

- OTIORRHYNCHUS OVATUS.—Common under stones on the shore, Thurso (August 1892).
- OTIORRHYNCHUS SULCATUS.—One in Thurso town (August 1892).
- TROPIPHORUS TOMENTOSUS (*Marsh*), MERCURIALIS, *Brit. Cat.*—One under stone, Thurso, 1892.
- BARYNOTUS SCHÖNHERRI, *Zett.*—A few specimens at Moffat (July 1890) and Thurso (August 1892).
- CURCULIO ABIETIS, *L.*—Abundant everywhere at Carrbridge (July 1890).
- MYELOPHILUS PINIPERDA, *L.*—One at Thurso (August 1892). This is a rather remarkable find, considering that there are very few trees in the neighbourhood. The specimen was found clinging to a Caithness flag.

References to the commoner Coleoptera will be found for Thurso in the "Entomologist's Monthly Magazine" (June 1893), and for Ben Nevis in the "Entomologist's Monthly Magazine" (December 1891).

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ON SOME NEW AND RARE COPEPODA FROM THE CLYDE.

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PLATE IV.

THE Firths of Forth and Clyde, which are the two most important estuaries, have had both their fauna and flora investigated by quite a number of able and enthusiastic naturalists, and zoology and botany have been enriched by many interesting and important discoveries that, as a result of these investigations, have been made in both these branches of study. Yet notwithstanding all the research of previous years, prolonged and thorough though it has been, much still remains to be done ere it may reasonably be asserted that, even in regard to these restricted areas, our knowledge of the

OTHIUS MELANOCEPHALUS, *Grav.*—Common under stones on the cliffs at Thurso, 1892 (August).

STENUS GUTTULA, *Mill.*—A few specimens at Thurso, 1892 (August), under stones in damp places on the cliffs.

BLEDIUS ARENARIUS (*Payk.*)—Common on sandhills at Castletown, Caithness, 1892 (August).

CLAVICORNIA.

NECROPHORUS RUSPATOR, *Er.*—One specimen at Thurso, 1892 (August).

SILPHA OPACA, *L.*—A pair at Thurso, 1892. One in the town (August).

MICROPELUS PORCATUS, *Payk.*—Abundant at Thurso, 1892 (August), on the flags used for dividing fields.

BYRRHUS PILULA, *L.*—Moffat, under stones (July 1890).

SIMPLOCARIA SEMISTRIATA, *F.*—Thurso, 1892, under stones (August).

LAMELLICORNIA.

APHODIUS LAPONUM, *Gyll.*—Abundant in sheep droppings on moors at Moffat (July 1890), all dark forms.

SERICA BRUNNEA.—Common on sandhills at Castletown, Caithness (August 1892).

STERNOXI.

CORYMBITES CUPREUS, *F.*, and *var.* *ÆRUGINOSUS*.—Both at Thurso (August) and Moffat (July), but chiefly *var.* *æruginosus*.

PHYTOPHAGA.

DONACIA BIDENS, *Ol.*—Abundant on leaves of *Potamogeton* in a little tarn near Thurso, August 1892.

CREPIDODERA FERRUGINEA, *Scop.*—A dark variety common on Gosford shore near Aberlady (August 1895).

