1. A catalogue of land, fresh-water, and marine Crustacea found in the basin of the River Forth and its estuary.

2. A catalogue of land, fresh-water, and marine Crustacea found in the basin of the River Forth and its estuary. Part II.
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A CATALOGUE OF

LAND, FRESH-WATER, AND MARINE CRUSTACEA FOUND IN

THE BASIN OF THE RIVER FORTH AND ITS ESTUARY.

BY


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ABERDEEN.
(Read 27th March 1905.)

PART I.—MALACOSTRACA, CLADOCERA, AND BRANCHIURA.

INTRODUCTORY REMARKS.

(1) On the Drainage Area of the Forth.¹

The river Forth, from its source on the side of Ben Lomond to where it terminates in the estuary near Kincardine-on-Forth, measures about 64½ miles, and as the length of the estuary is about 48 miles, the total length, from the source of the river to the seaward limits of the estuary, is slightly over 112 miles. Leslie and Herdman describe the Forth estuary as extending to the Vale of Stirling, or about 8 miles farther west than the limit stated here.

The drainage area of the river, including its tributaries, is almost 628 square miles, while that of the estuary is about 1133 square miles, or about 1760 square miles altogether.

The average depth of the estuary scarcely exceeds 15 fathoms. There are one or two places where it reaches to about 40 fathoms, but these are very limited. A considerable portion of the estuary towards its seaward limits ranges from 15 to 30 fathoms in depth; but nowhere is there such deep water as in the Firth of Clyde.

The largest fresh-water lochs within the area are—Loch Katrine, Loch Vennachar, Loch Voil, Loch Lubnaig, and Loch Leven (Kinross). There are a number of smaller lakes, such as Loch Achray, Loch Ard, Lake of Menteith, and others, a few of which, though not yet examined, are

¹ The measurements, etc., given here are obtained chiefly from Part II. of the Twelfth Annual Report of the Fishery Board for Scotland (1894), which contains a map of the catchment-basins of all the Scottish rivers, with explanatory notes, giving the lengths of the various rivers, the areas of each river-basin, and other useful information derived from official sources.
not expected to add much to what is already known concerning the fresh-water Crustacea of the district. For a description of the physical geography of the estuary, see the Introduction to Parnell's *Fishes of the Firth of Forth*, and to Leslie and Herdman's *Invertebrate Fauna of the Estuary*.

(2) *On the History of the Crustacean Fauna of the Forth.*

**Contributions by Sir Robert Sibbald and Professor Jameson.**

Though Sir Robert Sibbald in 1710, and Professor Jameson in 1809, published lists of Forth Invertebrata which are of much interest, the number of Crustacea recorded by them is small, and consists for the most part of the larger species.

**Contributions by Harry Goodsir.**

The interesting field opened up by the researches of Harry Goodsir, and the success that attended his labours, might have directed some attention to the micro-crustacean fauna of the Firth of Forth, but the so-called "stalk-eyed" forms still continued to be the chief object of study. Even Professor Bell, in his work on the *British Stalk-eyed Crustacea*, could add little to what Goodsir had published on the Schizopoda and Cumacea, but simply transcribed that author's descriptions and drawings.

**Contributions by Dr James M'Bain.**

The lists of the flora and fauna of the Firth of Forth prepared by Dr James M'Bain, R.N., and which form part of the Appendix to the Rev. Walter Wood's *East Neuk of Fife*—a local but valuable work on the history and antiquities of that part of Fifeshire, published in 1862—marks an important stage in our knowledge of the natural history of the estuary, and, as the author remarks, the lists contained in that work are "more perfect than any which had hitherto been published."

In the list of Crustacea given on pages 375 and 376 of that work, thirty-two species are recorded, the names of which are as follow:

Inachus Dorsettensis.
Hyas araneus.
" coarctatus.
Eurynome aspera.
Cancer pagurus.
Carcinus maenas.
Portunus variegatus.
" depurator.
" marmoreus.
" pusillus.
Pinnotheres pisum.

Atelcyclus heterodont, now A. septemdentatus.
Corystes cassivelaunus.
Lithodes maia.
Pandalus annulicornis,
Pagurus Bernhardus.
" ulidianus,
" Forbesii,
" Hyndmanni,
" laevis,
Porcellana platycheles.
" longicornis.
Galatheia squamifera.
" strigosa.
" nesca.
Munida Rondeletii,
Homerus vulgaris,
Nephrops norvegicus.
Crangon vulgaris.
Hippolyte varians.
Mysis chamaeleon,

Dr M'Bain, when compiling his list, appears to have overlooked the discoveries of Harry Goodsir, published in 1843; for, with the exception of the Mysis chamaeleon, all the species recorded belong to the Decapoda. A second omission briefly noticed here, but which is more fully referred to in the sequel, is that of Calocaris Macandreae, Bell. This curious
species was obtained by Captain M'Andrew in the stomach of a haddock captured by him in the Firth of Forth in 1851. But the list, notwithstanding these omissions, is of considerable value, as giving a fairly accurate summary of what at that time was known concerning the Crustacea of the Forth estuary.

CONTRIBUTION BY LESLIE AND HERDMAN.

The next important contribution to the literature of the Forth Crustacea is contained in Leslie and Herdman's *Invertebrate Fauna of the Firth of Forth*, published in 1881. The authors have not only given the results of a large amount of original research, but they have incorporated, along with their own discoveries, the species recorded by previous observers, so that this work presents the most complete account of the Invertebrata of the estuary published up to that date. The list of Crustacea contained in it, though limited to the two sub-classes Cirripedia and Malacostraca, is considerably extended, and would doubtless have been much larger had the time at the disposal of the authors permitted them to take up the Entomostraca as well; but the animals belonging to this sub-class are, for the most part, microscopic, and on that account, and also because of their great numbers and variety, require a considerable amount of time and patience for their successful study.

Ninety-seven species of Crustacea are recorded in Leslie and Herdman's Catalogue, and they are arranged in the following order:

<table>
<thead>
<tr>
<th>Sub-class</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cirripedia</td>
<td>12</td>
</tr>
<tr>
<td>Amphipoda</td>
<td>20</td>
</tr>
<tr>
<td>Isopoda</td>
<td>10</td>
</tr>
<tr>
<td>Cumacea (Sympoda)</td>
<td>7</td>
</tr>
<tr>
<td>Stomatopoda (Schizopoda)</td>
<td>4</td>
</tr>
<tr>
<td>Decapoda</td>
<td>44</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>

Among the Cirripedia mentioned, one species—*Balanus tintinabulum*—is, as stated by the authors, "an inhabitant of the warmer seas, and its occurrence in the Forth is an accidental circumstance."

Among the Amphipoda, *Caprella lobata*, O. F. Müller, is now regarded as synonymous with *Caprella linearis* (Linn.).

Among the Isopoda, *Arcturus* (or *Astacilla*) *gracilis*, Goodsir, is considered by G. O. Sars to be the young of *A. longicornis* (Sow.).

Among the Cumacea, *Cuma Edwardsi*, Goodsir, has been shown to be synonymous with *C. scorpioides* (Montagu).

Among the Schizopoda, *Cynthia Flemingi*, Goodsir, is considered by Canon A. M. Norman to be probably identical with *Leptomysis lingvura*, G. O. Sars, and *Themisto brevispinosa*, Goodsir, to be probably the male of *Mysis (Macromysis) flexuosus* (Müll.).¹

*Themisto longispinosa*, Goodsir, Canon Norman is unable to identify—the description being insufficient.

These and similar changes in arrangement and nomenclature are, however, incidental to the more accurate knowledge we now possess concerning the animals themselves, as well as concerning the discoveries and writings of the earlier authors, but notwithstanding these changes, the work referred to is still indispensable to those who wish to become acquainted with the natural history of the Forth estuary.

**Contribution by Dr J. R. Henderson.**

A further contribution to the natural history of the estuary was made by Dr J. R. Henderson, in a paper read before the Royal Physical Society of Edinburgh in December 1884, entitled, "Recent Additions to the Invertebrate Fauna of the Firth of Forth." The number of species previously recorded was considerably increased, and as Dr Henderson's attention had been devoted chiefly to the Crustacea, the largest number of the additions occurred in this group. They are as follows:—

AMPHIPODA—13 Species, viz.:—

Hyale Nilssonii (Rathke).
Stenothoe pollexiana (Bate), now Metopa norvegica (Lillj.).
Amphelasma aequicornis, Bruzel
Iphimedia obesa, Rathke.
Pherusa bicuspis¹ (Kröyer), now Paramphithoe bicuspis (Kröyer).
Ph. fucicola, Leach, ?, Apherusa Jurinii (M. Edw.).
Calliopeus bidentatus, Norman, now Paramphithoe bicuspis (Kröyer).
Aora gracilis, Bate.
Noenia tuberculosa, Bate, Podoceropsis Sophia, Boeck.
Ph. excavata, Bate, exc. excavata (Bate).
Corophium tenuoicorne, Norman, Corophium affine, Bruzel.
Hyperia obliquia, Kröyer, Parathemisto obliquia (Kröyer).
Proto ventricosa, Müll., Phthisica marina, Slabber.

ISOPODA—3 Species.
Tanais vittatus, Rathke, now Tanais Cavolinii, M. Edw.
Jera albifrons, Leach.
Idotea linearis (Penn.).

CUMACEA (SYMPODA)—1 Species.
Diastylis lavis, Norman (previously recorded in Leslie and Herdman's Invertebrate Fauna as Alavna rostrata, Goodsir), now Diastylis rostratus (Goodsir).²

SCHIZOPODA—2 Species.
Nyctiphanes norvegica (M. Sars).
Podopsis Slabberi (V. Ben.), now Macropsis Slabberi.

DECAPODA—2 Species.
Hippolyte pusiola, Kröyer.
Eupagurus pubescens (Kröyer).

¹ Pherusa bicuspis is Bate's name, not Kröyer's; and though Pherusa bicuspis, Bate, was at one time considered to be synonymous with Kröyer's Amphithoe bicuspis (now Paramphithoe bicuspis (Kröyer)), it turns out, on the contrary, to be equivalent to Apherusa bispinosa (Bate).
² It is but right to state that though G. O. Sars regards D. lavis as identical with D. rostratus, Norman does not agree with that opinion (see note under that species).
It will be observed from the above list that twenty species, exclusive of the *Diastylis*, were at this time added to the Crustacean fauna of the estuary. Two undescribed species belonging to the Amphipoda were also found by Dr Henderson in 1884, but were not recorded till 1894; ere that time, however, they had been described by Professor G. O. Sars. They are entered in the present Catalogue under the names of *Sthenometopa robusta* (G. O. Sars) and *Paramphithoe monocupis*, G. O. Sars.

**Contributions by the Present Writer in the Reports of the Fishery Board for Scotland, etc.**

Although various groups of the Crustacea were receiving more attention than formerly, it was not till 1888 that a list of the Forth Entomostraca was published. In that year I contributed a small paper to the *Sixth Annual Report of the Fishery Board for Scotland*, entitled, "A Revised List of the Crustacea of the Firth of Forth," in which I gave the results of some researches extending over the autumn and winter of 1887, and these included a list of marine Entomostraca. For several years thereafter, my leisure time was devoted chiefly to the study of the Crustacea, and especially of the Entomostraca of the Forth estuary. The work assigned to me by the Fishery Board for Scotland afforded me opportunities for this study such as are seldom enjoyed by the student, and I desire to express my great obligation to the Fishery Board for the many favourable opportunities I have enjoyed for prosecuting the study both of the marine and of the fresh-water Crustacea of Scotland. The results of my researches, under the title of "Additions to the Fauna of the Firth of Forth," were published year by year in the Board's Annual Reports. The last of these papers (No. 8) was published in 1896, in Part III. of the Fourteenth Report. But though no papers have been published since 1896 dealing exclusively with Forth Crustacea, records of new or rare forms from the Forth have appeared occasionally in subsequent Reports, along with the descriptions of species from other parts of Scotland. Papers on the land and fresh-water
Crustacea of the district were also contributed by me to the *Proceedings of the Royal Physical Society* for 1890-94.

Some months ago I decided to collect all the scattered records of Forth Crustacea published by myself in the Annual Reports of the Fishery Board for Scotland and elsewhere, and, adding those published by other writers, or that have been supplied to me by friends interested in the natural history of the district, to prepare a catalogue of the land, fresh-water, and marine Crustacea known to occur within the limits of the basin of the river Forth and of its estuary, in the hope that it might be useful to other students, as former catalogues have been to myself.

**Contributions by Professor G. S. Brady, Rev. A. M. Norman, and David Robertson.**

In the preparation of this Catalogue, I have been indebted to a paper by Professor G. S. Brady and David Robertson on the "Ostracoda and Foraminifera of Tidal Rivers," and to the excellent monograph of "The Marine and Fresh-Water Ostracoda of the North Atlantic and North-Western Europe" by Brady and Norman, for a considerable number of Forth records of species belonging to that group.

**Contribution by Dr and Miss Sprague.**

An excellent paper on the Fresh-Water Crustacea of Mid-Lothian, by Dr and Miss Sprague, published in the *Transactions of the Edinburgh Field Naturalists and Microscopical Society* in 1901, has also been very helpful to me.

**Contributions by William Evans, F.R.S.E., and Mrs Janet Carphin.**

Mr William Evans, F.R.S.E., Edinburgh, has added one or two interesting species, notably the rare terrestrial Isopod, *Platyarthrus Hoffmannseggii*, to the Crustacean fauna of the Edinburgh district, and has also furnished me with a number
of additional localities for species already recorded; while Mrs Janet Carphin, in the course of her searches for land and fresh-water Mollusca in the district around Edinburgh, has been successful in capturing in the Union Canal the curious *Argulus foliaceus*—a Crustacean which is the only living representative in Scotland of the Branchiura, a suborder of the Branchiopoda.

One of the many discoveries made by my friend the late Mr James Bennie, of the Geological Survey, was the occurrence, near Edinburgh, of numerous remains of *Lepidurus (Apus) borealis* belonging to the Phyllopoda, which is also a suborder of the Branchiopoda. This discovery is the more interesting, as no living representative of that suborder is now known to occur in the British Islands.

With the assistance of the works referred to, and of friends interested in the natural history of the district, the compilation of this Catalogue has been more a pleasure than a task. It may also be stated that several valuable monographs of special groups of Crustacea published during recent years, have been of much service to me in the systematic arrangement of the species, and though reference to these will be found throughout the Catalogue, a few of the more important of them may be mentioned here, viz.:

*The Crustacea of Norway,* by Professor G. O. Sars of Christiania. Four volumes of this great work have already been published, viz.—Vol. I., the Amphipoda; Vol. II., the Isopoda; Vol. III., the Cumacea; and Vol. IV., the Copepoda-Calanoida. Vol. V., the Copepoda-Harpacticoida, is at present in course of publication.

*Résultats des Campagnes Scientifiques accomplies sur son Yacht par Albert 1er Prince Souverain de Monaco—Fascicule xvi., Amphipodes provenant des Campagnes de l'Hirondelle* by Edouard Chevreux.

