of the antennules, the long and slender inner branches of the first pair of swimming feet, and the less powerful armature of the outer branches, are characters quite sufficient to distinguish this from *Idya furcata*, Baird, and *Idya longicornis*, T. and A. Scott.

Trematoda.

Octobothrium merlangi (Kuhn), (Pl. IV. figs. 23, 24).

This curious parasite was obtained on the gills of a specimen of the Whiting (*Gadus merlangus*) from the Firth of Forth, in March 1891. Several specimens were obtained. It was first described by Kuhn (*Memoires du Museum*) in 1830, and afterwards by P. J. van Beneden (*Bulletin de l'Académie de Belgique* (1) xxiii.) in 1856. The same author also refers to it in his *Animal Parasites* (vol. xx. of the International Scientific series), p. 261 (1876).

This parasite does not seem to be very common in the Firth of Forth—at anyrate I have only once observed it.

I am indebted to my kind correspondent, Dr R. Blanchard of Paris, for most of the above information concerning this interesting parasite.

DESCRIPTION OF THE PLATES.

Plate III.

Stenhelia reflexa, n. sp.

Fig. 1.	Female—lateral view,	× 52	diameters.
Fig. 2.	Antennule—female,	× 380	,,
Fig. 3.	Antenna,	× 380	,,
Fig. 4.	Mandible and palp,	× 380	,,
Fig. 5.	Posterior foot-jaw,	× 380	,,
Fig. 6.	Foot of first pair of swimming feet,	× 253	,,
Fig. 7.	Foot of fourth pair,	× 127	,,
Fig. 8.	Foot of fifth pair,	× 253	,,
Fig. 9.	Last two abdominal segments and caudal stylets,	× 190	,,

Laophonte intermedia, n. sp.

Fig. 10. Female—lateral view, ... × 53 diameters.
Fig. 11. Antennule—female, ... × 380 ,,
Fig. 12. Antennule—male, ... × 380 ,,
Fig. 13. Antenna, ... × 380 ,,
Fig. 14. Mandible and palp, ... × 380 ,,
Fig. 15. Posterior foot-jaw, ... × 380 ,,
Fig. 16. Foot of first pair of swimming feet, . . . × 380 ,,
Fig. 17. Foot of fourth pair, . . . × 253 ,,
Fig. 18. Foot of fifth pair—female, ... × 380 ,,
Fig. 19. Foot of fifth pair—male, ... × 380 ,,
Fig. 19A. One of the appendages to first abdominal segment—male, × 380 ,
Fig. 20. Last two abdominal segments and caudal stylets, . × 380 ,,

Cletodes similis, n. sp.

Fig. 21. Female—dorsal view, ... × 80 diameters.
Fig. 22. Antennule—female, ... × 380 ,,
Fig. 23. Antennule—male, ... × 380 ,,
Fig. 24. Posterior foot-jaw, ... × 380 ,,
Fig. 25. Foot of fifth pair—female, ... × 380 ,,
Fig. 26. Foot of fifth pair—male, ... × 380 ,,

Plate IV.

Cletodes similis, n. sp.

Fig. 1. Antenna—female, ... × 380 diameters.
Fig. 2. Foot of first pair of swimming feet, . . . × 380 ,,
Fig. 3. Foot of fourth pair, ... × 380 ,,

Harpacticus obscurus, n. sp.

Fig. 4. Female—lateral view, ... × 53 diameters.
Fig. 5. Antennule—female, ... × 253 ,,
Fig. 6. Antenna, ... × 380 ,,
Fig. 7. Mandible and palp, ... × 380 ,,
Fig. 8. Posterior foot-jaw, ... × 380 ,,
Fig. 9. Foot of first pair of swimming feet, . . . × 253 ,,
Fig. 10. Foot of fourth pair, ... × 253 ,,
Fig. 11. Foot of fifth pair, ... × 380 ,,
Fig. 12. Last two abdominal segments and caudal stylets, . × 126 ,,

Idya gracilis, n. sp.