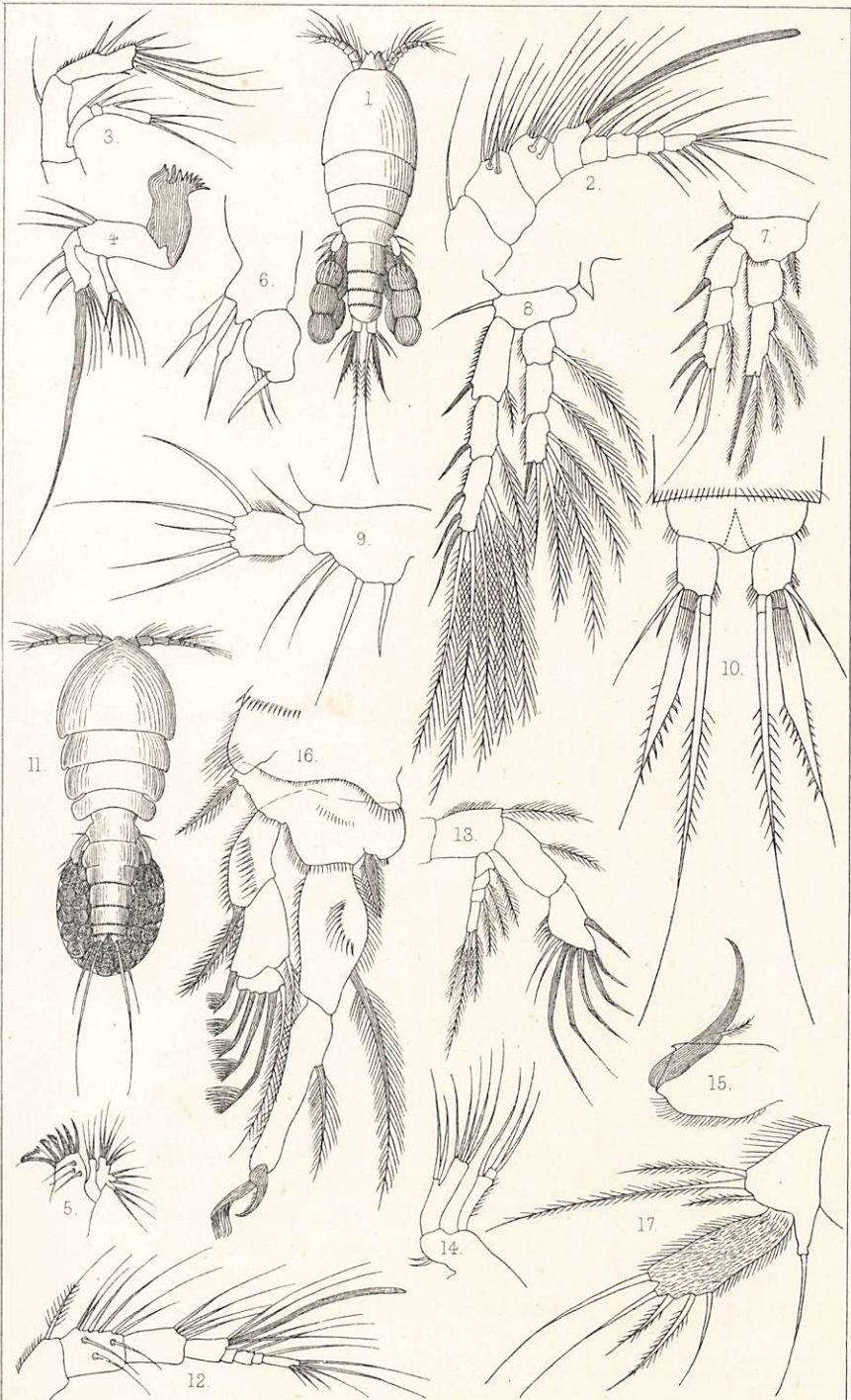
RHYNCHOPHORA.

OTIORRHYNCHUS BLANDUS, *Gyll.*, MONTICOLA, *Walt.*—Common in the valleys under stones at Carrbridge (August 1892) and on the shore at Thurso, 1892 (August).

OTIORRHYNCHUS MAURUS, *Gyll.*—A single specimen at Carrbridge (1890) under a stone in a pine wood.

OTIORRHYNCHUS ATROAPTERUS, *De G.*—Common on *Cirsium arvense* on sandhills, Castletown, Caithness, August 1892.

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A. Scott, Delt.

R. & R. Clark, Ltd. Imp.

FIGS. 1-10 DELAVALIA GIESBRECHTI, Sp. n.