*Contribution a l'étude des Épicarides: les Bopyridæ,* by M. Jules Bonnier.

*Les Copépodes du Boulonnaise,* by Dr Eugene Canu.

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Deutschlands freilebende Süßwasser-Copepoden, by Prof. Otto Schmeil.

Die Asterocheriden des Golfes von Neapel, by Dr W. Giesbrecht, of Naples.

The Choniostomatidae: A Group of Minute Parasitic Copepoda, by Dr H. J. Hansen.


Deutschlands Süßwasser-Ostracoden, by Dr G. W. Müller.

Cypriden und Darwinuliden der Schweiz, by Dr A. Kaufmann.

The work by the Rev. T. R. R. Stebbing, F.R.S., entitled A History of Crustacea, has been very helpful to me in the general systematic arrangement of the species, and especially of the Malacostraca.

My son, Mr Andrew Scott, A.L.S., has given me valuable assistance with the identification of the Entomostracan species; and I also am greatly indebted to my friend Mr F. G. Pearcey, for rich collections of micro-Crustacea from the Forth estuary and elsewhere.

The Map which accompanies this part of the Catalogue shows approximately the limits of the basin of the river and its estuary. It also shows approximately the positions of the ten Experimental Stations laid down by the Fishery Board for Scotland in the Firth of Forth, since many of the species recorded here were obtained at one or other of these "Stations." The Stations are marked in Roman numerals: Stn. I., Stn. IV., etc.

In arranging the species, I have followed the classification in Stebbing's Natural History of Crustacea (page 49), in which the Podophthalma have the first place, while the Cirripedia come last.

The following is the order in which the species in this part (Part I.) of the Catalogue are arranged.
Land, Fresh-Water, and Marine Crustacea.

Part I.

Sub-Class I.—MALACOSTRACA.

Order 1. Podophthalma, or Stalked-eyed Crustacea.

Suborder Brachyura, . . number of species, 19
" Macrura, . . " " 33
" Schizopoda, . . " " 26
Total number of species belonging to the Podophthalma, 78

Order 2. Edriophthalma, or Sessile-eyed Crustacea.

Suborder Sympoda (Cumacea), number of species, 21
" Isopoda, . . " " 42
" Amphipoda, . . " " 145
Total number of species belonging to the Edriophthalma, 208

Sub-Class II.—ENTOMOSTRACA.


Suborder Cladocera, . . number of species, 54
" Branchiura, . . " " 1
Total number of species belonging to the Branchiopoda, 55
" " recorded in this Part, 341

Part II. will contain a catalogue of species belonging to the Order Ostracoda, of which there are about 132 species,
" " Copepoda, of which there are about 300 "
the Sub-Class Cirripedia, of which there are about 13 "
and adding to these the number given above, viz., 341 "

The total number of species for the Forth at present known is about 786

In compiling this first part, should any species have been overlooked, or should any additional species occur before Part II. is published, they will be noticed in an Appendix to that part.
Sub-Class I. MALACOSTRACA.

Order 1. PODOPHTHALMA.

Suborder Brachyura.¹

Family CANCEODE.

Genus (1) Cancer, Linné, 1767.


Habitat.—Firth of Forth, from inshore to moderately deep water. Specimens have occasionally been captured in the trawl-net of the Fishery steamer "Garland," at all the experimental stations from above Queensferry to the mouth of the estuary.

Family PORTUNIDÆ.

Genus (2) Carcinus, Leach, 1813.

2. Carcinus mænas (Linné).


Habitat.—Common everywhere between tide-marks, especially where the shore is rough and provides suitable shelter; also occasionally found in moderately deep water.

Genus (3) Portunus, Fabricius, 1798.

3. Portunus puber (Linné).


Habitat.—Taken at the mouth of the estuary on deep-sea lines (Leslie and Herdman). This appears to be, so far, the only published record of this species for the Firth of Forth.

4. Portunus depurator (Linné).


Habitat.—Common throughout the estuary, and frequently associated with P. holsatus.

¹ In the nomenclature of this suborder, Bell's British Stalk-eyed Crustacea, 1853, has been generally followed.


_Habitat._—Firth of Forth (Dr Leach, as *P. lividus*). Commonly met with on the oyster-banks (Henderson).¹ Firth of Forth (White, 1857). One of the more common of the Forth Brachyuræ, but is not mentioned in Wood’s List.


_Habitat._—At Portobello and Musselburgh, found occasionally on the beach (Howden; L. & H.). Obtained amongst trawl refuse west of May Island (Mihi).


_Habitat._—Off Prestonpans (Howden). Firth of Forth, common (Norman; cf. White, _Brit. Crust._, 1857, p. 52). Leslie and Herdman say they have frequently dredged this species near Inchkeith (Invert. Fauna, p. 51). I have occasionally observed *P. pusillus* amongst the trawl refuse when at work in Largo Bay.

Genus (4) *Portumnus*, Leach, 1814.


Family _Corystidae_.

Genus (5) *Corystes*, Latreille, 1802.


_Habitat._—Off Inchkeith (M’Bain). Newhaven (C. W.  

Proceedings of the Royal Physical Society.

Peach). Near the Bass Rock (Metzger). Firth of Forth (Edin. Mus.). Aberlady and Kirkcaldy Bays (Leslie and Herdman). Aberlady and Portobello (W. Evans). I have occasionally observed this species among the trawl refuse when at work with the Fishery cruiser "Garland."

Genus (6) Atelecyclus, Leach, 1813.

10. Atelecyclus septemdentatus (Montagu).


Habitat.—Firth of Forth, rare (Goodsir). Firth of Forth (Edin. Mus.). Beach at Portobello (M'Bain). Found in the stomach of a cod-fish (Dr J. A. Smith,¹ and Leslie and Herdman). I have obtained A. septemdentatus on one or two occasions.

Family PINNOTHERIDÆ.

Genus (7) Pinnotherees, Latreille, 1802.

11. Pinnotherees pisum (Linné).


Habitat.—Taken off Longniddry and elsewhere (Leslie and Herdman). I have occasionally obtained living specimens—male and female—in the shells of large horse-mussels (Mytilus modiolus). Two females from M. modiolus, Prestonpans, Feb. 1905 (W. Evans).

Family MACIDÆ.

Genus (8) Macropodia, Leach, 1814.

12. Macropodia rostrata (Linné).

1853. Stenorynchus Phalangium, Bell, op. cit., p. 18.

Habitat.—Firth of Forth, at Prestoupsans (Edin. Mus.). Both Howden, and Leslie and Herdman record this species,

and describe it as generally distributed where the bottom consists of mud and sand. I have frequently obtained it in the neighbourhood of Inchkeith, and off Musselburgh. North Berwick, 1895 (W. Evans).

Genus (9) Inachus, Fabricius, 1798.


*Habitat.*—Howden records obtaining this species on fishermen’s deep-sea lines, but no locality is given.

14. *Inachus leptochirus*, Leach.


Family MAIDÆ.

Genus (10) Hyas, Leach, 1813.

15. *Hyas araneus* (Linne).


*Habitat.*—Firth of Forth, common in the littoral and laminarian zones.


*Habitat.*—Moderately common in the Firth of Forth, especially in the deeper water.

Family PARTHENOPIDÆ.

Genus (11) Eurynome, Leach, 1814.


*Habitat.*—Taken off Prestonpans and Port Seton (Howden).
Family Leucosiidae.

Genus (12) Ebalia, Leach, 1817.

18. Ebalia tuberosa (Pennant).

1853. Ebalia Pennantii, Bell, op. cit., p. 141.

Habitat.—Dredged off the west side of May Island, on moderately hard ground, scarce (Mihi).

19. Ebalia Cranchi, Leach.


Habitat.—Firth of Forth (Goodsir). Dredged twice in 25 fathoms about 2½ miles off Dunbar (F. M. Balfour; cf. Leslie and Herdman, Appendix, p. 106).

Suborder Macrura.

Family Lithodidae.

Genus (1) Lithodes, Latreille, 1806.

1. Lithodes maia (Linne).


Habitat.—Firth of Forth (Howden). Dr Neil obtained young specimens in the stomach of a cod-fish. Leslie and Herdman state that Lithodes is not uncommon near the mouth of the estuary. It has been taken, though sparingly, with the “Garland’s” trawl-net off the east and west sides of May Island.

Family Paguridae.

Genus (2) Eupagurus, Brandt, 1851.

2. Eupagurus bernhardus (Linne).

1853. Pagurus bernhardus, Bell, op. cit., p. 171.

Habitat.—Common in the Firth of Forth. The form recorded by Howden under the name of P. ulidianus, is regarded as a small or young E. bernhardus.1


*Habitat.*—Firth of Forth, occupying the shell of a *Turrettella* (F. M. Balfour). This species is apparently rare in the Forth estuary.


*Habitat.*—Taken west of May Island in 20 fathoms (Henderson). East of Inchkeith, 9 to 10 fathoms; apparently rare.


*Habitat.*—Dr Howden has recorded *Pagurus (Spiropagurus) Forbesii* from the Forth estuary; but Stebbing, in his *History of Crustacea*, p. 161, regards this as synonymous with *Eupagurus sculptimanus*, Lucas, the occurrence of which in the Forth is somewhat doubtful.1]

Genus (3) *Anapagurus*, Henderson, 1886.


*Habitat.*—Off Musselburgh and Prestonpans (Howden). I have occasionally obtained this species amongst the trawl refuse of the Fishery steamer “Garland.”

1 It is probable that a critical study of the smaller hermit crabs of the Forth estuary might show that some that are regarded as forms of common species may turn out to be distinct.


*Habitat.*—Firth of Forth (Howden). This species is of more frequent occurrence than the last; I have taken it both with the dredge and amongst trawl refuse, in different parts of the estuary.

**Family Porcellanidæ.**

Genus (4) *Porcellana*, Lamarck, 1801.


*Habitat.*—Moderately common, and generally distributed.


*Habitat.*—Taken at Crail and Fifeness at low-water (Howden). At Elie, and near North Berwick (Leslie and Herdman).

**Family Galatheidæ.**

Genus (5) *Galathea*, Fabricius, 1793.


*Habitat.*—Firth of Forth, moderately common (cf. Leslie and Herdman). In rock pools at North Berwick, January 1896 (W. Evans).


*Habitat.*—Off Port Seton (Howden).


*Habitat.*—Common "on the so-called oyster-banks" (Henderson).¹


**Habitat.**—Firth of Forth (Dr Anderson).°

14 *Galathea strigosa* (Linné).


**Habitat.**—Off the Bass Rock (Howden). Taken near Dunbar (Robert Gray). I have obtained one or two specimens of this species while at work on the Fishery steamer "Garland," but it did not appear to be very common in the estuary. North Berwick 1895, one specimen (W. Evans).

Genus (6) *Munida*, Leach, 1820.


**Habitat.**—Not uncommon at Dunbar (Robert Gray). Mr Evans informs me that in January 1896, Mrs Rickards, North Berwick, showed him several specimens which had been obtained there.

Family **Thaumastocheilidae**.

Genus (7) *Calocaris*, Bell, 1853.


**Habitat.**—Adam White, in his *Popular History of British Crustacea* (1857), p. 99, states that *Calocaris* was "found by Mr M'Andrew in Loch Fyne and the Mull of Galloway; and subsequently, when dredging in the Firth of Forth in 1851, he got a quantity of haddocks, the stomach and intestines of one of which were filled with it."

*Calocaris* does not appear to have again been observed in the Forth estuary till 1901, when it was obtained by Mr

F. G. Pearcey, while engaged with some special work on board the Fishery steamer "Garland." On this occasion it was obtained by him among the refuse of the trawl-net, and in the stomachs of a Long Rough Dab and one or two Witch Soles. White's record of the occurrence of Calocaris in the Forth seems to have been overlooked by subsequent writers on the Crustacea of the estuary.

Family **Nephropidæ**.

Genus (8) **Nephrops**, Leach, 1819.

17. *Nephrops norvegicus* (Linné).


*Habitat.*—Common, especially in the seaward part of the estuary. Two fine specimens at water's edge, Gullane Point, 2nd May 1890; one cast up during storm at Prestonpans, October 1898 (W. Evans).

Genus (9) **Astacus**, Leach, 1814.

18. *Astacus gammarus* (Linné).


*Habitat.*—Frequent in Firth of Forth. Lobsters in considerable numbers are captured by fishermen where the coast-line is rocky, and especially about the seaward limits of the estuary.

Tribe *Caridea*.

Family **Crangonidæ**.

Genus (10) **Crangon**, Fabricius, 1798.


*Habitat.*—Common in the littoral zone where the shore is sandy; taken occasionally with the dredge in moderately deep water.
20. **Crangon Allmani**, Kinahan.


*Habitat.*—Moderately common in the deeper parts of the estuary; it is also obtained occasionally in shallow water inshore. In 1862 Kinahan instituted a new genus (*Steiro-crangon*) for this species, but subsequent authors do not consider the characters on which the new genus is founded as sufficient to separate it from *Crangon*.


*Habitat.*—Taken near the Bass Rock (Metzger, German Exploring Expedition, 1872). I have obtained it in mid-channel east of May Island, off Prestonpans, off the west side of Inchkeith, and in Largo Bay.

22. **Crangon trispinosus**, Hailstone.


*Habitat.*—Firth of Forth, not common (Mihi).

23. **Crangon neglectus** (G. O. Sars).


24. **Crangon fasciatus**, Risso.

1816. *Crangon fasciatus*, Risso, Hist. Nat. Crust. de Nice, p. 82, pl. iii. fig. 5.


Family **NIKIDÆ**.

Genus (11) **Nika**, Risso, 1816.

25. **Nika edulis**, Risso.

1816. *Nika edulis*, Risso, Crust. de Nice, p. 85, pl. iii. fig. 3.

*Habitat.*—Taken at the mouth of the estuary by tow-net, rare.
Family *Hippolytidae*.

Genus (12) *Hippolyte*, Leach, 1813.


_Habitat._—In shore pools (Howden). Frequent in tidal pools west from Granton. Off the west side of May Island. *H. fascigera*, Gosse, which is now considered to be only a form of *H. varians*, has been taken at Cramond Island at the edge of low-tide.

Genus (13) *Spirontocaris*, Spence Bate, 1888.

27. *Spirontocaris spinus* (Sowerby).


_Habitat._—Common in the littoral and laminarian zones (Leslie and Herdman). I have occasionally obtained specimens in different parts of the estuary. *S. securifrons* (Norman), which differs chiefly in having the dorsal aspect of the abdomen even instead of the third segment terminating in a strong posterior dorsal tooth, is also occasionally obtained, but is regarded as a variety of the other.


_Habitat._—Newhaven, from the fishermen's lines (Henderson). I have dredged *S. pusiolus* west of Queensferry, in the neighbourhood of Inchkeith, off Musselburgh, and off St Monans. This is probably the species referred to by Dr Howden as being common off Crail.¹

29. *Spirontocaris Cranchii* (Leach).