Fig. 13. Female—dorsal view, ... × 40 diameters.
Fig. 14. Antennule—female, ... × 190 ,,
Fig. 15. Antenna, ... × 190 ,,
Fig. 16. Mandible and palp, ... × 253 ,,
Fig. 17. Anterior foot-jaw, ... × 380 ,,
Fig. 18. Posterior foot-jaw, ... × 380 ,,
Fig. 19. Foot of first pair of swimming feet, . . . × 190 ,,
Fig. 20. Foot of fourth pair, ... × 126 ,,
Fig. 21. Foot of fifth pair, ... ,,

Mesochra MacIntoshi. T. and A. Scott.

Fig. 22. Female—lateral view, ... × 106 diameters.

Octobothrium merlangi (Kuhn).

Fig. 23. Specimen seen from below, ... × 11 diameters.
Fig. 24. The same seen from above, ... × 11 ,,

II.—THE INLAND WATERS OF THE SHETLAND ISLANDS.

By Thomas Scott, F.L.S., and Robert Duthie, Fishery Officer.
(Plate V.)

No systematic attempt has hitherto been made to investigate the microfauna of the lochs of Shetland. Much has, no doubt, been written on various matters of interest, including the natural history and antiquities relating to these islands, but the references to their natural history have usually been confined to the *Vertebrata* among the animals and to the *Phanerogamia* and higher *Cryptogamia* among plants; while the investigation of the microfauna of the lochs of Shetland, as well as of their microflora, has very seldom, if ever, been taken up as a systematic study. This attempt to make a more or less thorough examination of the lochs of Shetland may therefore be of interest.

There is another thing we desire to draw attention to in these preliminary remarks. It is well known that many of the Shetland lochs, though comparatively of small size, are good lochs for trout, but it may not be so well known that one of the greatest enemies to the trout inhabiting these lochs is the cormorant. But it is the case that, in the more shallow lochs, where there is little aquatic vegetation, such as the pond weeds, rushes, sedges, etc., where trout can find at the same time shelter and food, the poor fish are sorely persecuted by these feathered pirates. It is a fact, as will be shown in the sequel, that the absence of trout in some of the smaller lochs of Shetland is almost entirely due to the incessant persecution by these marauding birds, and not to unfavourable natural conditions.

In the following notes we will show that in most of the lochs that have already been examined, there is an ample food supply for trout, and that what is wanted is protection for the fish by encouraging the cultivation of aquatic plants of the kinds already mentioned, under shelter of which the fish may find safety from their persecutors.

We have divided our paper into two sections. In Section I., Mr Duthie gives a general description of the lochs that have been examined, and which form the subject of the present memoir. In Section II., Mr Scott records the names of the various kinds of organisms that have been obtained and identified in the gatherings collected from the different lochs, together with notes on some of the more interesting species.

There is also a table appended giving a general view of the distribution of the species that have been identified.

We propose to describe the lochs in the following order:—

First.—The Lochs on the Island of Unst.