FIGS. 11-17 IDYA MINOR, Sp. n.

creatures to be found within their limits is approximately complete. No doubt the vertebrates and the larger of the invertebrates have been more or less exhaustively studied, so that additions to the number of species already known are now rarely met with; but in regard to the more minute invertebrates the case is different, and it is to these that our remarks chiefly apply. Of the various groups of these minute organisms, that of the Copepoda is perhaps one of the most interesting and most likely to reward the systematist with the discovery of new forms.

In the present contribution we give, as far as appears necessary, a brief account of the details of structure of two apparently undescribed Copepods from the Clyde, and new records for some rare species already described. The first we propose to describe is a species of *Delavalia*, viz:—

DELAVALIA GIESBRECHTI, *sp. nov.*, Plate IV. Figs. 1-10.

Description of the Female.—Length .45 mm. ($\frac{1}{5}$ of an inch). Antennules moderately stout, eight-jointed. The proportional lengths of the joints are approximately as follows:—

Proportional lengths of the joints	9	10	8	6	5	6	5	7
Numbers of the joints	1	2	3	4	5	6	7	8

Antennæ somewhat like those of *Delavalia æmula*, T. Scott, but the secondary joints, which are three-jointed, are rather more slender than in that species. The mandibles—the structure of which is characteristic of the genus—have the principal seta at the end of the apical branches of the palp spiniform and of considerable length, while the lateral branches appear to be two-jointed, the end joint being very small (Fig. 4). Posterior foot-jaws very small, and armed with a small terminal claw (Fig. 6). First pair of swimming feet somewhat similar to those of *Delavalia palustris*, Brady, but the first joint of the inner branches is proportionally shorter and the second joint longer and narrower than in that species; the second joint is also furnished with a moderately long spine and a plumose seta at the apex and two plumose setæ on the inner margin, while a similar seta springs from the inner distal angle of the first joint; the outer branches are armed somewhat similar to those of *Delavalia palustris* (Fig. 7).

The second, third, and fourth pairs are somewhat similar to those of that species (Fig. 8). In the fifth pair the inner portion of the basal joints is only slightly produced; the posterior free margin, which is irregularly angular, bears four setæ—the two exterior setæ are close together, but the other two, which are moderately stout, are somewhat distant from each other as well as from the two exterior setæ; the secondary branches are subquadrangular, they are longer than broad, and are each furnished with five setæ ranged around the distal end—the middle seta is much shorter than the others (Fig. 9). Caudal stylets short, about equal in length to the last abdominal segment, and each furnished at the apex with a long slender seta interiorly and two small setæ at the outer angle, while intermediate between these is a broad spine-like appendage. This appendage, seen from the dorsal aspect, has its two margins apparently nearly parallel for rather more than half its length; they then taper towards the end, where the appendage terminates in a slender hair. This tapering portion is plumose on both sides, but the feathering shows most prominent on the inner edge. The middle portion of each long seta also appears to be plumose (Fig. 10). Ovisacs two, moderately large.

Habitat.—Ayr Bay, Firth of Clyde, not very rare.

Remarks.—Perhaps the most obvious character of this small but distinct and interesting species, and one which requires no dissection to render evident, is that of the curious broad spine-like appendages of the caudal stylets. The peculiar character of these appendages distinguish this species at a glance from any other member of the genus. The species is named in compliment to Herr Dr. W. Giesbrecht, of the Naples Zoological Station.

DELAVALIA ÆMULA, *T. Scott.*

This species was described in the "Eleventh Annual Report of the Fishery Board for Scotland" (part iii. p. 204, Plate IV., Figs. 36-47, 1893), from specimens obtained in Largo Bay, Firth of Forth, and till this year this was the only station for the species known to us; we are now, however, able to record its occurrence in the Clyde estuary,

having found it not unfrequent in some dredged material from Ayr Bay. *Delavalia æmula* has both branches of the first pair of swimming feet three-jointed, the second and third joints of the inner branches being subequal and together rather longer than the first joint; and, though in this respect the species does not agree with the generic definition, it is nevertheless a typical *Delavalia*, and therefore we prefer to leave it in the genus to which it was first assigned.

