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III.—OBSERVATIONS ON SOME PARASITES OF FISHES NEW OR RARE IN SCOTTISH WATERS.

By THOMAS SCOTT, LL.D., F.L.S., &c.

Plates V. and VI.

In Part III. of the Twenty-second Annual Report of the Fishery Board for Scotland, I published a small paper on some parasites of fishes new to the Scottish marine fauna. Since the issue of that paper several other rare and interesting species have been examined, and these I now propose to describe.

The species to be described belong for the most part to the Copepoda ; but there are also five species belonging to the Trematoda. As these parasitic Copepoda and Trematoda are quite distinct groups, my observations on them are, as in the previous paper, divided into two parts, viz., Part I. Copepoda parasita, and Part II. Trematoda.

I have been indebted for several of the species described here to Dr. H. C. Williamson ; Mr. Bowman and Mr. Irvine have also obtained a few interesting species for me. Canon A. M. Norman has also allowed me the privilege to examine one or two rare Copepoda in his collection, sent to him many years ago from the Moray Firth by the late Thomas Edward of Banff.

My son, Andrew Scott, A.L.S., has prepared the drawings which illustrate this paper.

PART I.—COPEPODA PARASITA.

FAMILY ERGASILIDÆ.

Genus *Bomolochus*, Nordmann (1832).

Bomolochus soleæ, Claus.

This species of *Bomolochus* has quite recently been obtained in the nostrils of *Gadus luscus*, which adds another to the number of fishes now known to harbour these Copepods in their nostrils. It was in the nostrils of *Cyclopterus lumpus* that the first specimens were observed, early in 1900, but soon afterwards they were obtained in the nostrils of some other fishes, and notably in those of the cod *Gadus morhua*, where they appear to be of quite frequent occurrence. The fishes in whose nostrils the copepods have been most commonly obtained are those belonging to the gadidæ. The following are the names of the fishes :—*Cyclopterus lumpus* L., the Lumpsucker. *Gadus morrhua* L., the Cod-fish. *Gadus aeglefinus* L., the Haddock. *Gadus merlangus* L., the Whiting. *Gadus luscus* L., the Brasse. *Gadus pollachius* L., the Lythe. *Molva molva* L., the Ling. *Pleuronectes platessa* L., the Plaice, and *Pleuronectes flesus* L., the Flounder. *Bomolochus soleæ* was first found on the back of the common Sole—*Solea vulgaris*, Quen.

FAM. CALIGIDÆ.

Genus *Caligus*, O. F. Müller (1785).

**Caligus abbreviatus*, Kröyer. Pl. v., figs. 1–6.

1863. *Caligus abbreviatus*, Kr., Bidrag til Kundskab om Synltekrebsene; Naturh. Tidsskr., 2R., 2B., p. 61, pl. iii., fig. 3, a–k.

Description of the Female.—The Female represented by the drawing, (fig. 1) measures 5mm. ($\frac{1}{5}$ of an inch). The cephalic shield is nearly circular in outline, but is rather widest behind the middle; the width of the frontal plate is scarcely half the width of the cephalic shield at the widest part; lunulæ very clearly defined. Abdomen and furcal joints very short, as represented in the drawing.

The antennules have the basal joints robust and broadly sub-triangular, but the end joints are long and narrow (fig. 3).

The second maxillipeds are robust, and form powerful grasping organs (fig. 5).

The sternal fork, which is moderately stout, and the branches of which are not greatly divergent, has a resemblance to the same appendage in *Lepeophtheirus Thompsoni*, Baird (fig. 4).

The fourth pair of thoracic legs are elongated; the basal joint is moderately stout and one-branched; this branch is slender and composed of two joints, and the end-joint is about twice the length of the first, and is armed with a long, slender and claw-like terminal spine and a short spine near the distal end of the outer margin; the first joint is also furnished with a spine on the outer distal angle (fig. 6).

Habitat.—On a Ballan Wrass, *Labrus bergylta*, captured in the Moray Firth in October 1904, and on another fish of the same species captured in the North Sea. Kröyer also obtained his specimens of the *Caligus* on the Ballan Wrass.

A young specimen representing the *Chalimus* stage of this *Caligus* is represented by figure 2, and was obtained along with the adult form. In this specimen the siphon is still present, showing a somewhat dilated and biarticulated base; the antennules are composed of two short subequal joints, the cephalic shield is elongate-ovate in outline, and the abdomen is very short. The frontal plate slopes posteriorly, and the development of the lunulæ is considerably advanced.