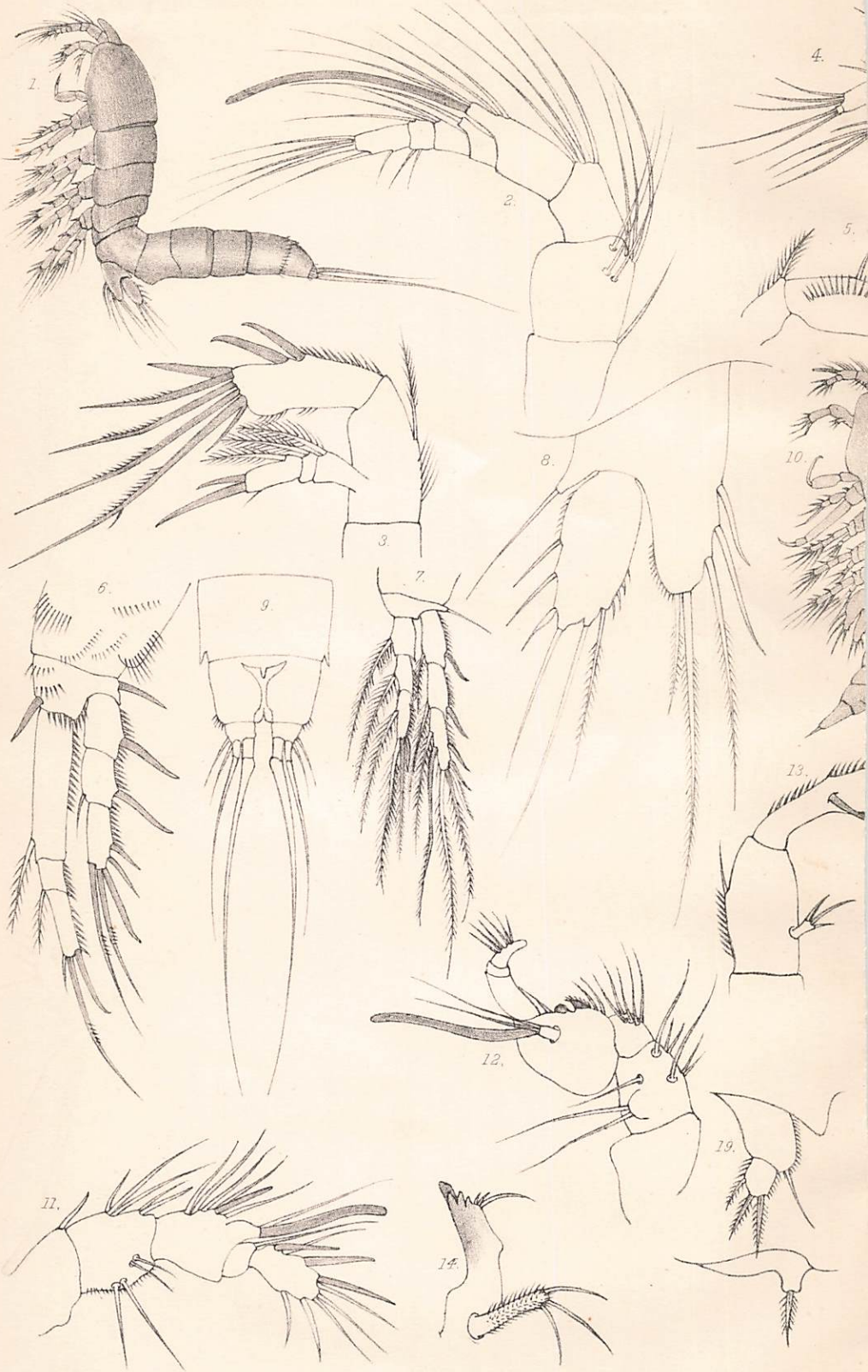
Loch of Cliff.
Loch of Whatley.
Loch of Stourhoull.
Loch of Snarravoe.
Loch of Belmont.
Small Loch of Uyasound.
Large Loch of Uyasound.
Small Waters of Unst.

Second.—Lochs on the Island of Whalsay.

Loch of Sandwick.
Loch of Huxter.
Loch of Livister.
Bu Water.