(?) DELAVALIA, *sp.*

This is another interesting aberrant species of *Delavalia*, also from the Clyde, but we have not yet had time to prepare a description of it. It is apparently a typical *Delavalia*, except that, like *Delavalia æmula*, the inner branches of the first pair of swimming feet are three-jointed; it differs, however, from that species in having the first joint of the inner branches long and slender, nearly equal to the entire length of the outer branches, while the second and third joints, though distinct, are very short. In this respect it resembles some of the species of *Dactylopus*.

DELAVALIA (?) ROBUSTA, *Brady*.

A *Delavalia*, which appears to be identical with *D. robusta*, except in the form of the principal terminal seta of the inner branches of the first pair of swimming feet, was comparatively frequent in one or two of the Clyde dredgings recently collected, and especially in a dredging from Kilbrennan Sound. In these Clyde specimens the principal terminal seta of each of the inner branches of the first feet is stout at the base, but is otherwise long and slender, and is, so far as we have observed, invariably curved forward in a falcate manner: the concave margin of the seta is also furnished with a dense fringe of delicate cilia. The form of this seta appears to be the only point of difference between the Clyde specimens and *Delavalia robusta* as described and figured by Dr. Brady. *Delavalia robusta* has not previously been recorded for Scotland, Dr. Brady's specimens having been obtained off the coasts of Durham and Yorkshire.

IDYA MINOR, *sp. n.*, Plate IV. Figs. 11-17.

Description of the Female.—Length .7 mm. ($\frac{1}{36}$ of an inch). Body closely resembling *Idya furcata* (Baird) in general appearance. Antennules eight-jointed, stout; second and third joints of about equal length, and longer than any of the others; the first, fourth, and last are also moderately elongate, and nearly equal in length. The formula shows approximately the proportional lengths of all the joints:—

Proportional lengths of the joints	$\frac{12}{1}$	$\frac{18}{2}$	$\frac{18}{3}$	$\frac{12}{4}$	$\frac{3}{5}$	$\frac{5}{6}$	$\frac{3}{7}$	$\frac{11}{8}$
Numbers of the joints	1	2	3	4	5	6	7	8

The first three joints of the secondary branches of the antennæ are short; the fourth joint is as long as the second and third together (Fig. 13). Mouth organs somewhat similar to those of *Idya furcata*. The first pair of swimming feet are robust; their outer branches do not reach much beyond the end of the first joint of the inner branches; the spine on the exterior distal angle of the first joint of the outer branches scarcely extends beyond the terminal joint (Fig. 15). The second, third, and fourth pairs resemble those of *Idya furcata*. In the fifth pair the inner portion of the basal joint is subtriangular in outline and bears three setæ at the bluntly rounded apex, the middle seta being much longer than the other two; the secondary joint is somewhat spatulate, the width being greater towards the distal end, the length of the joint is equal to about three times its width, the end is truncate and furnished with five apical setæ, both surfaces of the secondary joint are covered with minute hairs. Caudal stylets short. Ovisac large.

Habitat.—In a few localities in Loch Fyne, especially where the water is shallow with a muddy bottom as in Loch Gair and in the vicinity of Carndow and Largabruach; not uncommon.

Remarks.—*Idya minor* is the smallest member of the genus that we have yet observed. It may be distinguished by the structure of the antennules and antennæ, by the robust form of the first pair of feet and the comparatively broad and spatulate secondary branches of the fifth pair. In general appearance *Idya minor* resembles *Idya furcata* more closely than any of the other described forms; but in the latter species the third joint of the antennules is distinctly

shorter than the second joint, and the secondary joints of the fifth pair of feet are narrow and of nearly equal width throughout; it is also a larger species.

Besides *Idya minor* and *Idya furcata*, two other species of *Idya* have been obtained in the Clyde district, viz. *Idya gracilis*, T. Scott, and *Idya longicornis*, T. and A. Scott.