Caligus minimus, A. W. Otto.

1828. *Caligus minimus*, Otto, Nova Acta Acad. Cæs. Leop., vol. xiv., p. 354, pl. xxii., fig. 7.

1840. *Caligus minutus*, M. Edw., Hist. Nat. Crust., vol. iii., p. 450.

1901. *Caligus minimus*, A. Scott, Trans. Liverpool Biol. Soc., vol. xv., p. 349, pl. i., figs. 1–8.

Habitat.—On a Bass, *Labrax lupus*, captured above Queensferry on February 4, 1903. This appears to be the first record of *C. minimus* for the Forth district.

* This species closely resembles, and is probably identical with, *Caligus centrodontus*; Baird. (Cf. Brit. Entom., p. 272–3, Tab. xxxii., figs. 6, 7.)

Genus *Pseudocaligus*, A. Scott (1901).

Pseudocaligus brevipedis (Bassett-Smith).

1896. *Caligus brevipedis*, Bassett-Smith, Ann. and Mag. Nat. Hist. (6), vol. xviii., p. 11, pl. iii., fig. 1.

1901. *Pseudocaligus brevipedis*, A. Scott, Trans. Liverpool Biol. Soc., vol. xv., p. 350, pl. ii., figs. 1-4.

Habitat.—Found attached to the base of the tongue of a Three-bearded Rockling, *Onos tricirratus*, captured at the mouth of the River Dee, Aberdeen, November 23, 1904. Eight specimens of a *Bomolochus*, probably *B. onosi*, were also found on the same fish adhering to the gills and gill-arches.

Genus *Lepeophtheirus*, Nordmann (1832).

Lepeophtheirus sturionis, Kröyer. Pl. v., figs. 7-14.

1837. *Lepeophtheirus sturionis*, Kr., Tidsskrift, i., Tab. vi., fig. 6.

Description of the female.—The female of this species has a general resemblance to that of *Caligus diaphanus*, Nordmann, but is much larger, being fully half an inch in length (about 14mm.).

The cephalic shield is nearly circular in outline, and the frontal plate, which is not very prominent, is without lunule.

The last thoracic segment is considerably shorter than the cephalic shield, and is only slightly longer than broad.

Abdomen moderately narrow and elongated, being equal to nearly three-fourths the length of the last thoracic segment. Furcal joints very short (fig. 7).

The basal joints of the antennules are considerably dilated, and the end joints though short are also tolerably stout (fig. 8).

Antennæ robust and armed with a large and strong claw, the distal end of which is bent at nearly a right angle, as shown in the drawing (fig. 9).

The mandibles resemble those of *L. pectoralis*, O. F. Müller.

The basal-joint of the second maxillipeds is moderately stout and elongate, and armed with a short but strong terminal claw (fig. 11).

The "palpi," though slightly dilated at the base, have the sides nearly parallel, and the two branches of the bifid extremity are tolerably elongated (fig. 10); the small appendage at the bases of the palpi bear each one moderately large spine and two small ones, as shown in the drawing.

Sternal fork very stout and with triangularly divergent branches (fig. 12).*

Fourth pair of thoracic legs stout, each with a single three-jointed branch; the outer distal angle of the first joint in each branch terminates in a small tooth, a stout spine springs from the outer distal angle of the second joint, while the end joint is armed with three terminal spines of varying lengths (fig. 13).

The short furcal joints bear a few small apical setæ or spines (fig. 14).

Habitat.—Taken from a Sturgeon, *Acipenser sturio*, Linn., captured about 16 miles S.E. by E. of Aberdeen, and landed at the Fish Market, Aberdeen, on December 29, 1904. I am indebted to Mr. Bowman, Aberdeen, for this addition to the marine copepod fauna of Scotland.

* Kröyer in Naturh. Tidsskr. 1 Band (1837), Pl. vi., fig. 66, shows the ends of the branches of the sternal fork slightly bifid; but the figure in Naturh. Tidsskr. 3 R., 2 B. (1863), Pl. xvii., fig. 4, represents the sternal fork of another form bluntly pointed at the ends, and with which our figure is identical.

FAM. DICHELESTIIDÆ.

Genus *Dichelestium*, J. F. Hermann (1804).

Dichelestium sturionis, Hermann. Pl. v., figs. 17–24; pl. vi., figs. 1–6.