_Habitat._—Rocks off Broxmouth, near Dunbar (F. M. Balfour; in Leslie and Herdman's, Invert. Fauna of Firth of Forth, p. 106).

1853. " pandaliformis, Bell, op. cit., p. 294.

Habitat.—Above Queensferry, and at one or two other parts of the estuary; not common.

Family Pandalidae.
Genus (14) Pandalus, Leach, 1814.

31. Pandalus Montagui, Leach.
1853. " annalicornis, Bell, op. cit., p. 297.

Habitat.—Firth of Forth, common, and generally distributed.

Genus (15) Pandalina, Calman, 1899.

32. Pandalina brevirostris (Rathke).
1837. Pandalus brevirostris, Rathke, Mem. présenté a l’Acad. de Petersb., t. iii.
1853. Hippolyte Thompsoni, Bell, op. cit., p. 290.

Habitat.—Firth of Forth (F. M. Balfour). I have obtained this species off the west side of Inchkeith, off Musselburgh, between Fidra and the Bass Rock, and in mid-channel west of May Island, but always sparingly.

Family Palæmonidae.
Genus (16) Leander, Desmarest, 1849.

33. Leander squilla (Linné).
1853. Palæmon squilla, Bell, op. cit., p. 305.

Habitat.—In rock pools near the mouth of the estuary, frequent (Leslie and Herdman). In rock pools, North Berwick, rather common, August 1897 (W. Evans).

Suborder Schizopoda.

For this group I have followed the arrangement and nomenclature of the Rev. Canon Norman’s “Revision of the British Species of Schizopoda,” published in Ann. and Mag.
Family Euphausiidae.

Genus (1) Nyctiphanus, G. O. Sars, 1883.

1. Nyctiphanus norvegica (M. Sars).

   Habitat.—Firth of Forth, young specimens not uncommon (Henderson). Nyctiphanes was usually scarce in our tow-net collections, but it appears to be scarcer some years than others.

Genus (2) Rhoda, G. Sim, 1872.

2. Rhoda Raschi (M. Sars).
   1872. Rhoda Jardineana, G. Sim, Scottish Naturalist, vol. i. p. 187, pl. iv. fig. A.

   Habitat.—Firth of Forth, moderately frequent, and generally distributed.

3. Rhoda inermis (Krøyer).
   1849. Thysanopoda inermis, Krøyer, Voyage in Scand., Crust., pl. vii. fig. 2, a-t.

   Habitat.—Firth of Forth, captured in 1892 and 1894.

Genus (3) Thysanoessa, F. Brandt, 1851.

4. Thysanoessa neglecta (Krøyer).
   1849. Thysanopoda neglecta, Krøyer, op. cit., pl. vii. fig. 3, a-d.
   1872. Thysanoessa aberdonensis, G. Sim, Scottish Naturalist, vol. i. p. 188, pl. v. figs. 1-8.

   Habitat.—Firth of Forth, frequent.

5. Thysanoessa longicaudata (Krøyer).
   1849. Thysanopoda longicaudata, Krøyer, op. cit., pl. viii. fig. 1, a-f.

   Habitat.—Firth of Forth, off St Monans, 1891; a few

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specimens were obtained mixed up with *T. neglecta*. *T. longicaudata* is very similar in general appearance to the more common *T. neglecta*, and therefore it may have occasionally been overlooked.

Genus (4) **Nematoscelis**, G. O. Sars, 1883.


1872. *Thysanoessa borealis*, Norman, M. S., in *Sim, Stalk-eyed Crust N.E. Coast of Scotland; Scottish Naturalist*, vol. i. p. 188.


**Habitat.**—Firth of Forth, 1892 [see Norman in *Ann. and Mag. Nat. Hist.* (June 1892), p. 464]. Off St Monans, one specimen, 28th May 1904.

Family **MYSIDÆ**.

Genus (5) **Siriella**, Dana, 1850.


**Habitat.**—Firth of Forth, near May Island, 1889, rare.

8. *Siriella jalensis* (Czerniavsky).


**Habitat.**—Taken at Joppa, September 1887, and subsequently at various other places, but always sparingly. The latest record I have is for Station V., where one or two specimens were captured on 24th April 1901.


**Habitat.**—Taken off St Monans in February 1889, and at Station III. in March 1892. It also occurred sparingly in the same gathering with *S. jalensis* from Station V. collected in April 1901. This *Siriella* has been observed in the Forth estuary more frequently than any of the other members of the genus.
Genus (6) Gastroscus, Norman, 1869.

10. Gastroscus spinifer (Goës).

1872. Acanthocaris Livingstoniana, G. Sim, Scottish Naturalist, vol. i. p. 185, pl. iv. fig. 8, 1-7.

Habitat.—Obtained frequently in surface tow-net gatherings collected off Bo'ness in 1887-88, and subsequently at various places throughout the estuary.

Genus (7) Heteromysis, S. I. Smith, 1873.


Habitat.—One or two specimens were captured off the east side of Inchkeith in October 1888. Taken also at Station I. in August 1894, and at Station IV. on 27th February 1895.


12. Erythrops erythrophthalmus (Goës).


Habitat.—Frequent in all parts of the estuary between Inchkeith and May Island, especially during the winter and spring.


Habitat.—Firth of Forth, 1901, taken very sparingly on one or two occasions.


Habitat.—Obtained in 1889 in the neighbourhood of the Bass Rock, rare.


*Habitat.*—Taken in the Firth of Forth in November 1888, and subsequently on various occasions, and in different parts of the estuary, but always sparingly.


*Habitat.*—Firth of Forth, frequent. It has been taken in Granton Harbour, as well as at several of the Experimental Stations (cf. Sixteenth F. B. Rept., pt. iii. p. 209, 1898).


*Habitat.*—Captured very sparingly at Stations I., III., and V., not more than one or two specimens being obtained in any single gathering.

Genus (10) Leptomysis, G. O. Sars, 1869.


1869. *Leptomysis gracilis*, idem, Undersøgelser over Christianiafjordens, Dybvandsfauna, p. 29.

*Habitat.*—Captured off the east side of Inchkeith, off St Monans, and in the vicinity of Fidra, in October and November 1888, and subsequently at nearly all the Experimental Stations.


*Habitat.*—Obtained in a tow-net gathering collected off
Joppa in September 1887; off the east side of Inchkeith in March 1892, and also in other parts of the estuary, but always very sparingly.


20. Hemimysis Lamorna (Couch).


Habitat.—Collected off Bo’ness in November 1887; Largo Bay, December 1888; and afterwards at nearly all the Experimental Stations. This species, when living, is readily observed by its brilliant red colour.

Genus (12) Macropsis, G. O. Sars, 1876.

21. Macropsis Slabberi (Van Beneden).


Habitat.—Firth of Forth below Grangemouth, 1884, and subsequently near Granton Quarry, Inchmickery, and Inchkeith (Henderson). Common off Bo’nness and off Musselburgh, but becoming gradually scarcer seaward, and rarely taken at the mouth of the estuary.

Genus (13) Macromysis, White, 1847.


Habitat.—Common, especially inshore, off Musselburgh and in the upper parts of the estuary. (See Norman, op. cit., for a list of synonyms.)

23. Macromysis inermis (Rathke).


Habitat.—Off Bo’nness in November 1887, and in February

1 Cf. Stebbing on the name of the genus in A History of Crustacea, p. 267 (1898).
1895. I have also observed it at Stations V., VIII., and IX., though somewhat sparingly.

Genus (14) Schistomysis, Norman, 1892.


*Habitat.*—Off Bo'ness in November 1887, and subsequently at nearly all the Experimental Stations. Moderately frequent.


*Habitat.*—Off Bo'ness in November 1887, with the others recorded above, and at nearly all the Experimental Stations.

Genus (15) Neomysis, Czerniavsky, 1882.


*Habitat.*—Moderately common in some parts of the estuary, as west of Queensferry and off Musselburgh. I have also captured it in Granton Harbour. In shoals at the mouth of Belhaven Burn, September 1905 (Evans).

Order 2. EDRIOPHTHALMA.

Suborder *Sympoda*. ¹

In the preparation of this part of the Catalogue, I have adhered more or less closely to the arrangement and nomenclature of Sars *Crustacea of Norway*, vol. iii., published 1899-1900. See also a paper by myself in the *Annals of Scottish Natural History* for October 1900.

¹ See remarks on this group by Rev. T. R. R. Stebbing, in his account of the *Crustacea brought by Dr W. H. Lay from the South Seas*, published by the Cambridge University Press, December 1900.
Family **Bodotriidæ.**

Genus (1) **Bodotria**, Goodsir, 1843.

1. **Bodotria arenosa**, Goodsir.


**Habitat.**—Firth of Forth, 1841-42 (Goodsir).

2. **Bodotria scorpioides** (Montagu).


**Habitat.**—Firth of Forth (Goodsir). Largo Bay (Leslie and Herdman). Dredged off Musselburgh and a few other places.

3. **Bodotria pulchella** (G. O. Sars).


**Habitat.**—Off St Monans, Largo Bay, and in the neighbourhood of Fidra; moderately common.

Genus (2) **Cumopsis**, G. O. Sars, 1879.

4. **Cumopsis Edwardsii** (Spence Bate).


**Habitat.**—Taken at Joppa, in pools between tide-marks, in 1888. Captured with bottom tow-net at Station III., in September 1891, and subsequently in various other parts of the estuary.

Genus (3) **Iphinoë**, Spence Bate, 1856.

5. **Iphinoë trispinosa** (Goodsir).


**Habitat.**—Firth of Forth (Goodsir). Bass Rock, 24
fathoms (Metzger). This species is not rare in the Forth estuary, especially inshore, where the bottom consists of muddy sand.

**Family Vaunthompsoniidae.**

Genus (4) Vaunthompsonia, Spence Bate, 1858.


_Habitat._—Off the west side of May Island on 11th March 1896. This appears to be a rare species in the Forth estuary.

**Family Lampropsidae.**


_Habitat._—Near Joppa, frequent between tide-marks; also taken in Granton Harbour. It is not uncommon in shallow inshore water, where the bottom is muddy sand.

**Family Leuconidae.**

Genus (6) Leucon, Kröyer, 1846.


_Habitat._—More or less frequent all over the estuary; its distribution appears to be somewhat irregular, due in part, perhaps, to seasonal variation. My latest record of the species is for Station V., where it was captured on 26th April 1901.

Genus (7) Eudorella, Spence Bate, 1867.


_Habitat._—Taken in deep water near the seaward limits of the estuary; not common.


*Habitat.*—Firth of Forth, sparingly distributed; my latest record is for Station III., where it was collected on 23rd May 1901. Immature specimens are not uncommon, but adults of either sex are rare.


*Habitat.*—Taken off St Monans and in Aberlady Bay, 1890; not common. This species, though somewhat rare, is widely distributed.

Family *Diastylidae*.

Genus (9) *Diastylis*, Say, 1818.


*Habitat.*—Not very rare in the Firth of Forth. A considerable number of specimens were captured by the dredge off the west side of Inchkeith in 1888: both females and adult males were present in this gathering. Prof. G. O. Sars mentions (*Crustacea of Norway*, p. 108) that the drawings of the male on plate lxxii. of his fine work on this group were prepared from a Forth specimen. Adam White, in his *Popular History of British Crustacea*, considered the *Alauna rostrata* of Goodsir to be synonymous with *D. Rathkei* (Kröyer),—an opinion which is also shared by Canon Norman.


*Habitat.*—Generally distributed, but not common. It has been taken in Largo Bay, off St Monans, off North Berwick, and in the deep water west of May Island.


**Habitat.**—It has been taken very sparingly off the west side of Inchkeith, and at Stations V. and VII.; not common.

15. *Diastylis rostratus* (Goodsir).


**Habitat.**—Firth of Forth (Goodsir). Off Fidra, in 12 fathoms (Henderson). I have obtained *Diastylis levis*, Norman, at Experimental Stations III., V., VI., and VII., but always very sparingly.


**Habitat.**—Off North Berwick, in 10 to 15 fathoms; captured in March 1891, but not identified till 1900. The species was described from specimens taken by Norman in Shetland in 1863. It was subsequently discovered in the Moray Firth by Thomas Edward of Banff, and in the Firth of Clyde by Dr Robertson of Millport, Cumbrae.

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**Family PSEUDOCUMIDÆ.**

**Genus (10) Pseudocuma, G. O. Sars, 1864.**

17. *Pseudocuma cercaria* (Van Beneden).


**Habitat.**—Common, and generally distributed in the Firth.


**Habitat.**—Firth of Forth, apparently rare, but it resembles

1 Canon Norman considers that the *Alauna rostrata* of Goodsir is not the same as his *Diastylis levis*, but is rather synonymous with Kröyer's *D. Rathkei* as stated above. If that is so, *D. levis* will have to be restored for this species.

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the common *Pseudocuma cercaria* so closely that it is easily overlooked. The specimens I have were dredged at Station V., on 24th April 1901.


*Habitat.*—Dredged in Largo Bay in March 1891; in the neighbourhood of May Island on 14th April 1893, and very sparingly in other parts of the estuary.

Family NANNASTACIDÆ.


*Habitat.*—Taken at Station VI. (off St Monans), in May and again in July 1901; rare. This is a minute species, and easily missed; it may therefore be more frequent in the Forth estuary than at present it appears to be.

Family CAMPYLASPIDÆ.


*Habitat.*—Taken in the neighbourhood of the Bass Rock in 1889, and at Station V. on 30th August 1894. It has also been taken off the east side of May Island, but always very sparingly. This appears to be a deep-water species, and is usually found on a muddy bottom.

Suborder Isopoda.

The work I have followed in the arrangement and nomenclature of the Isopoda is Prof. G. O. Sars' *Crustacea of Norway*, vol. ii. (1896-1899).
The Rev. Canon Norman's papers on "British Land Isopoda" and "British Isopoda Chelifera" [in *Ann. and Mag. Nat. Hist.* (7), vol. iii. (January and April 1899)] have been useful to me in the preparation of this section of the Catalogue, and to shorten the synonymy the reader is referred to these works; also to a paper by myself in the *Annals of Scottish Natural History* for October 1898.

**Chelifera.**

**Family Tanaiidae.**


*Habitat.*—Taken at May Island and Dunbar, about half tide, living chiefly among mussels (Henderson).

Genus (2) *Paratanais*, Dana, 1852.


*Habitat.*—Off North Berwick, December 1892; dredged off North Craig, near Inchkeith, in 10 to 12 fathoms on 4th July 1901, apparently rare.


*Habitat.*—Firth of Forth, 1894; rare. This specimen, though collected in 1894, has only recently been identified.


*Habitat.*—Taken in 1891 and 1892. Station VII., in 17
fathoms, 9th July 1901. This, like the species already recorded, was obtained in the deeper parts of the estuary.

5. *Leptognathia breviremes* (Lilljeborg).


*Habitat.*—Firth of Forth, 1891 and 1892; moderately rare.