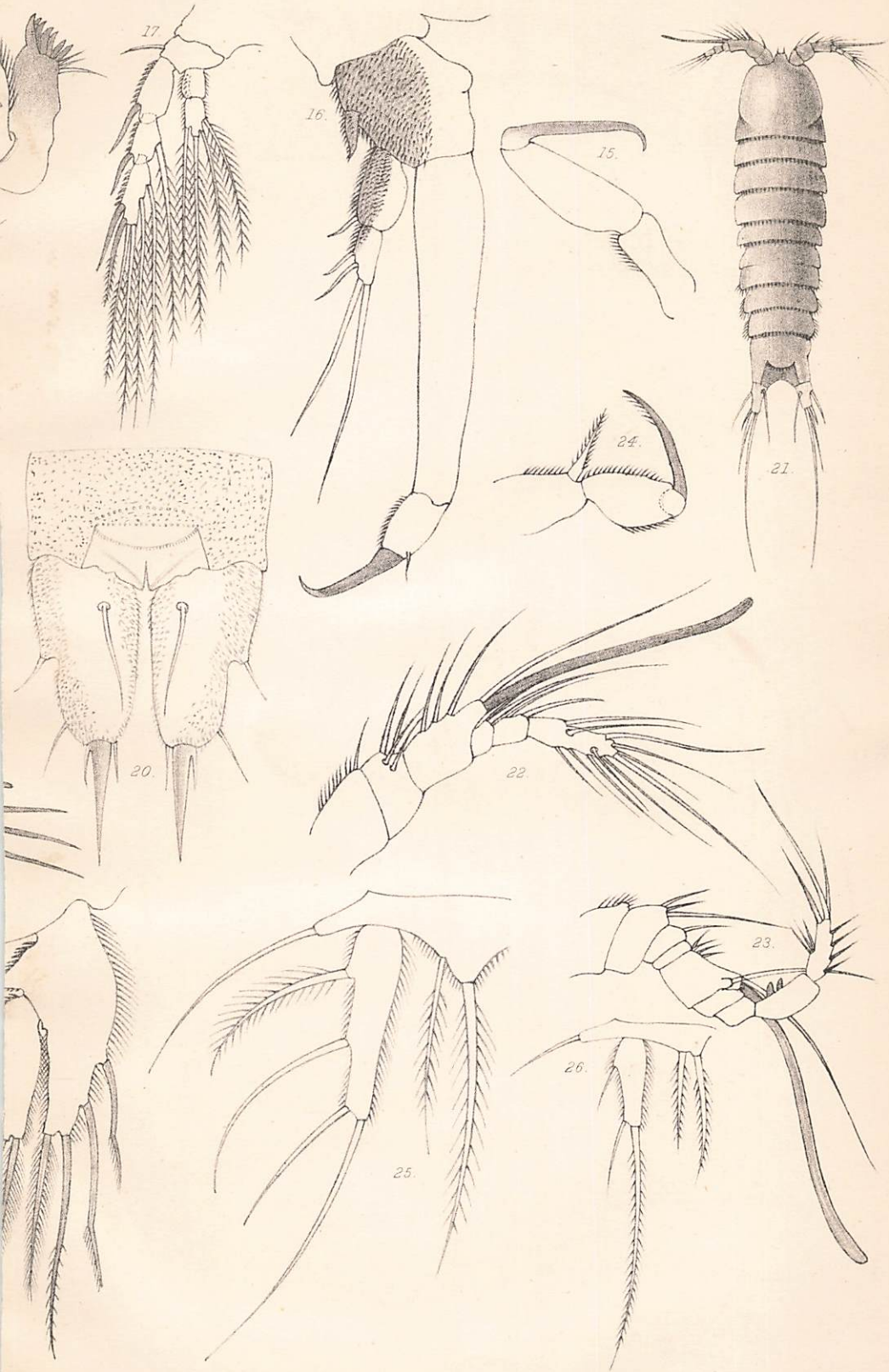
Third.—Lochs on the Mainland.

Loch of Brindister.
Loch of Quarff.
North Loch (off Clikimin).
Loch of Clikimin.