1804. *Dichelestium sturionis*, Herm., Mem. Aptérologique, p. 125, Tab. v., figs. 7–8.

1837. *Dichelestium sturionis*, Kröyer, Naturh. Tidsskr., 1st B., p. 299, Tab. ii, figs. 5 and 5a (♀).

Description of the Female.—The length of the female represented by the drawing (pl. vi, fig. 1) is 17·8mm (nearly $\frac{3}{4}$ of an inch). Body elongated and narrow; cephalic segment nearly as broad as long, widest behind the middle, sides angulated, truncate, and obscurely trilobed in front. Thoracic segments four, first and second subequal, length equal to about half the breadth, and narrowly rounded at the sides; third segment rather shorter than the one which follows, and each with a shallow transverse suture that divides it into two slightly unequal portions. Genital segment narrow, and about one and a half times the length of the one which immediately precedes it; the ultimate segment ovate, small, being scarcely half the length of the genital segment. Furcal joints short. Ovisac long and slender (pl. vi, fig. 1).

Antennules short, slender, and apparently composed of eight subequal joints (pl. v., fig. 17).

Antennæ robust, extremities chelate, and forming powerful grasping organs (pl. v., fig. 18).

The mandibles resemble those of *Caligus* or *Lepeophtheirus* very closely, but differ in having a stouter basal part, and in the long slender rod-like portion being only three-jointed, the last joint being coarsely serrated on the inner edge (pl. v., fig. 20).

Maxillæ small; two-branched; primary branch stout, tapering distally and furnished with two slender apical setæ; secondary branch very small (pl. v., fig. 21).

The first maxillipeds appear to be three-jointed. The first joint, which is large and tolerably dilated, is about as long as the next two combined; the distal end of the second joint is fringed with short bristles, and the end joint, which is very small, is furnished with a short terminal claw, and a few small marginal spines are shown in the drawing (pl. v., fig. 22).

The second maxillipeds, short, very robust and strongly chelate (pl. v., fig. 23).

The thoracic legs are short and stout. The first and second pairs are two-branched. The branches of the first are indistinctly two-jointed, and the outer branches are furnished with a small spine on the outer distal angle of the first joint, while the end-joint bears five moderately stout spines on its rounded extremity; the inner branches bear each two terminal spines (pl. vi., fig. 3). The second pair are rather more dilated than the first, and both branches are similarly armed (pl. vi., fig. 3).

The fourth pair is composed of a single uniarticulate branch in the form of an elongated lamelliform plate which bears a few minute teeth round the distal end (pl. v., fig. 24).

The male, which resembles the female, but is considerably smaller, being scarcely half an inch in length, and the genital segment is also proportionally shorter (pl. vi., fig. 2); there is also a difference in the second and fourth pairs of thoracic legs, as shown in the drawing (pl. vi., figs. 5 and 6). In other respects the male is very similar to the female.

Habitat.—Taken from a sturgeon, *Acipenser sturio*, captured about 16 miles S.E. by E. of Aberdeen and brought into the Aberdeen Fish Market, December 29, 1904. The same species of *Dichelestium* has also been found by my son, Andrew Scott, on the gills of a sturgeon captured near Barrow-in-Furness, Lancashire. I am indebted to Mr. Bowman of Aberdeen for this further addition to the marine copepod fauna of Scotland.

The structure of the mouth organs, and especially of the mandibles, indicates a close relationship of *Dichelestium* with the Caligidæ.

Genus *Anthosoma*, Leach (1816).

Anthosoma crassum (Abilgaard). Pl. v., figs. 15 and 16.

- 1794. *Caligus crassus*, Abgd., Mém. de Copenhagen, *Act. Soc. Nat. Havn.*
- 1837. *Anthosoma Smithi*, Kröyer, Naturh. Tidsskr., 1st B., p. 295, Tab. ii., figs. 2 and 2a (♀).
- 1850. *Anthosoma Smithi*, Baird, Brit. Entom., p. 296, pl. xxxiii., fig. 9.
- 1861. *Anthosoma crassum*, Steenstrup and Lütken, Bidrag til Kundskab, p. 397, pl. xxii., fig. 24 (♂).