*Habitat.*—Largo Bay, and off Musselburgh, in 1891. Off North Berwick in December 1892. Off Aberdour, November 1893; apparently rare.

7. *Leptognathia longiremis* (Lilljeborg), var.


*Habitat.*—Off North Berwick, December 1892 and January 1894. Off Musselburgh, 30th May 1891, and in the neighbourhood of the Bass Rock on 9th July 1891. This form, as shown by the drawings in the *Fishery Board Report* referred to, differs from the typical *L. longiremis* by the apparent absence of the lateral denticles on the terminal segment of the metasome, and, moreover, the antennules in the female are sometimes composed of five instead of four joints. Perhaps *variety varia* might be a suitable name for this form.¹

**Genus (5) Tanaopsis, G. O. Sars, 1896.**


*Habitat.*—Firth of Forth, 1891. Dredged at Station III. on 23rd May, and at Station VII., in 17 fathoms, on 9th July 1901.

¹ As there are no specimens in my collection of the *Leptognathia rigida*, Spence Bate, mentioned in my *Notes on some Scottish Marine Isopods*, I am unable to verify the record, and prefer, therefore, to exclude it from the present Catalogue.
Land, Fresh-Water, and Marine Crustacea.

Flabellifera.

Family Gnathidae.

Genus (6) Gnathia, Leach, 1814.


Habitat.—Near Inchkeith, 1888, and subsequently in various parts of the estuary; the female being more frequently met with than the male.

Family Eurydineae.

Genus (7) Eurydice, Leach, 1815.

10. Eurydice pulchra, Leach.


Habitat.—Taken off Preston Island, west of Queensferry, 28th November 1887; and at Station III., November 1890. I have not met with this species very frequently in the Forth estuary.

Family Limnoriae.

Genus (8) Limnoria, Leach, 1814.

11. Limnoria lignorum (Rathke).


Habitat.—Firth of Forth, at Elie (Leslie and Herdman). Common, burrowing in old wood of piers, wharves, etc., exposed between tide-marks on both sides of the estuary.
Family Sphæromidae.

Genus (9) Sphæroma, Latreille, 1802.

12. Sphæroma rugicauda, Leach.


 Habit.—In brackish pools at Aberlady; common.

Genus (10) Næsa, Leach, 1818.


Valvifera.

Family Idotheidae.

Genus (11) Idothea, Fabricius, 1798.


1774. Oniscus balticus, Pallas, Spicil. Zool., fasc. ix. p. 66, pl. iv. fig. 6, A-D.


 Habit.—Firth of Forth, in shallow water at various places (Leslie and Herdman). Moderately common upon Laminaria and other sea-weeds in shallow water on both sides of the estuary.

15. Idothea pelagica, Leach.


 Habit.—"Common on the Bell Rock in the Firth of Forth" (Bate and Westwood, op. cit., p. 385). "Bell Rock" is doubtless, I think, a misprint for Bass Rock, for it is described as being "in the Firth of Forth," whereas the Bell Rock is 13 or 14 miles north by east of Fife Ness, the extreme limit of the Forth estuary on the north side.
16. *Idothea emarginata* (Fabricius).


**Habitat.**—Aberlady Bay, 1888. Station I., 23rd May 1891. Occasionally obtained with *I. baltica* amongst Laminaria at various places within the estuary.

17. *Idothea linearis* (Linné).


**Habitat.**—Occasionally at Newhaven (Henderson). Off Crail, 1888. Station X. (west of Queensferry), 31st August 1894, and 26th April 1901. Station IV., 22nd April 1901. Several of the specimens are adorned with longitudinal light and dark lines (cf. form *I. sexlineata*, Kröyer).

**Family ARCTURIDÆ.**

Genus (12) *Astacilla*, Cordiner, 1795.

18. *Astacilla longicornis* (Sowerby).

1806. *Oniscus longicornis*, Sow., British Miscellany, Taf. 19

**Habitat.**—Firth of Forth (Goodsir). Off Dysart, T. W. Simmons (cf. Bate and Westwood, *op. cit.*, vol. ii. p. 369). Moderately frequent in the estuary, and generally distributed. G. O. Sars considers the *A. gracilis* of Goodsir to be the male of *A. longicornis*.

19. *Astacilla intermedia* (Goodsir).


**Habitat.**—Taken off Anstruther (Goodsir). This is the

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1 As *Astacilla*, Cordiner, was instituted in 1795, and *Arcturus*, Latrille, in 1804, the family name should perhaps be *Astacillidæ*, from the older genus.

2 James Sowerby, "British Miscellany; or, Coloured Figures of New, Rare, or Little-Known Animal Subjects, many not before ascertained to be Natives of the British Isles." London, 1806, 8vo.
Proceedings of the Royal Physical Society.


Genus (13) Arcturella, G. O. Sars, 1897.


Habitat.—Dredged off St Monans, 22nd May 1901; only a single male specimen was obtained.

ASELLOTA.

Family ASELLIDÆ.

Genus (14) Asellus, G. St Hillaire, 1764.


Habitat.—Pond at Redbraes, near Edinburgh, "in remarkable profusion" (Sir J. Dalyell). Very common in Union Canal, near Gilmore Place, Edinburgh (1889-90); Duddingston Loch (1897). Marchfield Pond, very common (Dr and Miss Sprague, July 1900). Braid Burn; Peffer Burn, near Aberlady, etc. (W. Evans). Upper Elf Loch, Braid Hills, common in 1905 (W. Evans).

· Family JANIRIDÆ.

Genus (15) Janira, Leach, 1813

22. Janira maculosa, Leach.


Habitat.—Firth of Forth, off Bo'ness, 1887. Taken at Station IX. in April 1870, and subsequently at other stations, but always very sparingly.

Genus (16) Jøra, Leach, 1813.


Habitat.—Common at May Island and Granton Quarry
under stones, near high-water mark (Henderson). Dredged off Inchkeith; taken between tide-marks at Joppa and other places; frequent. South Queensferry (Evans). Sars is somewhat doubtful whether the form figured by Bate and Westwood under the name of Jæra Nordmanni, Rathke, is the true Rathkian species, or more probably the male of Jæra marina.

Family Munniæ.

Genus (17) Munna, Boeck, 1839.


Habitat.—Firth of Forth (Goodsir). Off the west side of Inchkeith (1887). Dredged at Station III., and at the north-west end of Inchkeith, in May 1901; not very common.

Genus (18) Paramunna, G. O. Sars, 1866.


Habitat.—Firth of Forth, 1894. Moderately rare in dredged material from Stations VI. and III., and from the north-west end of Inchkeith, collected by F. G. Pearcey in May 1901.

Genus (19) Pleurogonium, G. O. Sars, 1871.¹


Habitat.—Firth of Forth, 1894 and 1895; rare.

¹ The Rev. Canon Norman, in a paper entitled "A Month on the Trondhjem Fiord" (Ann. and Mag. Nat. Hist. (6), vol. xiii. p. 281), remarks, "The genus Leptaspidia, Bate and Westwood, is, I think, unquestionably a synonym of Pleurogonium." Moreover, it seems to me that Bate and Westwood's text-figure of Leptaspidia resembles Pleurogonium inerme more closely than any other species of the genus.


*Habitat.*—Taken off Musselburgh, April 1891.


*Habitat.*—Taken at the north-west end of Inchkeith, 23rd May 1901; rare.


29. (?) *Eurycope mutica*, G. O. Sars.


*Habitat.*—Firth of Forth, near the Bass Rock, in 20 fathoms, 28th June 1904; two specimens that appear to belong to this species—one of them an ovigerous female—were obtained.

**Oniscoida.**

"This tribe comprises the air-breathing or terrestrial Isopoda" (G. O. Sars).

**Family Ligidae.**

Genus (21) *Ligia*, Fabricius, 1798.


*Habitat.*—Cramond, 1888 (Mihi). Aberlady, November 1891; North Berwick, August 1897; and shore at Dalmeny, March 1901 (W. Evans). Also at Granton and other places, under stones on the shore.
Family **Trichoniscidae**.

Genus (22) *Trichoniscus*, Brandt, 1833.


**Habitat.**—Under stones at St Margaret's Hope, Cramond Island, Arthur's Seat, Largo, and other places; moderately frequent. Generally distributed (W. Evans).


1838. *Itea rosea*, Koch, Deutschlands Crustaceen, p. 22, fig. 16.


Family **Oniscidae**.

Genus (23) *Oniscus*, Linné, 1761.

33. *Oniscus asellus*, Linné.


**Habitat.**—Common everywhere, usually hiding under stones, old wood, etc. *O. fossor*, Bate and Westw., is now regarded as a form of *O. asellus*.

¹ On the occasion of this visit to Cramond Island in April 1888, a friend and I crossed over to it about 1 a.m. — just before the track was covered by the rising tide — and we remained on the island till the tide ebbed and began to flow again. The interval from the time that daylight made things visible till we recrossed to the mainland, was spent in searching for natural history objects, and especially for the smaller Crustacea, and with fairly satisfactory results.
Proceedings of the Royal Physical Society.

Genus (24) Philoscia, Latreille, 1804.

34. Philoscia muscorum (Scopoli).


Habitat.—Under stones, among dead leaves, etc.; common, and generally distributed.

Genus (25) Platyarthrus, Brandt, 1833.

35. Platyarthrus Hoffmannseggii, Brandt.


Habitat.—Near Inverkeithing, Fifeshire, “in nests of the common ashy-black ant, Formica fusca” (W. Evans, Edinburgh). The only other Scottish record for this curious species is that by Thomas Edward, of Banff, in the list of Crustacea in Smiles’ Life of Edward.

Genus (26) Porcellio, Latreille, 1804.

36. Porcellio scaber, Latreille.


Habitat.—Under stones, old wood, etc., everywhere.

37. Porcellio pictus, Brandt.

1830. Porcellio pictus, Brandt and Ratzeburg, Medicin. zoologie, vol. ii. p. 78, pl. xii. fig. 5.


Habitat.—At the foot of a wall near Seafield, Leith, April 1888; apparently rare. Taken under a stone near Dunbar in 1904 (W. Evans).

Genus (27) Cylisticus, Schnitzler, 1853.

38. Cylisticus convexus (De Geer).


Habitat.—Under stones at the foot of Salisbury Crags,
Land, Fresh-Water, and Marine Crustacea. 141

14th April 1888, and subsequently; not common. Foot of Salisbury Crags (W. Evans).

Family *Armadillidiidae*.

Genus (28) *Armadillidium*, Brandt, 1830.


*Habitat.*—Under stones at Salisbury Crags. Salisbury Crags, Blackford Hill, Pettycur, St David’s (Fife), etc. (W. Evans).

**Epicarida.**

The Epicarida are but poorly represented in this “Catalogue of Forth Crustacea,” and further careful research should add considerably to this group.

Family *Bopyridae*.

Genus (29) *Athelges*, Hesse, 1861.

40. *Athelges paguri* (Rathke).


*Habitat.*—Firth of Forth, parasitic on *Eupagurus bernhardus* (Dr J. Anderson).

Genus (30) *Phryxus*, Rathke, 1843.

41. *Phryxus abdominalis* (Kröyer).

1840. *Bopyrus abdominalis*, Kröyer, Nat. Tidsskr., vol. iii. p. 102, pls. i. and ii.

*Habitat.*—Firth of Forth, off St Abb’s Head, 40 fathoms (Metzger). Station III., parasitic on *Pandalus Montagui*, Leach, 9th May 1901.
Family Cryptoniscidæ.

Genus (31) Cryptothir, Dana, 1852.

42. Cryptothir balani, Spence Bate.


Habitat.—Firth of Forth, parasitic on Balanus balanoides (inside the shell). This is one of the interesting additions to the fauna of the Firth of Forth by H. D. S. Goodsir. I obtained a single specimen of this curious parasite at East Tarbert, Loch Fyne, on the same kind of barnacle.

Suborder Amphipoda.


Hyperidea.

Family Hyperiidae.

Genus (1) Hyperia, Latreille, 1825.

1. Hyperia galba (Montagu).


Habitat.—Frequent and generally distributed; often found associated with Aurelia cyanea and other large Medusæ.

Genus (2) Hyperoche, Bovalius, 1887.

2. Hyperoche tauriformis (Bate and Westwood).


Habitat.—Generally, though sparingly, distributed throughout the estuary.
Genus (3) Parathemisto, Boeck, 1870.

3. Parathemisto oblivia (Kröyer).

1838. Hyperia oblivia, Kröyer, Grønlands Amhipoder, p. 70, pl. iv. fig. 19.

Habitat.—Generally distributed, usually more or less frequent, and at times abundant, especially in the seaward part of the estuary, and particularly in winter and spring.

Genus (4) Euthemisto, Bovalius, 1887.

4. Euthemisto compressa (Gröss).

1865. Themisto compressa, Göös, Öfvers k. Vet.-Akad. Forhandl., p. 533, pl. xli. fig. 34.

Habitat.—Taken sparingly off the west side of May Island in February 1892 and November 1893; and at Station VII. (off North Berwick) in November 1892. These were probably stragglers from the great shoal of Euthemisto reported off the Yorkshire coast in February 1892. ¹

Gammaridea.

Family Orchestiidae.

Genus (5) Talitrus, Latreille, 1802.

5. Talitrus locusta (Pallas).

1772. Oniscus locusta, Pallas, Spicilegia Zoologica, fasc. 9, pl. iv. fig. 7.

Habitat.—“Very abundant about high-tide mark among stones, seaweed, etc.” (L. and H.). I have taken T. locusta near Dunbar. At high-water mark sandy beaches, Gullane and North Berwick (Evans).

Genus (6) Orchestia, Leach, 1814.

6. Orchestia littorea (Montagu).


Habitat.—Common on the shore west from Granton amongst decaying seaweed at about high-tide mark. Taken also on the shore near Dunbar. Aberdour and Prestonpans (Evans).

¹ Cf. T. H. Nelson in Naturalist for May 1892.
Proceedings of the Royal Physical Society.

Genus (7) *Hyale*, Rathke, 1837.


*Habitat.*—“Granton Quarry, common; May Island, near high-water” (Henderson). West of Queensferry, rare.

[8. *Hyale (Nicea) Lubbockiana* (Spence Bate).

This species is recorded among my notes of Amphipoda dredged off St Monans in 1889, but no specimens are in my collection, and I am unable to verify the record.]

Family **Lysianassidae**.

Genus (8) *Acidostoma*, Lilljeborg, 1865.

9. *Acidostoma obesum* (Spence Bate).


*Habitat.*—Dredged between Fidra and the Bass Rock in 1893, and on 9th July 1901; it has also been dredged off St Monans, but always very sparingly.

Genus (9) *Socarnes*, Boeck, 1870.

10. *Socarnes Vahli* (Kröyer).


*Habitat.*—Firth of Forth; very rare.

Genus (10) *Calisoma*, A. Costa.


1863. "" *crenata*, Bate and Westw., Brit. Sessile-eyed Crust., vol. i. p. 120.