Idya gracilis is about twice the length of *Idya minor*, and is easily distinguished by the remarkably long and slender inner branches of the first pair of swimming feet. This species was described in part iii. of the "Thirteenth Annual Report of the Fishery Board for Scotland (1895)," from specimens obtained in the Firth of Forth. It has not hitherto been recorded from the Clyde district, but specimens have now been obtained by us in material (chiefly dredged) from one or two places in Loch Fyne and in Kilbrennan Sound.

Idya longicornis is the largest species of *Idya* known to us. It was described in the "Annals and Magazine of Natural History" for June 1895, from specimens discovered in East Loch Tarbert (Loch Fyne). It has since been obtained in Caradale Bay and a few other Clyde stations, but we know of no record for the species beyond the Clyde area.

CANUELLA PERPLEXA, T. and A. Scott.

This interesting Copepod, so closely resembling *Longipedia coronata* in general appearance and in several of its structural details, and yet differing so much in other points as to make it generically distinct, has lately been obtained in some gatherings of Clyde Copepods; it was moderately frequent in dredged material from Ayr Bay, and is an addition to the Clyde Copepod fauna. Can the close resemblance between *Canuella perplexa* and *Longipedia coronata* be considered a case of "mimicry"? : it looks like it. *Canuella perplexa* was described in the "Annals of Scottish Natural History" for April 1893, from specimens obtained in the Firth of Forth; it has also been observed in Liverpool Bay.

NEOBRADYA PECTINIFER, T. Scott.

This was one of a group of peculiarly slender species of Copepoda described in the "Tenth Annual Report of the Fishery Board for Scotland"; they had been discovered in

the Firth of Forth off St. Monans, at a place locally known as "the Fluke Hole" and famous for the fine quality of its flat-fishes, especially plaice and lemon soles. In structure, *Neobradya pectinifer* is somewhat intermediate between *Longipedia* and *Bradya* (or *Ectinosoma*); it is, however, quite distinct from other British Harpactids, and is apparently local in its distribution. Till quite recently "the Fluke Hole" was the only habitat for *Neobradya* known to us. We are now, however, able to record its occurrence in the Clyde; a few specimens of it, along with specimens of other rare forms, having been obtained in a small gathering of Copepods from Ballantrae Bank.

PSEUDOCLETODES VARARENSES, *T. and A. Scott.*

This genus and species were instituted to include a somewhat large Copepod from the Moray Firth, and descriptions were published in the "Annals and Magazine of Natural History" for October 1893. Only a very few specimens of this Copepod were obtained at that time, and no others have been observed by us till a short time ago, when, on re-examining a number of doubtful forms from the Clyde set aside for further study, several specimens of this apparently rare species were obtained. They had been collected from some material dredged near Sanda Lighthouse at the mouth of Clyde estuary, where the conditions as regards depth of water and the nature of the bottom are apparently somewhat similar to that part of the Moray Firth where the species was first discovered. The elongate cylindrical form of the species, with its somewhat long and peculiar caudal stylets, distinguish it from other allied Copepods.

EXPLANATION OF PLATE IV.

DELAVALIA GIESBRECHTI, *sp. n.*

Fig. 1. Female, dorsal view . . .	× 80	Fig. 7. Foot of first pair . . .	× 253
„ 2. Antennule . . .	× 380	„ 8. Foot of fourth pair . . .	× 253
„ 3. Antenna . . .	× 253	„ 9. Foot of fifth pair . . .	× 253
„ 4. Mandible and palp . . .	× 253	„ 10. Caudal stylets and	
„ 5. Maxilla . . .	× 253	last two segments	
„ 6. Second foot-jaw . . .	× 760	of abdomen . . .	× 253

IDYA MINOR, *sp. n.*

Fig. 11. Female, dorsal view . . .	× 53	Fig. 15. First foot-jaw . . .	× 253
„ 12. Antennule . . .	× 130	„ 16. Foot of first pair . . .	× 253
„ 13. Antenna . . .	× 253	„ 17. Foot of fifth pair . . .	× 253
„ 14. Mandible palp . . .	× 380		