This interesting species was found on a shark, supposed to be a Porbeagle shark, *Lamna cornubica*, captured off the coast of Scotland by one of the trawling steamers that make only short runs from Aberdeen. The steamer, which captured the shark in October 1904, is one of those belonging to Mr. Davidson, Aberdeen, and is locally known as a "short tripper." Two specimens of the *Anthosoma* were obtained; one of them is a female with ovisacs, the other, which is smaller, is probably a male. The drawings, figures 15 and 16 on plate v., represent a dorsal and ventral view of the female. This specimen measured about 15 millimetres exclusive of the ovisacs, and about 62 millimetres—nearly $2\frac{1}{2}$ inches—to the extremity of these appendages.

The female, which is tolerably elongated, appears, when seen from above to be of an ovate outline; it is narrow in front, and a brownish horny shield, which gradually expands towards the posterior end, covers the head and a considerable portion of the thorax; an obscure constriction marks the junction of the head with the thorax; two large foliaceous elytraform, circular plates, the inner margins of which partly overlap each other on the dorsal aspect, cover entirely the remaining portion of the thorax not covered by the dorsal shield, and also the abdomen and furcal joints. These plates are ornamented by numerous minute scattered punctures or depressions, as shown in the drawing (fig. 15).

The antennules are short, slender, and composed of six joints which are very sparingly setiferous; but the antennæ—described by Baird as the first pair of footjaws—are strong and powerful; they are longer than the antennules and composed of three joints, and armed with strong, terminal, hook-like claws.

The first maxillipeds are slender and feeble, and appear to consist of three joints; they are provided with a small, terminal, claw-like spine.

The second maxillipeds are short, very stout and powerfully clawed.

The thoracic legs are in the form of thin and broadly foliaceous plate, each having a distinct notch on the inner margin.

The abdomen is short and the furcal joints narrow and moderately elongated, as in figure 16, which shows the ventral aspect of the specimen.

The shield is of a chitinous texture, of a brownish colour on the sides,

but merging into blackish brown along the middle and towards the proximal end; the elytraform plates and thoracic feet, which also appear to be chitinous, are whitish with a slight tinge of yellow.

I am indebted to Mr. Irvine for the opportunity of examining and describing this interesting species.

Drs. Steenstrup and Lütken in the work referred to above give a series of excellent figures illustrative of the structure of the male of *Anthosoma*, and it would appear from the description and figures of these authors that the large foliaceous and elytraform dorsal plates which cover the posterior part of the female are absent in the male.

FAM. LERNÆIDÆ.

Genus *Pennella*, Oken.

Pennella filosa (Linne).

- 1754. *Pennatula filosa*, Linn., Syst. Nat. et. Amœn. Acad., vol. iv.
- 1767. *Pennatula filosa*, Linn., Syst. Naturæ, Ed. 12, vol. ii., pp. 13–22.
- 1870. *Pennella Orthagorisci*, E. P. Wright, Ann. and Mag., Nat. Hist. (4), vol. v., p. 42, pl. 1.

The Rev. Canon A. M. Norman, to whom I am often indebted for information and help in Natural History research, has, with his usual kindness, permitted me to examine a specimen of this curious copepod parasite which he received many years ago from the late Thomas Edward of Banff, who found it on a short sunfish, *Orthagoriscus mola*, in the Moray Firth. The species is recorded in Smiles' Life of Edward, among the many other Natural History rarities mentioned at the end of that work, under the name of *Pennella fibrosa*. Linnaeus in his 12th Edition of *Systema Naturæ*, referring to the host of *Pennella filosa*, says, "Habitat in M. Mediterranei Xiphis."

Genus *Lernæa*, Linné (1767).

Lernæa lusci, Bassett-Smith. Pl. vi., fig. 18.

- 1896. *Lernæa lusci*, Bassett-Smith, Ann. and Mag. Nat. Hist. (6), vol. xviii., p. 13, pl. iv., fig. 6.
- 1904. *Lernæa lusci*, T. Scott, 22nd F.B. Rept., Pt. III., p. 277, pl. xvii., fig. 12 and 13.

A *Lernæa* apparently belonging to this species was found adhering to a small *Gadus luscus* sent to the Laboratory from the fish market at Aberdeen on January 12, 1905. The various species belonging to the genus *Lernæa* fix themselves to the gills or gill-arches of the fishes infested by them, but the specimen now recorded had its head buried in the flesh of the fish some distance behind the operculum, as shown in the drawing (fig. 18). This is the first example of the kind I have met with.

FAM. CHONDRACANTHIDÆ.

Genus *Sphyrion*, Cuvier (1830).

Sphyrion lumpi, Kröyer.