*Habitat.*—Moderately common in the Firth of Forth; it occurs sometimes in abundance inside the dead tests of *Amphidolus* and *Spatangus*, feeding on the decaying animal matter; also on dead fishes.
Genus (11) Hippomedon, Boeck, 1870.

12. Hippomedon denticidatus (Spence Bate).


*Habitat.*—Taken in the vicinity of May Island in 1888, and subsequently in various parts of the estuary between May Island and Inchkeith, but seldom more than a few specimens taken in any single gathering.

Genus (12) Orchomene, Boeck, 1870.


*Habitat.*—In the neighbourhood of the Bass Rock; rare.

Genus (13) Tryphosa, Boeck, 1870.

14. Tryphosa nana (Kröyer).

1891. *Orchomenella ciliata*, G. O. Sars, op. cit., p. 69, pl. xxv. fig. 2.

*Habitat.*—Taken near Joppa in 1888; subsequently in other parts of the estuary, but always sparingly.

Genus (14) Tryphosella, J. Bonnier, 1893.

15. Tryphosella Sarsi, Bonnier.


*Habitat.*—Firth of Forth; not common.

16. Tryphosella Höringii (Boeck).


*Habitat.*—Firth of Forth, 1896; off the east side of Inchkeith, in 5 fathoms, 23rd May 1901; not common.
17. Tryphosella nanoides (Lilljeborg).

1865. Anonyx nanoides, Lillj., On the Lysianassa magellanica, etc., p. 25, pl. iii. figs. 32-34.

1891. Tryphosa nanoides, G. O. Sars, Crustacea of Norway, vol. i. p. 79, pl. xxviii. fig. 2.


Habitat.—Off St Monans, captured with a tow-net at a depth of about 13 fathoms, in November 1904. In this species, the palm of the first gnathopods does not slope away from the base of the claw (dactylus), but forms nearly a right angle with the sides of the propodos.

Genus (15) Tryphosites, G. O. Sars, 1891.

18. Tryphosites longipes (Spence Bate).


Habitat.—Off St Monans, several specimens, 1889; and subsequently, but sparingly, in other parts of the estuary.

Genus (16) Anonyx, Kröyer, 1838.

19. Anonyx nugax (Phipps).

1774. Cancer nugax, Phipps, Voyage towards the North Pole, p. 192, pl. xii. fig. 2.


Habitat.—Near May Island, February 1889. North end of Inchkeith, 23rd January 1896; rare.

Genus (17) Hoplonyx, G. O. Sars, 1891.


1891. Hoplonyx leucophthalma, G. O. Sars, op. cit., p. 97, pl. xxxiv. fig. 1.

Habitat.—This somewhat critical species was taken off St Monans with a tow-net, close to the bottom, in November 1904. In this species the eyes are of a light cream colour or almost white; the dactylus of the first gnathopods has also a row of very minute spines extending along its dorsal aspect.
a little below the upper margin, which appears to be a character peculiar to this species.

Genus (18) \textit{Lepidepecreum}, Spence Bate, 1868.

21. \textit{Lepidepecreum longicorne} (Bate).

1861. \textit{Anonyx longicornis}, Bate and Westw., \textit{op. cit.}, vol. i. p. 91 (♂).

\textit{Habitat.}—Off St Monans; off the north end of Inchkeith, January 1896; and off the east side of the same island, May 1901.

\textbf{Family Pontoporeiidae.}

Genus (19) \textit{Bathyporeia}, Lindström, 1855.

22. \textit{Bathyporeia Guilliamsoniana} (Bate).


\textit{Habitat.}—Firth of Forth; taken sparingly in various parts of the estuary.

23. \textit{Bathyporeia pelagica}, Spence Bate.


\textit{Habitat.}—Firth of Forth; taken occasionally with the other species of the genus.

24. \textit{Bathyporeia Robertoni}, Spence Bate.

1892. \textit{Bathyporeia Robertoni}, Bate, \textit{op. cit.}, p. 173, pl. xxxi. fig. 5.

\textit{Habitat.}—Firth of Forth, frequent near low-water on the sandy shore east of Burntisland; obtained by passing the wet sand through a wire-sieve.

Genus (20) \textit{Haustorius}, Statius Müller, 1775.

25. \textit{Haustorius arenarius} (Slabber).


\textit{Habitat.}—Firth of Forth, sandy shore east of Burntisland, near low-water; not common.
Genus (21) Urothoe, Dana, 1852.

26. Urothoe marinus, Spence Bate.


Habitat.—Firth of Forth; not very common.

27. Urothoe brevicornis, Spence Bate.

1862. Urothoe brevicornis, Bate and Westw., op. cit., vol. i. p. 198.

Habitat.—Largo Bay; not common.

Family Phoxocephalidae.

Genus (22) Phoxocephalus, Stebbing, 1888.

28. Phoxocephalus Holbølli (Krøyer).


Habitat.—Taken off the west side of May Island in 1888. Taken in Largo Bay in 1892 and 1894, and at Station III. on 23rd May 1901.


Habitat.—Off St Monans; not rare.

Genus (23) Harpinia, Boeck, 1870.


Habitat.—Generally though sparingly distributed. First recorded for the Firth of Forth in 1888. This is the Phoxus plumosus of Bate and Westwood’s British Sessile-eyed Crustacea, but not of Krøyer.

31. Harpinia crenulata, Boeck.


Habitat.—Near Inchkeith, and other parts of the estuary; not common. Station III., in 5 fathoms, 23rd May 1901.
Family *Ampeliscidae*

Genus (24) *Ampelisca*, Kröyer, 1842.

32. *Ampelisca typica* (Spence Bate).


*Habitat.*—Between Fidra and the Bass Rock; not common.

33. *Ampelisca tenuicornis*, Lilljeborg.


*Habitat.*—Near the Bass Rock, 24 fathoms; off St Abb’s Head, 40 fathoms (Metzger). Off Prestonpans, 1888, not common; off the North Craig, 4th July 1901.

34. *Ampelisca assimilis*, Boeck.


*Habitat.*—Taken near May Island, 1893. Off St Monans, in 13 fathoms, and at Station III., in 7 fathoms, May 1901. Several specimens of *Ampelisca*, including *A. assimilis*, were obtained in the stomachs of Long Rough Dabs captured in the Forth estuary in May 1901.


*Habitat.*—Largo Bay and one or two other places, 1893. Taken also at Station III., in 7 fathoms, on 23rd May 1901.

36. *Ampelisca macrocephala*, Lilljeborg.


*Habitat.*—Firth of Forth, 24 fathoms (Metzger). I have obtained this species in the stomachs of Long Rough Dabs and Whitings captured in the Firth of Forth in May 1901, as well as in tow-net gatherings collected about the same time.
37. *Ampelisca spinipes*, Boeck.


*Habitat.*—Taken near May Island, not common, 1893. At Station III., in 5 fathoms, 23rd May 1901. Also in the stomachs of Long Rough Dabs and small Whitings captured in the estuary in May 1901.

38. *Ampelisca equeicornis*, Bruzelius.


*Habitat.*—West of May Island, 20 fathoms (Henderson). This appears to be the only record of *A. equeicornis* for the Forth estuary.

Genus (25) *Byblis*, Boeck, 1870.


*Habitat.*—Taken off St Abb's Head, 40 fathoms (Metzger, 1875). Near May Island, 1890 (Mihi).

Genus (26) *Haploops*, Lilljeborg, 1855.

40. *Haploops tubicola*, Lilljeborg.


*Habitat.*—Taken near the Bass Rock, 1892, and in other parts of the estuary. Dredged in 5 fathoms at Station III., 23rd May 1901; found also in the stomachs of Long Rough Dabs (*Drepanopsetta platessoides*) captured in the Forth during the same month.

**Family AMPHILUCHIDÆ.**

Genus (27) *Amphilochus*, Spence Bate, 1862.

41. *Amphilochus manudens*, Spence Bate.


*Habitat.*—Taken in South Bay in 1888, not common.
Dredged at Station III., and also at the north-west end of Inchkeith, on 23rd May 1901.

42. *Amphilochus tenuimanus*, Boeck.


*Habitat.*—Taken in the stomach of a small Whiting captured in the estuary in April, and in the stomach of a Long Rough Dab captured in May 1901; obtained also in a small gathering of dredged material at Station IX., collected 5th June 1903.

Genus (28) *Amphilochoïdes*, G. O. Sars.

43. *Amphilochoïdes serratipes* (Norman).


*Habitat.*—Firth of Forth, near Fidra Island; rare.

44. *Amphilochoïdes odontonyx* (Boeck).


*Habitat.*—At various places in the Firth of Forth, but always very sparingly. This species was described by Professor G. O. Sars under the name of *Amphilochoïdes pusillus*, but was afterwards identified as the true *A. odontonyx* of Boeck; see footnote below.

1 At p. 159 of Part III. of the *Fourteenth Annual Report of the Fishery Board for Scotland* (1896), in my remarks on *Amphilochoïdes intermedius*, I state incidentally that the typical *A. odontonyx*, G. O. Sars (*A. serratipes*, Norman), had not hitherto been observed in the Firth of Forth; this was a mistake, due to my forgetting that that species had been recorded in Part III. of the *Eleventh Annual Report*, with drawings showing two of the most characteristic parts of the animal. Further, as pointed out by Professor G. O. Sars (*op. cit.*, p. 690), the form mentioned here is not the *A. odontonyx* of Boeck, but a different species, for which Sars proposed to substitute the name *A. Boecki*, being unaware that Norman had already described it.


*Habitat.*—Taken in various parts of the estuary, but usually very sparingly. The latest records I possess of the occurrence of *A. intermedius* in the Forth are for Station III., where it was obtained on the 23rd and 25th of May 1901.

Genus (29) *Gitana*, Boeck, 1870.

46. *Gitana Sarsi*, Boeck.


*Habitat.*—Taken very sparingly in various parts of the estuary. My most recent record of this species is for Station III., where it was dredged on 23rd and 25th May 1901.

47. *Gitana abyssicola*, G. O. Sars.


*Habitat.*—Dredged at Station VI. (off St Monans), 25th May 1901. One of the characters which serves to distinguish this small species from *G. Sarsi* is that the second pair of coxal plates are rather narrow, and they exhibit only two small serrations on the obtusely-pointed tips of these plates, instead of three, as in *G. Sarsi*.

Family *Stenothoidæ*.

Genus (30) *Stenothoe*, Dana, 1852.

48. *Stenothoe marina* (Spence Bate).


*Habitat.*—Various parts in the Firth of Forth from Inchkeith to May Island, but not very common, 1889. Station V., 24th April, and off the north-west end of Inchkeith, 23rd May 1901.
49. *Stenothoe monoculoides* (Montagu).


*Habitat.*—Not very common; the specimens in my collection were taken in Granton Harbour with a surface tow-net.

Family **Metopidae**, T. R. R. Stebbing, 1899.\(^1\)

**Genus (31) Metopa**, Boeck, 1870.

50. *Metopa Alderi* (Spence Bate).


*Habitat.*—Firth of Forth, 1889; and taken subsequently at nearly all the Experimental Stations within the limits of the estuary. It has been also observed in the stomachs of Whitings captured in 1901.


*Habitat.*—Dredged in South Bay, off Musselburgh, in 1888.


*Habitat.*—Obtained in a bottom tow-net gathering collected at Station II. on 30th August 1894.


*Habitat.*—Firth of Forth, at the following places in 1901, viz.:—At Stations III. and VII. in April, at Station III. in May, and off North Craig in July; but not more than one or two specimens were obtained in any single gathering.\(^2\)

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54. Metopa Bruzelii (Göes).

Habitat.—Firth of Forth, 1896; not common.


Habitat.—Dredged off Crail in 1892; rare.

56. Metopa norvegica (Lilljeborg).

Habitat.—Newhaven (Henderson). Off the west side of Inchkeith, 1888. Dredged at the west end of Station III. in May, and off the North Craig in July, 1901. I find this species generally though sparingly distributed throughout the estuary.

Genus (32) Sthenometopa, Norman.1

57. Sthenometopa robusta (G. O. Sars).

Habitat.—Dredged at the west end of Station III. in May, and off the North Craig in July, 1901. The Rev. Canon Norman remarks (op. cit., p. 45) that Dr J. R. Henderson obtained this species in the Firth of Forth in 1884, but that T. and A. Scott were the first to record it as British.2

Genus (33) Metopella, G. O. Sars, 1892.

58. Metopella nasuta (Boeck).
1870. Metopa nasuta, Boeck, Crust. Amphip. borealia et arctica, p. 64.

Habitat.—Taken in moderately deep water west of May


2 It would thus appear that when Henderson found his specimens the species was still undescribed. Sars did not describe it till 1893.
Island, in 1892. The generic name *Metopella* was proposed by G. O. Sars in his remarks on a closely allied species, *M. longimana*, Boeck.\(^1\)

**Family Cressidae**, Stebbing, 1899.

**Genus (34) Cressa**, Boeck, 1870.

59. *Cressa dubia* (Spence Bate).


*Habitat.*—Taken at Station V. in February 1892. Dredged at Station III. on 23rd May 1901; apparently not very common.

**Family Leucothoidae.**

**Genus (35) Leucothoe**, Leach, 1814.

60. *Leucothoe Lilljeborgii*, Boeck.


*Habitat.*—Obtained in the neighbourhood of the Bass Rock, rare (1894). Dredged off the north-west end of Inchkeith on 23rd May 1901. Found also in the stomach of a Sharp-tailed *Lumpenus, Lumpenus lampretiformis*, captured in the estuary during the same month.

**Family Ediceridae.**


*Habitat.*—Dredged in Largo Bay, off St Monans, and near Fidra Island; not common.

\(^1\) Cf. *Crustacea of Norway*, vol. i. p. 274.
Genus (37) *Perioculodes*, G. O. Sars, 1892.

62. *Perioculodes longimanus* (Bate and Westwood).


**Habitat.**—Dredged off Bo’ness, 1888; Largo Bay, 1890, frequent. Station V., 24th April, and in the neighbourhood of the Bass Rock in 20 fathoms, 28th June 1901. Also found in the stomachs of small Whiting captured in the estuary in May 1901.

Genus (38) *Pontocrates*, Boeck, 1870.

63. *Pontocrates arenarius* (Spence Bate).


**Habitat.**—Shore east of Burntisland, frequent, burrowing in the wet sand, near low-water, 1889. Dredged in shallow water, off Musselburgh, in May 1901.

64. *Pontocrates altamarinus* (Bate and Westwood).


**Habitat.**—Dredged off Bo’ness; not common.

Genus (39) *Synchelidium*, G. O. Sars, 1892.

65. *Synchelidium brevicarpum* (Bate and Westwood).


**Habitat.**—Dredged in Largo Bay in 1889; at Station VI. (off St Monans) in April 1901; and at other places and dates; not common.

Genus (40) *Halimedon*, Boeck, 1870.

66. *Halimedon parvimanus* (Bate and Westwood).