A. Scott, del.

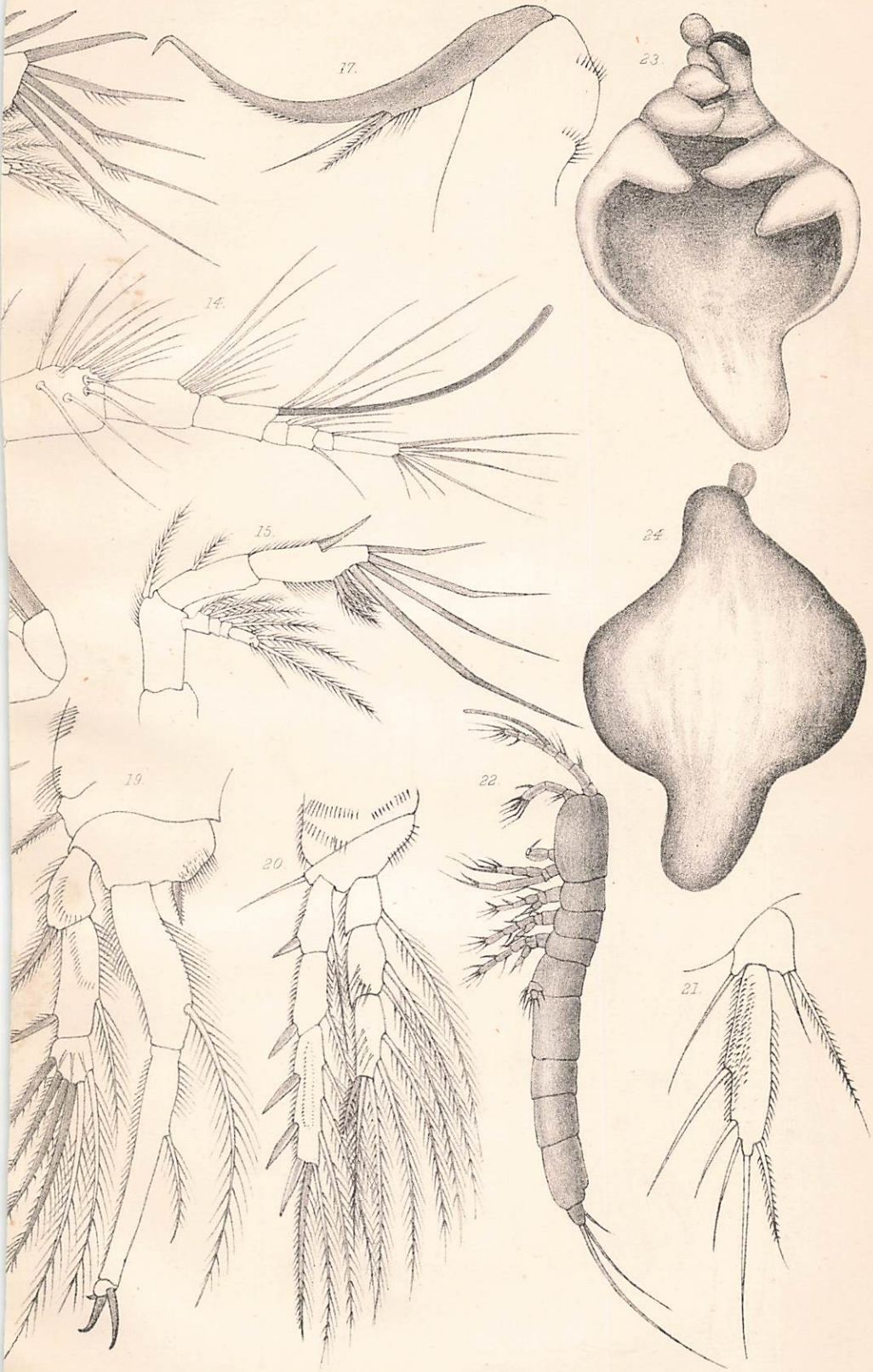
FIG. 1-9.—*Stenhelia reflexa*, n. sp. FIGS. 10-20.—*La*



rmedia, n. sp. FIGS. 21-26.—*Cletodes similis*, n. sp.

A. Scott, del.

FIGS. 1-3.—*Cletodes similis*, n. sp. FIGS. 4-12—*Ho*
FIG. 22.—*Mesochra MacIntoshi*, T. and A. S



scurus, n. sp. FIGS. 13-21.—*Idya gracilis*, n. sp.
. 23, 24.—*Octobothrium merlangi* (Kuhn).