- 1863. *Lesteira lumpi*, Kr., Bidrag til Kundskab, Nat. Tidsskr., BR. 2 B., p. 325, Tab. xviii., fig. 5, a-g.

Sphyrion lumpi, T. Scott, 19th F.B. Rept., Pt. III., p. 128, vol. vii., fig. 13.

A fine specimen, the most perfect I have seen of this curious species, was presented to me by Mr. Irvine of Aberdeen; it was obtained by him on one of a number of catfishes, *Anarrhicas lupus*, landed at Aberdeen Fish Market from a Norwegian trawler. The fishes were captured in about 200 fathoms, and therefore beyond the limits of the Scottish area. An imperfect specimen was taken from a Lumpsucker captured in April 1900 in the nets of the salmon fishers near the Laboratory at Bay of Nigg, Aberdeen, and is described and figured in Part III. of the Nineteenth Annual Report of the Fishery Board for Scotland.

Genus *Chondracanthus*, De la Roche (1811).

Chondracanthus depressus, sp. n. Pl. vi., figs. 7-13.

Description of the Female.—This species resembles in its general appearance the *Chondracanthus fluræ* of the Long Rough Dab, *Drepanopsetta platessoides*, but it is more depressed. The cephalon, which is sub-quadrangular, is scarcely as long as broad, the next two segments are also wide and very short, while the last thoracic segment is distinctly constricted in the middle and very depressed; it is broader in proportion to its length than the same segment in *Chondracanthus fluræ*, being about as broad as it is long. The postero-lateral processes are somewhat narrow, cylindrical, and sigmoid, and curved inward so as to approach close to each other, and sometimes overlap (fig. 8). The abdomen is very short.

The specimen represented by the drawing (fig. 7) measures about 5 mm. ($\frac{1}{5}$ of an inch), exclusive of the ovisacs, which are tolerably short and thick.

The antennules are short and very robust; they are simple in structure; and the distal extremity, which appears to be obscurely jointed, bears scattered apical spinules (fig. 9).

The antennæ are somewhat similar to those of *Chondracanthus cornutus*.

The mandibles, which are stout, moderately elongated, and strongly curved, taper gradually to the attenuated distal extremity; they are each armed with a row of small but moderately stout denticles along each margin, as shown in the drawing (fig. 10).

The first maxillipeds are greatly dilated at the base, and the terminal joint, which is also stout, tapers to a blunted apex, the internal margin is coarsely toothed on the distal half (fig. 11).

Thoracic feet two pairs, short, stout, and bifid, or with two rudimentary branches; both branches are stout, but the outer is shorter and scarcely so much dilated as the inner. Though the first pair are as robust as the second they are scarcely so long; the two branches in both pairs are covered more or less with minute prickles, as shown in the drawings (figs. 12 and 13).

Habitat.—On the gills of the Flounder, *Pleuronectes flesus*, captured in the Firth of Forth and St. Andrews Bay.

This form differs from any of the species previously described by the very short anterior thoracic segments and by the last segment being depressed and of a broadly quadriform outline, as well as by the structure of the thoracic legs.

A form which appears to be a variety of the species just described, and which has also been observed on the same kind of fish, differs in being rather more elongated and less depressed. The antennules are larger, with a slightly different armature; the two pairs of thoracic legs are also larger and more robust, and the inner branches more distinctly triangular.

in outline. Only one or two specimens of this form have yet been observed, and as it resembles *Chondracanthus depressus* in some respects I record it for the present as variety *oblongus* of that species (see figs. 14–17, pl. vi.).

FAM. LERNÆOPODIDÆ.

Genus *Brachiella*, Cuvier (1817).

Brachiella triglae, Claus

1901. *Brachiella triglae*, T. Scott, 19th F.B. Rept., Pt. III., p. 133, pl. vii., figs. 24–29.

Habitat.—Obtained on the gills of a Streaked Gurnard, *Trigla lineata*, captured at Station VIII., Firth of Forth, in September, 1897, but only now recorded. The Forth is a new station for this species.

PART II.

ON SOME SPECIES OF TREMATODA NOT PREVIOUSLY RECORDED.

The ecto-parasitic vermes of fishes are not uncommon, but as many of them, and especially of the Trematoda, are of small size and more or less flattened, and as their colour approximates closely to that of the fishes on which they live, they are readily missed when the fishes are being examined.

There is evidently a considerable variety of forms among these Trematodes. That some of them are elegant in outline as well as in structure is shown by the beautiful drawings in MM. van Beneden and Hesse's work, *Recherches sur les Trematodes Marins*.