**Habitat.**—Dredged at Station V. in February 1892, and
subsequently in other parts of the estuary. It was again dredged at Station V. in April 1901, and was also found in the stomachs of Sharp-tailed *Lumpenus* captured in the neighbourhood of that station in May of the same year.

Family **Pleustidae**.

Genus (41) *Paramphithoe*, Bruzelius, 1859.

67. *Paramphithoe bicuspis* (Kröyer).

1838. *Amphithoe bicuspis*, Kröyer, Grønlands Amphipoder, p. 45, pl. i. fig. 1.

**Habitat.**—Newhaven, from fishermen’s lines (Henderson). Dredged off the east side of Inchkeith on 23rd May 1901. The species appears to be generally though sparingly distributed throughout the seaward part of the estuary.


**Habitat.**—Firth of Forth (Henderson, 1884; cf. Twelfth *F. B. Rept.*, pt. iii. p. 264, 1894). Dredged off the east side of Inchkeith, and at the north-west end of the island, in May 1901.


**Habitat.**—Dredged between Inchkeith and May Island, found adhering to zoophytes brought up in the dredge, 1894. Dredged at Station VI. (off St Monans), 22nd May 1901; rare.

Genus (42) *Sympleustes*, Stebbing, 1899.\(^1\)

70. *Sympleustes latipes* (M. Sars).


**Habitat.**—Several specimens, prettily coloured, were

obtained adhering to a tuft of Antennularia antennina dredged off the east side of Inchkeith in August 1889, and at Station V. in September 1890.

Family **E** **P** **I** **M** **E** **R** **I** **D** **Æ**.
Genus (43) **E** **p** **i** **m** **e** **r** **i** **a**, A. Costa, 1851.

71. *Epimeria cornigera* (Fabricius).


*Habitat.*—Dredged at Station III. in 1890, and off the North Craig on 4th July 1901; not common.

Family **I** **P** **H** **I** **M** **E** **D** **I** **D** **Æ**.
Genus (44) **I** **p** **h** **i** **m** **e** **d** **i** **a**, Rathke, 1843.

72. *Iphimedia obesa*, Rathke.


*Habitat.*—Newhaven, many specimens, dredged to the east of Inchkeith (Henderson). Granton Harbour, 1888; Station V., January 1892. Generally distributed throughout the estuary, but usually not very common.

73. *Iphimedia minuta*, G. O. Sars.


*Habitat.*—Dredged at the north end of Inchkeith and other parts of the estuary; not common. Dredged at Station III. on 23rd May 1901.

Family **S** **y** **r** **r** **h** **o** **i** **d** **Æ**.
Genus (45) **A** **r** **g** **i** **s** **s** **a**, Boeck, 1870.

74. *Argissa hamatipes* (Norman).


*Habitat.*—Taken at various places during the autumn and
winter of 1892. Taken at Station V. in April, and at Station VI. in May, 1901.

Family Laphystiidæ.
Genus (46) Laphystius, Kröyer, 1842.

75. Laphystius sturionis, Kröyer.

Habitat.—Parasitic on various fishes; a considerable number of specimens have at different times been observed adhering to Angler-fishes, Lophius piscatorius, Linn., captured in the estuary.

Family Calliopiidæ.

76. Apherusa bispinosa (Spence Bate).

Habitat.—South Bay, 1888, and subsequently in other parts of the estuary. Taken in 20 fathoms in the neighbourhood of the Bass Rock, 28th June 1904.

77. Apherusa cirrus (Bate).
1893. Apherusa borealis, G. O. Sars, op. cit., vol. i. p. 441, pl. clv. fig. 2.

Habitat.—Generally distributed in the Forth; recent records include Station V., where it was taken on 24th April 1901, and near the Bass Rock on 28th June 1904.


*Habitat.*—? Newhaven, on fishermen’s lines (Henderson, 1884, as *Pherusa fucicola*). Several specimens were dredged in the estuary in 1887 (Mihi). I am doubtful if Henderson’s record really refers to *A. Jurinii*, but do not know what else to refer it to.

Genus (48) *Calliopus*, Lilljeborg, 1865.

79. *Calliopus Rathkei* (Zaddach).


*Habitat.*—Firth of Forth, near Dunbar, at the mouth of the estuary, 1894. This is probably only a smaller form of the next species.

80. *Calliopus leviusculus* (Kröyer).


*Habitat.*—Not uncommon in various parts of the estuary from above Queensferry to North Berwick, especially inshore amongst Algae.

Family *Atylidae*.

Genus (49) *Paratylus*, G. O. Sars, 1893.


*Habitat.*—Firth of Forth; moderately common and generally distributed.
82. *Paratylus falcatus* (Metzger).


*Habitat.*—Firth of Forth, 1896; several specimens in my collection.


*Habitat.*—Off Aberlady, 12th December 1892, and again in the spring of 1893. This form does not appear to be very rare, but it may be easily passed over as a more common species.

84. *Paratylus vedlomensis* (Bate and Westwood).


*Habitat.*—Taken sparingly in several localities between Inchkeith and May Island. Dredged off St Monans, 22nd May 1901.

**Family Dexaminidae.**

**Genus (50) Dexamine**, Leach, 1814.

85. *Dexamine spinosa* (Montagu).


*Habitat.*—Obtained at low-water at Prestonpans (Cunningham; Leslie and Herdman). Off Musselburgh, 1888. This appears to be a rare species in the Forth estuary.

86. *Dexamine Thea*, Boeck.


*Habitat.*—Firth of Forth, 1896; scarce.

**Genus (51) Tritæta**, Boeck, 1876.

87. *Tritæta gibbosa* (Spence Bate).


*Habitat.*—Firth of Forth, 1896; not common.
Genus (52) Guernea, Chevreux, 1887.

88. Guernea coalita (Norman).


Habitat.—Dredged off St Monans, 12 to 14 fathoms, 1889-90. In a gathering of dredged material from the same place, collected on 22nd May 1901; not uncommon.

Family MELPHIDIPPIDAE.

Genus (53) Melphidippella, G. O. Sars, 1893.

89. Melphidippella macera (Norman).


Habitat.—Taken with bottom tow-net at Station V., 16th April 1892. At the same Station on 24th April, and at Station VI. on 22nd May 1901; not common.

Family GAMMARIDÆ.

Genus (54) Amathilla, Spence Bate, 1863.

90. Amathilla homari (J. C. Fabricius).


Habitat.—Dredged near May Island, 1889. Also at Station IV., 23rd December 1892, and Station VII., 23rd February 1894; rare in the adult stage.

Genus (55) Gammarus, Fabricius, 1776.

91. Gammarus marinus, Leach.

1863. " " " Bate and Westw., op. cit., vol. i. p. 370.

Habitat.—Taken near Culross, west of Queensferry, 1892. Between tide-marks, Dalmeny shore, November 1904 (Evans). Generally but sparingly distributed throughout the estuary.


_Habitat._—Taken in the brackish water lagoon at the mouth of the Cocklemill Burn, near Largo, 1896; also in brackish water pools on May Island, 13th June 1893.

93. *Gammarus locusta* (Linne).


_Habitat._—Common, especially in the littoral zone.

94. *Gammarus pulex* (De Geer).


_Habitat._—Common in shallow fresh-water lakes, slow streams, ditches, etc., throughout the district.

Genus (56) *Melita*, Leach.

1 95. *Melita obtusata* (Montagu).


_Habitat._—Moderately frequent throughout the estuary.

96. *Melita dentata* (Kröyer).


_Habitat._—Taken in moderately deep water (28 fathoms) at the mouth of the estuary in January 1890; rare. Only two specimens, one partly dissected, are in my collection.

1 Two specimens of *Melita gladiosa*, Bate, were in 1888 recorded by me from Largo Bay (cf. *Sixth F. B. Rept.*, part iii. p. 247), but they were probably merely well-developed males of *M. obtusata*. 
Proceedings of the Royal Physical Society.

Genus (57) Mæra, Leach, 1813.

97. Mæra Othonis (M.-Edwards).

1863. ,, (?*longimana*), *ibidem*, p. 408 (♂).

*Habitat.*—Dredged in South Bay in 1888, and off the east side of Inchkeith in 1891; rare.

98. Mæra Loveni (Bruzelius).


*Habitat.*—A single specimen of this large species was dredged a short distance west of Inchkeith on 11th November 1887. Another specimen was obtained in the stomach of a Lemon Sole (*Pleuronectes microcephalus*) captured at Station IX. on 5th August 1890, and a third in the stomach of a Witch Sole (*Pleuronectes cynoglossus*) captured at Station V. on 28th June 1901.

199. Mæra tenuimana (Bate).


*Habitat.*—Firth of Forth, captured in 1895; rare. (Cf. *Fourteenth F. B. Rept.*, pt. iii. p. 160, 1896.)

Genus (58) Megaluropus, Norman, 1889.

100. Megaluropus agilis, Norman.


*Habitat.*—Taken in Largo Bay, 1888-90; frequent. Dredged off Musselburgh in May 1891, and at Stations V. and VI. in April 1901.

Genus (59) Cheirocratus, Norman, 1865.

101. Cheirocratus Sundewalli (Rathke).


Habitat.—Taken at Station II., 14th November 1888; and subsequently, but sparingly, at other parts of the estuary. Dredged off the east side and at the north-west end of Inchkeith in May 1901; also found in the stomach of a Long Rough Dab (Platessoides limandoides) captured in the Forth during the same month.


Habitat.—Firth of Forth, taken in 1889 and 1893 (but not recorded till 1896); rare.

103. Cheirocrates assimilis (Lilljeborg).


Habitat.—Dredged off the west side of Inchkeith in February 1894; at the north end of the same island on 23rd January 1896; and at Station III. on 23rd May 1901; moderately rare.

Family Lilljeborgiidae.

Genus (60) Lilljeborgia, Spence Bate, 1862.

104. Lilljeborgia Kinahani (Spence Bate).


Habitat.—Dredged at Station VI. and Station III., and also at the north-west end of Inchkeith, in May 1901, but only a few specimens were obtained altogether.
Family AORIDÆ.

Genus (61) Microdeutopus, A. Costa, 1853.

105. Microdeutopus anomalus (Rathke).


Habitat.—Firth of Forth, 1893; rare.

Genus (62) Aora, Kröyer, 1844.

106. Aora gracilis, Spence Bate.


Habitat.—Newhaven; many specimens. Both sexes taken off Fidra (Henderson, 1884). I have dredged it off Elie, and one or two other places, but usually in small numbers.

Genus (63) Lembos, Spence Bate, 1856.1

107. Lembos Webstери, Spence Bate.


Habitat.—Dredged at Station V., 24th April 1901; rare.

108. Lembos longipes (Lilljeborg).


Habitat.—Dredged off St Monans, 19th June 1893 and 22nd May 1901; rare.

Family PHOTIDÆ.

Genus (64) Protomedeia, Kröyer, 1842.


Habitat.—Captured near May Island, October 1894.

Found in the stomachs of Gurnards (Trigla gurnardus), as well as in the stomachs of sharp-tailed Lumpenus, small Whitings, and Long Rough Dabs, captured in the estuary in April and May 1901.

Genus (65) Leptocheirus, Zaddach, 1844.

110. Leptocheirus hirsutimanus (Spence Bate).


Habitat.—Dredged off Elie Ness in 17 fathoms in 1888. Dredged off Inchkeith in 1890, and again in 1894; and at Station III. and Station VI. in May 1901. In this species the accessory appendage of the superior antennae is composed of about six joints.

111. Leptocheirus pilosus, Zaddach.


Habitat.—Dredged in the Firth of Forth in 1893 and 1894. Over a dozen specimens of this species were obtained in some material dredged off St Monans on 22nd May 1901. In this species the accessory appendage of the superior antennae is two-jointed. A female specimen, with ova, measured a little over three millimetres.

Genus (66) Gammaropsis, Lilljeborg, 1854.

112. Gammaropsis maculata (Johnston).


Habitat.—Dredged off the west side of Inchkeith in 1888.

Taken at Station V. in December 1890; and subsequently, but always sparingly, in various other parts of the estuary.


_Habitat._—Taken at one or two places in the estuary in 1890. Dredged at Station IV. in April, and at Station III. in May, 1901.

Genus (67) *Megamphopus*, Norman, 1869.


_Habitat._—Firth of Forth, 1896; dredged at Station III. in May 1901.

Genus (68) *Microprotopus*, Norman, 1866.


_Habitat._—Dredged in Largo Bay in 1891, and subsequently in other parts of the estuary, but not very common.

Genus (69) *Photis*, Kröyer, 1842.

116. *Photis longicaudatus* (Bate and Westwood).


_Habitat._—Firth of Forth, dredged off St Monans in 1892; also west of Queensferry in April, and at Stations III. and VI. in May, 1901.

Genus (70) *Podoceropsis*, Boeck, 1860.


_Habitat._—"Dredged to the east of Inch Mickery, also
south-west of Inchkeith” (Henderson, 1884). This species I have not met with in the Firth of Forth.

118. *Podoceropsis excavata* (Spence Bate).

1862. *rimapatma*, idem, *ibidem*, p. 272, pl. xlvi. fig. 3 (♂).

_Habitat._—“With the last in both localities” (Henderson). Dredged in Largo Bay, Kirkcaldy Bay, at Station III., and elsewhere; generally though sparingly distributed.

Family **AMPHITHOIDÆ**

Genus (71) *Amphithoe*, Leach, 1813.

119. *Amphithoe rubricata* (Montagu).


_Habitat._—Dredged off Musselburgh and off the west side of May Island in 1887-88. Subsequently in other parts of the estuary, especially in shallow water amongst Algae.

Genus (72) *Pleonexes*, Spence Bate, 1857.

120. *Pleonexes gammaroides*, Spence Bate.


_Habitat._—Obtained off Pittenweem amongst trawl refuse, and between tide-marks near Portobello, 1887-88.

Family **ISCHYROGERIDÆ**

Genus (73) *Ischyrocerus*, Kröyer, 1838.

121. *Ischyrocerus minutus*, Lilljeborg.


_Habitat._—Taken in various parts of the estuary. The specimens in my collection were obtained in 1892.
1. Genus (74) Jassa, Leach, 1813.

122. Jassa falcata (Montagu).


Habitat.—Dredged off Musselburgh in 1888 and 1891; and subsequently, though sparingly, in other parts of the estuary.

123. Jassa pusilla (G. O. Sars).


Habitat.—Firth of Forth, 1887, and also in 1889, when the specimens in my collection were obtained. More recently it has been dredged at Station III., and at the north-west end of Inchkeith on 23rd May 1901.


1894. „, odontonyx, G. O. Sars, op. cit., vol. i. p. 597, pl. cexiii. fig. 2.

Habitat.—Off St Monans, 19th June 1893. This form, which I have observed on several occasions, resembles in some respects the Jassa pusilla (G. O. Sars); and, as A. O. Walker suggests, may be only a form of it. (It is probable that the species of Jassa mentioned above may have to be removed to another genus.)

125. Jassa pelagica, Leach.


Habitat.—Firth of Forth, off Musselburgh, in April 1891, and very sparingly on one or two other occasions.


Genus (75) Erichthonius, M.-Edwards, 1830.


1836. Cerapus abditus, Templ., Trans. Ent. Soc., vol. i. p. 188, pl. xx. fig. 5.


*Habitat.*—South Bay, 1888; Kirkcaldy Bay, 27th March 1891; Station III., 25th May 1901.


*Habitat.*—Dredged near the Bass Rock (Metzger). Dredged in South Bay in 1887. Obtained in the stomachs of small Whitings and Butter-fishes captured in the estuary in May 1901.

128. *Erichthonius Hunteri* (Spence Bate).


*Habitat.*—Firth of Forth, generally though sparingly distributed. The specimens in my collection were obtained in 1887 and 1894. Specimens of *E. Hunteri* were dredged at Station VII. in April, and at Station III. in May, 1901.

**Family C O R O P H I D I À E.**

Genus (76) *Cerapus*, Say, 1817.

129. *Cerapus crassicornis* (Spence Bate).


1863. *",* " Bate and Westw., Brit. Sessile-eyed Crust., vol. i. p. 496.

*Habitat.*—Firth of Forth; a single specimen (still in my collection) was obtained in a bottom tow-net gathering on 30th May 1892. This specimen, in its tube of hardened
mud, with which it was able to move freely about, had a close resemblance to a small insect larva.

Genus (77) Siphonoëcetes, Kröyer.

130. *Siphonoëcetes Whitei* (Gosse).


*Habitat.*—Frequent in material dredged in Largo Bay in 1890, and occasionally in other parts of the estuary.

Genus (78) Corophium, Latreille, 1807.

131. *Corophium grossipes* (Linné).


*Habitat.*—Dunbar (Robertson). "Very abundant on the mud flat at Morrison's Haven" (Cunningham).\(^1\) Brackish water pools at Aberlady in 1895.


*Habitat.*—Taken off Musselburgh in 1888. Aberdour Bay, November 1893. (Cf. also *Fourteenth F. B. Rept.*, pt. iii. p. 161, 1896.)


*Habitat.*—Taken near Dunbar in 1894. Dredged at Station III. in May 1901.

134. *Corophium affine*, Bruzelius.

1859. *Corophium affine*, Bruz., op. cit., p. 16.

*Habitat.*—A single specimen dredged off Fidra, October

\(^1\) Cf. *Invertebrate Fauna*, by Leslie and Herdman, pp. 44-106 (1881).
1884 (Henderson). Dredged off Inchkeith; in Kirkcaldy Bay, and other places, but seldom more than one or two specimens in any single gathering.


*Habitat.*—Firth of Forth, dredged 22nd November 1889, and on one or two subsequent occasions; rare.

Family *Dulichiidæ*.

Genus (80) *Dulichia*, Kröyer, 1845.


*Habitat.*—Taken off Musselburgh in April 1891. Dredged at Station III., and at the north-west end of Inchkeith, on 23rd May 1901. It was also obtained in the stomachs of small Whitings captured in the Forth during the same month.

137. *Dulichia monacantha*, Metzger.


*Habitat.*—Dredged at Station V. on 24th April, and on the 29th at Station VII., 1901. It was also obtained in the stomachs of a few of the fishes captured in Forth in April and May 1901, and which were sent for examination to the laboratory at Bay of Nigg, Aberdeen.


*Habitat.*—Taken with surface tow-net in Granton Harbour, 26th November 1887. Dredged near Inchkeith on 11th April 1892; and at Station V. on 24th April 1901. Obtained also in the stomachs of fishes.
Caprellidea.

Family C A P R E L L I D E .

Genus (81) Phtisica, Slabber, 1749.

139. Phtisica marina, Slabber.

1749. Phtisica marina, Slabber, Natuurkundige versluißigingen, etc., p. 79.


Habitat.—Newhaven, on fishermen’s lines, not uncommon (Henderson). Dredged in South Bay in 1888; and subsequently at other parts of the estuary; and also obtained in the stomachs of small fishes captured in the Forth.

Genus (82) Protella, Dana, 1852.

140. Protella phasma (Montagu).


Habitat.—Firth of Forth (Goodsir). Dredged in South Bay in 1888, and again in 1892; and at Station III. on 23rd May 1901.

Genus (83) Pariambus, Stebbing, 1888.

141. Pariambus typicus (Kröyer).


Habitat.—Firth of Forth, frequent on the common starfish Asterias rubens, with which it appears to be associated.

Genus (84) Caprella, Lamarck, 1818.

142. Caprella linearis (Linné).


Habitat.—“Plentiful in the laminarian zone” (Henderson).
South Bay, frequent, 1888. Dredged at Station III. on 23rd May 1901.

143. Caprella acanthifera, Leach.


Habitat.—Firth of Forth, taken by the Rev. J. Gordon (cf. Bate and Westwood, Brit. Sessile-eyed Crust., vol. ii. p. 67). A single specimen in my collection has on the label, “Firth of Forth, 1888,” but I don’t remember what part of the estuary it was taken in.

144. Caprella tuberculata, Guerin.


1842. , , , Goodsir, op. cit., vol. xxxiii. p. 188, pl. iii. fig. 6.


145. Caprella æquilibra, Say.


Habitat.—A considerable number of specimens were obtained amongst Algae and barnacles scraped from a ship’s bottom at Granton Harbour; most of the specimens were either females or immature, but a few adult males were found, by means of which the species to which they belonged was satisfactorily identified.

Sub-Class II. ENTOMOSTRACA

Order 3. BRANCHIOPODA.

Suborder Cladocera.

The arrangement followed for this suborder is that of Professor Lilljeborg’s monograph, Cladocera-Suecia, published

**Suborder Cladocera.**

Division CALYPTOMERA, G. O. Sars.

Tribe Ctenopoda, G. O. Sars, 1865.

Family Sidae, Baird, 1850.

Genus (1) Sida, Strauss, 1820.


*Habitat.*—Raith Lake, Kirkcaldy, Fifeshire, common, 1890; Loch Leven, Kinross; Loch Vennachar and Loch Katrine, Perthshire.

Genus (2) Diaphanosoma, Fischer, 1890.

2. *Diaphanosoma brachyurum* (Liéven).


*Habitat.*—Loch Leven, 1890; Raith Lake, 1890, common; Loch Katrine, Loch Achray, Loch Vennachar; Marfield Loch, Midlothian, September 1901 (Dr and Miss Sprague).

Genus (3) Latona, Strauss, 1820.


*Habitat.*—Loch Lubnaig, 29th September 1894.

1 For other synonyms see Professor Lilljeborg's work mentioned above.
Family Holopediæ.

Genus (4) Holopedium, Zaddach, 1855.


1855. Holopedium gibberum, Zaddach, Wiegmann, Archiv. fur Naturges., Bd. 21, p. 159, pl. viii. fig. 9.

Habitat.—Loch Achray, Loch Voil. Common in Loch Achray in September 1897 and June 1898, but entirely absent during the intervening winter months.

Tribe Anomopoda, G. O. Sars.

Family Daphniadæ, Strauss.

Genus (5) Daphnia, O. F. Müller, 1785.

The study of the various forms comprised in the genus Daphnia is extremely interesting, but very perplexing. The variations, especially in form, and also to some extent in structural details, are so great that the student of sanguine temperament could easily describe a dozen species where the severely critical could only make out two or three. As I cannot lay claim to a very expert knowledge of the relationships of this difficult genus, it is necessary for me to rely, to some extent, on the discrimination of writers more familiar with it.

5. Daphnia pulex (De Geer).


Habitat.—Generally distributed, and occurring sometimes in considerable abundance. Very plentiful in an artificial pond in the vicinity of Edinburgh in July 1898.¹ The variety hamata (Brady) has been taken by Dr and Miss Sprague in Granton Quarry, near Edinburgh, and I have found it, as well as the variety obtusata, in the "marl-pit" near Davidson’s Mains, Midlothian. This species possesses a comb-like fringe of minute hairs at the base of the post-abdominal claw.

¹ Seventeenth Fishery Board Report, part iii. (1899) p. 199.
1785. Daphnia longispina, O. F. Müller, Entomostraca, p. 88, tab. 12, figs. 8-10.

Habitat.—Duddingston Loch (?). A form very common in Duddingston Loch appears to belong to this species. The same form is also common in Loch Leven, and in several other small lakes and ponds. D. longispina differs from the last in the post-abdominal claw being without a pectinate fringe of small hairs at the base. The shell is also usually furnished with a moderately long and slender posterior spine. There appear to be several varieties of D. longispina. A variety with a curious sloping head (var. nasuta, G. O. Sars) was found in Loch Doon in Ayrshire. Immature individuals are sometimes furnished with a "vertex tooth" (cf. var. hamata).

7. Daphnia hyalina, Leydig, var. pellucida, P. E. Müller.

Habitat.—Duddingston Loch (G. S. Brady). This may turn out to be only another form of D. longispina, O. F. Müller.


Habitat.—Loch Leven (G. S. Brady). Probably frequent. Hurley Cove, Penicuik, 31st December 1900, common (Dr and Miss Sprague). This species possesses when young, and sometimes also in the adult stage, a "vertex tooth," which may be single or double. D. lacustris is, by some writers, considered to be a variety of the last species (D. hyalina), to which it bears a close resemblance.

1899. Daphnia galeata, T. Scott, Seventeenth F. B. Rept., pt. iii. p. 193, pl. vii. figs. 22, 53, see also fig. 16.

Habitat.—Loch Katrine, Loch Achray, and Loch Vennachar.
Granton Quarry, 1st September 1900 (Dr and Miss Sprague). I find this species exceedingly variable, especially in the form of the head, which in the more typical specimens is strongly crested, but passing by minute gradations to others that have no crest at all, but having the head evenly rounded. I am inclined to agree with those who regard this *Daphnia* and the two immediately preceding as forms of one and the same species, to which *Daphnia jardini*, Baird, must also be ascribed. In that case, Baird's name, being the older, would take precedence of the others.

Genus (6) *Scapholeberis*, Schoedler, 1858.


1785. *Daphne mucronata*, O. F. Müller, Entomostracea, p. 94, pl. xiii. figs. 6, 7.

*Habitat.*—Raith Lake, Kirkcaldy, frequent, 1890; Ravelston Cottage Quarry, Midlothian, July 1900 (Dr and Miss Sprague).

Genus (7) *Simoa*, Norman, 1903.

(Syn.—*Simocephalus*, Schoedler, 1858, preoccupied.)


*Habitat.*—Duddingston Loch; Loch Leven; Lochgelly and Kilconquhar Lochs, Fifeshire; Loch Coulter, Stirlingshire, etc.; frequent and generally distributed.

Genus (8) *Ceriodaphnia*, Dana, 1853.

12. *Ceriodaphnia reticulata* (Jurine).


*Habitat.*—Raith Lake, Kirkcaldy, frequent, 1890. Upper Elf Loch, Edinburgh, 1896 and 1897. In the same loch in September 1900 by Dr and Miss Sprague.

1785. *Daphnia quadrangula*, O. F. Müller, Entomostraca, p. 90, tab. 13, fig. 4.

*Habitat.*—Duddingston Loch, September 1897 and 1898. Taken in the same loch in June 1901 by Dr and Miss Sprague.


*Habitat.*—High Pond, Penicuik, 7th September 1901 (Dr and Miss Sprague).

This rare species is one of the additions made to the Entomostracan fauna of the inland waters of Scotland by Dr and Miss Beatrice Sprague.


1867. *Ceriodaphnia laticaudata*, P. E. Müller, Danmarks Cladocera, p. 130, pl. i. fig. 19.

*Habitat.*—Duddingston Loch, September 1897, frequent; not observed in 1898.

Family **Bosminadæ**

Genus (9) *Bosmina*, Baird, 1850.


*Habitat.*—Common and generally distributed in small lakes and ponds throughout the lowland parts of the district.

17. *Bosmina longispina*, Leydig.


*Habitat.*—Loch Katrine, Loch Achray, Loch Leven, etc.;
not rare in the larger lakes, where both species are sometimes found living together. They are both variable species, and a number of varieties have been described.

Family *Lyncodaphnidae*, G. O. Sars.


18. *Ilyocryptus sordidus* (Liévin).


*Habitat.*—Lochend Loch, Edinburgh, Loch Leven; Linlithgow Loch, and Loch Achray; not uncommon. Upper Elf Loch, Edinburgh (Dr and Miss Sprague).


*Habitat.*—Pond in Queen’s Park, Edinburgh, 16th June 1900; rare (Dr and Miss Sprague).

Genus (12) *Lathonura*, Lilljeborg, 1853.


1785. *Daphnia rectirostris*, O. F. Müller, Entomostraca, etc., p. 92, pl. xii. figs. 1-3.

*Habitat.*—Loch Achray, Trossachs, November 1897; rare.

Genus (13) *Drepanothrix*, G. O. Sars, 1861.


*Habitat.*—Loch Lubnaig, Loch Katrine, and Loch Achray.
Genus (14) Acantholeberis, Lilljeborg, 1853.


*Habitat.*—Marfield Loch, Midlothian, 21st September 1901; rare (Dr and Miss Sprague).


Genus (15) *Eurycercus*, Baird, 1843.


1785. *Lynceus lamellatus*, O. F. Müller, Entomostraca, p. 73, pl. ix. figs. 4-6.

*Habitat.*—Common and generally distributed throughout the district.

Genus (16) *Camptocercus*, Baird, 1843.


*Habitat.*—Loch Achray, November 1897; rare. The form described in Baird’s classical work on *British Entomostraca* is probably this species. Typical specimens of *C. macrurus* (O. F. Müller) have been observed in none of the Scottish lakes or ponds examined by me.

Genus (17) *Acroperus*, Baird, 1843.


1850. *Acroperus harpae*, idem, Brit. Entom., p. 129, pl. xvi. fig. 5.

*Habitat.*—Generally distributed and moderately common throughout the district.

Genus (18) *Alonopsis*, G. O. Sars, 1862.


*Habitat.*—Moderately common in several of the larger
lakes throughout the district. I have no record of it from the loch at Duddingston or from any locality in the vicinity of Edinburgh except Marfield Loch, where it was obtained by Dr and Miss Sprague, and in the Union Canal by myself.

Genus (19) Alona, Baird, 1843.

27. **Alona quadrangularis** (O. F. Müller).


**Habitat.**—Loch Achray, Loch Leven, Duddingston Loch, etc. This species appears to be generally distributed and moderately frequent throughout the district.


**Habitat.**—Distribution somewhat similar to that of *A. quadrangularis*.


**Habitat.**—Camilla Loch, Fifeshire, 1894, not uncommon; Duddingston Loch, frequent, 1st September 1897, but when this loch was visited three months later the species was not so common. No specimens were observed on 2nd March, but it was again of frequent occurrence in a shore-gathering collected on 15th June 1898. Dr and Miss Sprague found *A. tenuicaudis* rare in Duddingston Loch on 18th August 1900.