In the following notes I record a few curious forms exhibiting some peculiarities of structure which differ somewhat from those described in previous papers on these organisms, published in Part III. of the Annual Reports of the Fishery Board for Scotland for 1895, 1901, 1902, and 1904. I also give at the end of the present paper a list of all the species recorded in these various Reports.

TREMATODA.

FAM. POLYSTOMATIDÆ.

Genus *Phyllocotyle*, van Beneden and Hesse (1863).

Phyllocotyle gurnardi, van Beneden and Hesse. Pl. vi., figs. 19 and 20.

1863 *Phyllocotyle gurnardi*, v. Ben. and Hesse, Rech. sur les Trém., p. 103, pl. x., fig. 1–7 (not *Phyllocotyle gurnardi*, T. Scott in Part III. of the 19th Report, p. 147, pl. viii., fig. 23).

Under this name I record a species of Trematode found on the gills of specimens of the Grey Gurnard (*Trigla gurnardus*, Lin.) from the Moray Firth.

The body of this Trematode is lanceolate, very flat, and moderately slender at the anterior end, but becomes wider posteriorly; the distal end is rounded, and furnished on the ventral aspect with six marginal suckers of moderate size and of a rather complicated structure—three on each margin; an elongated process, slender and narrow, and with

parallel sides, springs from the rounded end ; this process is armed at the extremity with four hooked teeth, the two outer teeth are large and strong, with an expanded base, but the other two are smaller and more slender (fig. 20).

According to the authors of the *Recherches*, this species when extended measures about 5 mm., but in the specimen represented by the drawing (pl. vi., fig. 19, of this paper), the body is considerably contracted in length, and is consequently wider, the peduncle at the posterior end, which when fully extended is very slender and narrow, is also shortened in the specimen figured. This peduncle is very fragile, and is therefore occasionally incomplete, and for that reason, and also because it can be folded back under the body of the animal, it may at times easily escape being noticed.

Genus *Plectanocotyle*, Diesing.

Plectanocotyle Lorenzii, Monticelli.

1899. *Plectanocotyle Lorenzii*, Monticelli, Di una nova Specie del genre *Plectanocotyle*; Atti. R. Acad. delli Sci. di Torino vol. xxxiv., p. 1, pl. 1 (separate copy).

1901. *Phyllocotyle gurnardi*, T. Scott, 19th F.B. Rept., Pt. III., p. 147, pl. viii, fig. 23.

A Trematode recorded by me under the name of *Phyllocotyle gurnardi* in the Nineteenth Annual Report of the Fishery Board for Scotland (1901), was afterwards recognised as belonging to a species described by Dr. F. R. Sav. Monticelli two years previously under the name mentioned above.

This *Plectanocotyle* had been obtained by Dr. Lorenz some years before on a species of Gurnard, *Trigla* sp. The slender posterior peduncle, so characteristic of *Phyllocotyle gurnardi*, is apparently absent in *Plectanocotyle*. The Scottish specimens from *Trigla gurnardus* were examined by Dr. F. R. Sav. Monticelli, and recognised by him as belonging to the species he had described in 1899.

As already pointed out, the peduncle in *Phyllocotyle*, being so slender and fragile, is easily damaged, and when it gets torn off or folded under the body, and when the body is shortened by contraction—a contingency not uncommon when fishes infested by the parasites are preserved in spirit or formaldehyde—the one Trematode may easily be mistaken for the other.

Genus *Microcotyle*, van Beneden and Hesse (1863).

Microcotyle donavani, van Beneden and Hesse. Pl. vi., fig. 21.

1863. *Microcotyle donavani*, v. Ben. and Hesse, *Recherches*, p. 114, pl. xii., figs. 1-11.

This species was found on the gills of a Ballan Wrasse (*Labrus bergylta*, Ascan.), obtained by Dr. H. C. Williamson in the Moray Firth on October 23, 1904, and also on a Ballan Wrasse captured in the North Sea by Mr. Bowman.

The species is narrow and elongated, and at the posterior end there is a row of small suckers along each margin ; the number of suckers in each row appears to vary to a small extent. In the specimen represented by the drawing (fig. 21) the number in each row is about thirty-four.

Microcotyle donavani does not appear to be a rare form ; the authors of the *Recherches* state that it has been found in abundance on the

same species of *Labrus* in the month of March. Several specimens were found on the gills of the *Labrus* from the Moray Firth and from the North Sea, but none were very perfect. This species of *Microcotyle* is not only very slender, but is also without consistence, and therefore easily injured. The length of the specimen represented by the drawing is 5·3mm. Figure 22 is a front view of one of the suckers seen under a moderately high magnification.

Microcotyle labracis, van Beneden and Hesse. Pl. vi., fig. 21.

1863. *Microcotyle labracis*, v. Ben. and Hesse, Recherches, p. 112, pl. xii., figs. 12-18.

This species has a general resemblance to *M. donavani*, but differs in possessing about double the number of suckers at the posterior end (fig. 21). The structure of the oesophagean bulb also differs in the two species.

The length of the specimen represented by the drawing is about 7mm.

Habitat.—On the gills of the Bass, *Labrax lupus*. I am indebted to my son for specimens of this species.

FAM. GYRODACTYLIDÆ.

Genus *Diplectanum*, Diesing (1858).

Diplectanum aequans, Diesing. Pl. vi., fig. 24.

1858. *Diplectanum aequans*, Diesing, Revis. der Myzelm., p. 77.

1863. *Diplectanum aequans*, v. Ben. and Hesse, Recherches, p. 122, pl. xiii., figs. 9-22.

This Trematode is common on the gills of the Bass, *Labrax lupus*, but being very small it is easily missed. The length of the specimen represented by the drawing (fig. 24) is about 2mm.

In *Diplectanum aequans* the head is armed with two moderately strong hooked spines on each side of a deeply concave cleft; this cleft is occupied by a process thickly covered with minute prickles, as shown in the drawing.

I am indebted to my son for this small but interesting species.

The following is a list of species belonging to the Trematoda that have been described or recorded, and for the most part figured, in Part III. of the Annual Reports of the Fishery Board for Scotland. The species now recorded are included in the list. The names are arranged in alphabetical order.

Name of the Species.	Annual Report where published, and Number of Plate where figured.
<i>Acanthocotyle monticellii</i> , T. Scott,	20th Report ; Pl. xiii. ; 1902.
<i>Anthocotyle merluccii</i> , v. Ben. and Hesse,	19th " Pl. viii. ; 1901.
<i>Callocotyle kröyeri</i> , Diesing,	" " " "
<i>Dactycotyle pollachii</i> , v. Ben. and Hesse,	" " " "
<i>Diplectanum aequans</i> , Diesing,	Present Report ; Pl. vi. "
<i>Epidella hippoglossi</i> , O. F. Müller,	19th Report ; no figure.
<i>Heterocotyle pastinacæ</i> , T. Scott,	22nd " Pl. xvii. ; 1904.

Name of the Species.	Annual Report where published, and Number of Plate where figured.
<i>Microcotyle donavani</i> , v. Ben. and Hesse, <i>labracis</i> ,	Present Report; Pl. vi.
" <i>Octobothrium alosae</i> (Hermann), - - -	19th Report; Pl. viii.; 1901.
" <i>esmarkii</i> , T. Scott, - - -	" " No figure."
" <i>harengi</i> , v. Ben. and Hesse, - - -	" " Pl. viii.; 1901.
" <i>sombri</i> , Kuhn, - - -	13th " Pl. iv.; 1895.
" <i>merlangi</i> , Kuhn, - - -	19th " Pl. viii.; 1901.
<i>Onchocotyle appendiculata</i> , Kuhn,	Present Report; Pl. vi.
<i>Phyllocotyle gurnardi</i> , v. Ben. and Hesse,	19th Report; Pl. viii.; 1901.
<i>Phyllonella soleæ</i> ,	
* <i>Plectanocotyle lorenzi</i> , Monticelli, - - -	" " " "
<i>Pterocotyle morrhuae</i> , v. Ben. and Hesse, <i>palmata</i> , Leuckart, - - -	" " " "
<i>Thaumatocotyle concinna</i> , T. Scott, - - -	22nd " Pl. xvii.; 1904.
<i>Tristoma molæ</i> , Blanchard - - -	19th " Pl. viii.; 1901.
<i>Trochopus lineatus</i> , T. Scott, - - -	" " " "
<i>Udonella caligatum</i> , Johnston, - - -	" " " "

* Described in 1901 as *Phyllocotyle gurnardi*.

DESCRIPTION OF THE PLATES.

PLATE V.

Caligus abbreviatus, Kröyer.

Diam.

Fig. 1.	Female, dorsal view	.	.	.	.	.	x	14.
Fig. 2.	Female, young	.	.	.	.	.	x	27.
Fig. 3.	Antennule	.	.	.	.	.	x	72.
Fig. 4.	Sternal fork	.	.	.	.	.	x	120.
Fig. 5.	Second maxilliped	.	.	.	.	.	x	45.
Fig. 6.	Foot of fourth pair	.	.	.	.	.	x	108.

Lepeophtheirus sturionis, Kröyer.

Fig. 7.	Female, dorsal view	.	.	.	.	.	x	6·6.
Fig. 8.	Antennule	.	.	.	.	.	x	72.
Fig. 9.	Antenna	.	.	.	.	.	x	45.
Fig. 10.	One of the "palpi"	.	.	.	.	.	x	67·5.
Fig. 11.	Second maxilliped	.	.	.	.	.	x	45.
Fig. 12.	Sternal fork	.	.	.	.	.	x	90.
Fig. 13.	Foot of fourth pair	.	.	.	.	.	x	28.
Fig. 14.	Last segment of abdomen and furcal joints	.	.	.	.	.	x	31.

Anthosoma crassum, Abgld.

Fig. 15.	Female, dorsal view	.	.	.	.	.	x	6.
Fig. 16.	Female, ventral view	.	.	.	.	.	x	6.

Dichelestium sturionis, Hermann.

Fig. 17. Antennule, female	.	.	.	.	.	.	x	46.
Fig. 18. Antenna, female	.	.	.	.	.	.	x	17.
Fig. 19. Antenna, male	.	.	.	.	.	.	x	17.
Fig. 20. Mandible	.	.	.	.	.	.	x	60.
Fig. 21. Maxilla	.	.	.	.	.	.	x	46.
Fig. 22. First maxilliped, female	.	.	.	.	.	.	x	23.
Fig. 23. Second maxilliped, female	.	.	.	.	.	.	x	15.
Fig. 24. Foot of fourth pair, female	.	.	.	.	.	.	x	28.

PLATE VI.

Dichelestium sturionis, Herm.

Fig. 1. Female, dorsal view	.	.	.	.	.	.	x	4·6.
Fig. 2. Male, dorsal view	.	.	.	.	.	.	x	4·6.
Fig. 3. Foot of first pair, female	.	.	.	.	.	.	x	46.
Fig. 4. Foot of second pair, female	.	.	.	.	.	.	x	46.
Fig. 5. Foot of second pair, male	.	.	.	.	.	.	x	46.
Fig. 6. Foot of fourth pair, male	.	.	.	.	.	.	x	24.

Chondracanthus depressus, sp. n.

							Diam.
Fig. 7. Female, dorsal view	.	.	.	.	.	.	x 12.
Fig. 8. Posterior appendages of same	.	.	.	.	.	.	enlarged.
Fig. 9. Antennule	.	.	.	.	.	.	x 60.
Fig. 10. Mandible	.	.	.	.	.	.	x 260.
Fig. 11. First maxilliped	.	.	.	.	.	.	x 260.
Fig. 12. Foot of first pair	.	.	.	.	.	.	x 55.
Fig. 13. Foot of second pair	.	.	.	.	.	.	x 55.

Chondracanthus depressus, var. *oblongus*.

Fig. 14. Female, dorsal view	.	.	.	.	.	.	x	12.
Fig. 15. Antennule	.	.	.	.	.	.	x	60.
Fig. 16. Foot of first pair	.	.	.	.	.	.	x	55.
Fig. 17. Foot of second pair	.	.	.	.	.	.	x	55.

Lerneæ lusci, Bassett-Smith.

Fig. 18. Gadus lucus with parasite <i>in situ</i>	reduced
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Trematoda.

Fig. 19. <i>Phyllocotyle gurnardi</i> , v. Ben. and Hesse	x	45
Fig. 20. Extremity of peduncle of the same	x	260.
Fig. 21. <i>Microcotyle donavani</i> , v. Ben. and Hesse	.	.	.	.	.	.	x	27.
Fig. 22. The same—one of the posterior suckers	.	.	.	.	.	.	x	390.
Fig. 23. <i>Microcotyle labracis</i> , v. Ben. and Hesse	.	.	.	.	.	.	x	18.
Fig. 24. <i>Diplectanum aequans</i> , Diesing	.	.	.	.	.	.	x	45.