**Habitat.**—Upper Elf Loch, and ditch near Harelaw Dam,
in the vicinity of Edinburgh; Lochgelly Loch; not uncommon.


*Habitat.*—Camilla Loch, Loch Leven, Loch Achray, and Upper Elf Loch. Duddingston Loch (Dr and Miss Sprague).

32. Alona intermedia, G. O. Sars.


*Habitat.*—Loch Katrine and Loch Achray. This species, which does not appear to be very rare, was described in 1895 from specimens found in some Shetland lochs. It has not yet been recorded from England or Ireland.


*Habitat.*—Loch Achray. This appears to be a widely distributed though somewhat local species. It was first observed in samples of Entomostraca sent to me from Shetland by Robert Duthie, Fishery Officer.

34. Alona rostrata (Koch).


*Habitat.*—Cobbinshaw Reservoir, 13th August 1900; rare (Dr and Miss Sprague).

1 The *Alona intermedia* recorded from Shetland in the Thirteenth F. B. Report is not Sars' species of that name, but the *Alona rectangula* of G. O. Sars. I have no record for this species from the Forth basin, but as it is not rare, especially in ponds and marshy places near the sea, it may yet be found in the district.
Genus (20) Rhynchotalona, Norman, 1903.  
(Syn.—Leptorhynchus, Herrick, and Harporhynchus, G. O. Sars, both of which names are preoccupied.)

35. Rhynchotalona falcata (G. O. Sars).


Habitat.—Loch Katrine and Loch Achray; not common.

Genus (21) Ledigia, Kurz.

36. Ledigia quadrangularis (Leydig).

1860. Lynceus quadrangularis, Leydig, Naturges. der Daphnid., p. 221, pl. viii. fig. 59.

Habitat.—Lochgelly Loch, Fifeshire. It may be of interest to recall the fact that the record of this species in the Fishery Board’s Report mentioned above was the first for Britain.

Genus (22) Graptoleberis, G. O. Sars, 1862.

37. Graptoleberis testudinarius (Fischer).


Habitat.—Lochend Loch, 1894; Upper Elf Loch, Braid Hills, 1896 and 1897, where it was also obtained in August 1901 by Dr and Miss Sprague.

Genus (23) Alonella, G. O. Sars, 1862.

38. Alonella excisa (Fischer).


Habitat.—Loch Leven, frequent. Loch Katrine, Loch Achray, Loch Vennachar, and Loch Lubnaig. Marfield Loch,
Proceedings of the Royal Physical Society.

9th April 1901 (Dr and Miss Sprague). As *Alonella excisa* (Fischer) and *A. exigua* (Lilljeborg) are retained by Lilljeborg as distinct species, and as the Scottish specimens I have examined belong to Fischer's *L. excisus*, that name is used here (see remarks in Seventeenth F. B. Rept., pt. iii. p. 201).


*Habitat.*—Upper Elf Loch, Raith Lake, Loch Leven, Loch Katrine, Loch Achray. Marfield Loch (Dr and Miss Sprague).

Genus (24) *Peratacantha*, Baird, 1843.


1785. *Lynceus truncatus*, Müller, Entomostraca, p. 75, pl. xi. figs. 4-8.

*Habitat.*—Lochgelly Loch, Loch Katrine, Loch Achray, Loch Vennachar, and Loch Lubnaig. High Pond, Penicuik, 7th September 1901; rare (Dr and Miss Sprague).


*Habitat.*—Camilla Loch, Fifeshire; not common.

42. *Pleuroxus trigonellus* (O. F. Müller).

1785. *Lynceustrigonellus*, Müll., Entomostraca, p. 74, pl. x. figs. 5, 6.

*Habitat.*—Duddingston Loch, Loch Leven, Raith Lake, Loch Katrine, Loch Achray. Marfield Loch (Dr and Miss Sprague).


*Habitat.*—Raith Lake and Loch Leven.
Genus (26) Chydorus, Leach, 1816.

44. Chydorus globosus, Baird.

_Habitat._—Loch Achray. Dr and Miss Sprague collected this fine species in an old quarry in Dalmeny grounds, close to the river Almond, on 6th September 1901.

45. Chydorus ovalis, Kurz.
1874. Chydorus ovalis, Kurz, Dodekas neuer Cladoc., p. 73, pl. iii. fig. 11.

_Habitat._—A few specimens of a _Chydorus_, which agree with the description of _C. ovalis_ given by Professor Lilljeborg in his important work on the Swedish Cladocera, were obtained in Linlithgow Loch in October 1896 and in Loch Leven in June 1898.

46. Chydorus latus, G. O. Sars.

_Habitat._—Loch Achray, frequent in March 1898, but this was the only time it was observed during my four visits to this loch.

47. Chydorus barbatus (G. S. Brady).

_Habitat._—This _Chydorus_ appears to be moderately frequent in some of the lochs and ponds within the district under consideration, as Loch Leven, Loch Lubnaig, Loch Katrine, Loch Achray, etc. As remarked by Mr Scourfield, "the ventral shell margin is in this species densely fringed with long plumose setae, hence the name _C. barbatus._"

48. Chydorus sphæricus (O. F. Müller).
1785. _Lynceus sphæricus_, O. F. Müller, Entomostraca, p. 71, No. 2932.

_Habitat._—Common and generally distributed. _C. cælatus_, Schoedler, is, according to Professor Lilljeborg, a variety of _C. sphæricus._


*Habitat.*—Loch Leven, 1890; Loch Achray, November 1897; rare.

Division *GYMNOMERÆ*.

Tribe *ONYCHOPODA*, G. O. Sars.

Family *POLYPHEMIDÆ*.

Genus (28) *Polyphemus*, O. F. Müller, 1776.


*Habitat.*—Loch Leven, 1890; Loch Lubnaig, 1894; Loch Vennachar, Raith Lake.


51. *Bythotrephes longimanus*, Leydig.

1860. *Bythotrephes longimanus*, Leydig, Naturges. der Daphniden, p. 244, pl. x. figs. 73-75.

*Habitat.*—Loch Leven, 1890; Loch Vennachar (1895), Loch Katrine, and Loch Achray. Not uncommon in the larger lochs.

Genus (30) *Podon*, Lilljeborg, 1853.

(The members of this genus and the next are marine.)


*Habitat.*—Firth of Forth, occasionally frequent, especially
in the seaward part of the estuary. The *Podon polyphemoides* recorded in Part III. of the *Ninth Annual Report of the Fishery Board for Scotland*, p. 308 (1891), is probably this species, as no Forth specimens of *P. polyphemoides* are now in my collection.

Genus (31) *Evadne*, S. Loven, 1836.


*Habitat.*—Firth of Forth, usually moderately common.

Tribe **Haplopoda**, G. O. Sars.

Family **Leptodoridæ**, Lilljeborg.


54. *Leptodora Kindtii* (Focke).


*Habitat.*—Loch Leven, June 1890, frequent in the open water; common on 3rd September 1897, but no specimens were obtained in December of the same year, nor in the months of March and June of 1898. A few specimens were captured in September 1897 in Loch Katrine, but none in November; in 1898 none were taken in March, while in June, though none were observed at the upper end of the loch, the species was moderately frequent at the lower end. The only other lake within the limits of the district from which I have notes of *Leptodora* is Loch Achray; it was found sparingly here on 10th September 1897, but no specimens were observed when the loch was visited in November; neither were any specimens observed when the loch was examined on the 17th of March and the 28th of June 1898.
In Professor Lilljeborg's work on the Cladocera of Sweden, 38 genera are described; 32 of them are represented in the preceding list. The 6 not represented are as follows:

1. Limnosida, G. O. Sars.
5. Streblocerus, G. O. Sars.

Three of these—Ophryoxus gracilis, G. O. Sars, Streblocerus serricaudatus (Fischer), and Anchistropus emarginatus, G. O. Sars, have been obtained in Scotland. The first was discovered by Mr D. J. Scourfield in Loch Ness, and in a backwater of the Caledonian Canal at Coiltry Lock. The second I found in the Dhu Lochan—a small loch close to Loch Lomond, and about two miles south of Rowardennan. The third was taken by the late Dr Robertson, of Millport, in 1863, in the Paisley Canal (since filled up), and has occurred more recently in Ireland, and at one or two places in England.

Moina—all three species—has been recorded from England, but not from Scotland, and there does not appear to be any British record for the other two. But though the genera are so well represented, our list comes far short in the matter of species. Lilljeborg describes about 100 species from Sweden, besides numerous varieties, whereas our record amounts only to 54. It is thus apparent that further research is necessary, and will doubtless be rewarded.

Suborder Branchiura.

Family Argulidae, Leach, 1819.

Genus (1) Argulus, O. F. Müller, 1781.

1. Argulus foliaceus (Linn.).


Habitat.—Found attached to a specimen of the Three-spined Stickleback (Gasterosteus aculeatus), and also free amongst Anacharis in the Union Canal, near Edinburgh, by Mrs Janet Carphin, on 26th August 1895.1

Sketch-Map showing the limits of the Basin of the River Forth and its Estuary.
A CATALOGUE OF
LAND, FRESH-WATER, AND MARINE CRUSTACEA FOUND IN
THE BASIN OF THE RIVER FORTH AND ITS ESTUARY.

PART II.

BY


EDINBURGH:
Published by ROBERT GRANT & SON, 107 PRINCES STREET.
MDCCCCVI.
Price, Four Shillings.
XXIII. A Catalogue of Land, Fresh-Water, and Marine
Crustacea found in the Basin of the River Forth and
Soc. Zool. de France, etc.
(Read 26th March 1906.)

PART II.—THE OSTRACODA, COPEPODA, AND
CIRRIPIEDIA.

97-190, contained the MALACOSTRACA, CLADOCERA,
and BRANCHIURA.)

Order OSTRACODA.

The work that has been mainly followed in the arrange-
ment and nomenclature of the Ostracoda is that by Professor
G. S. Brady and the Rev. Canon A. M. Norman, entitled
“A Monograph of the Marine and Fresh-Water Ostracoda
of the North Atlantic and North-Western Europe.” The
work was published in two separate portions in the scientific
Transactions of the Royal Dublin Society. The first portion,
which formed Part II. of Vol. IV. (Series 2), appeared in
1889, and the second, which formed Part II. of Vol. V. of
the same series, in 1896.

In this work the Ostracoda are divided into four sections,
viz.—(1st) the Podocopa, which comprises all the fresh-
water and most of the marine species; (2nd) the Myodocopa,
which is represented in this Catalogue by only two species,
Asterope Mariae and Philomedes interpuncta; (3rd) the
Cladocopa, which is represented by Polycopha orbicularis and
Polycopsis compressa; and (4th) the Platycopa—a section
not represented in this Catalogue.

As this work has been, with few exceptions, followed
throughout, I have not considered it necessary to mention
it under every species, and where it is mentioned it is
referred to as the Monograph (or l. c.), Part I. or Part II.,
as the case may be.

Various other works have been consulted, two of which
VOL. XVI.
may be mentioned here, viz., one by Dr G. W. Müller on "The Fresh-Water Ostracoda of Germany," and the other by Dr A. Kaufmann on "The Fresh-Water Ostracoda of Switzerland."

Section I. Podocopa.

Family C Y P R I D I DÆ.

Genus (1) Cypria, Zenker, 1854.

1. Cypria exculta (S. Fischer).


This species, though widely distributed, is not very common in the district under consideration. It has been obtained in Loch Leven,1 Lochgelly Loch, Lochs Lurg and Dow, Kinross; Loch Achray, Perthshire; and Goldenhoof Dam, near Howietoun, Stirlingshire. Loch Ard, July 1906 (W. Evans).

2. Cypria ophthalmica (Jurine).


This is one of the most common and widely distributed species of our fresh-water Ostracoda.

Genus (2) Cycloocypris, G. S. Brady and A. M. Norman, 1889.


Has been obtained in a pond near Musselburgh in August 1894; Loch Leven, Loch Fitty, Black Loch, Loch Dow, Loch Katrine, Loch Achray, Loch Vennachar, and Loch Coulter. Teith at Callander (Evans).

1 It will be understood that the Loch Leven mentioned in this Catalogue is Loch Leven, Kinross.
4. *Cyclocypris serena* (Koch).

   A common and widely distributed species. It has been found in Loch a Chroin, at an altitude of 2500 feet, by Mr Evans.


   This, which is not such a common species as the last, has an elliptical instead of an ovate form when looked at from above. It has been observed in Duddingston Loch, Lochgelly Loch, pools on Luffness Links, etc.

   Dr G. W. Müller appears to think that the species referred by G. S. Brady and Norman to *Cyclocypris serena*, Koch, is the true *C. laevis* of O. F. Müller, and that their *C. laevis* is probably identical with a form described by Croneberg under the name of *Cyclocypris pygmaea*.

Genus (3) *Cypris*, O. F. Müller, 1785.


   *Hab.*—Duddingston Loch; Upper Elf Loch, Braid Hills; Linlithgow Loch; Loch Leven. Roslin Curling Pond, March 1906 (W. Evans).


   *Hab.*—Abundant in pools in the brickfield at Portobello in the autumn of 1888. In pools on May Island in September 1890. Common in pools on the side of the Union Canal at

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1 *Scottia Browniana* (Jones), which up till 1887, when living specimens were obtained near Rothesay, was only known as a fossil, was collected in a post-Tertiary deposit at Elie, Fifeshire, by the late James Bennie of the Geological Survey (cf. *Proc. Roy. Phys. Soc. Edin.*, vol. x. pp. 339-341, 1890-91). This form, which is placed between *Cyclocypris* and *Cypris*, has not yet been found *living* on the east side of Scotland.
Kingsknowe in May 1888. Pond at House-o’-Hill Farm, Midlothian, common, July 1900 (Dr and Miss Sprague).

8. Cypris virens, Jurine.


*Hab.*—Duddingston Loch; pools on Luffness Links; pools at Slateford; Kilconquhar Loch; Loch Leven. Marchfield Pond, July 1900, very common (Dr and Miss Sprague). Roslin Curling Pond, March 1906 (Evans).


1851. *Cypris affinis*, Fischer, Ueber das genus *Cypris*, p. 32, pl. x. figs. 9-11.

1889. ,, *reticulata*, Brady and Norman, *l. c.*, Part I. p. 76, pl. viii. figs. 1, 2; pl. xi. figs. 5-7.


*Hab.*—Camilla Loch, Fifeshire, and Duddingston Loch. This species does not appear to be very common. (I have recorded *C. affinis* from Linlithgow Loch, but the dissections show that the specimens belong to *C. fuscata*.)

10. Cypris obliqua, G. S. Brady.


*Hab.*—Lurg Loch (near L. Glow), Kinross-shire; Lochgelly Loch and Loch Achray. Craigleith Quarry, near Edinburgh, February 1901, one specimen (Dr and Miss Sprague).

Genus (4) Eurycypris, G. W. Müller, 1898.

11. Eurycypris pubera (O. F. Müller).

1785. *Cypris pubera*, O. F. Müller, Entomostraca, p. 56, taf. v. figs. 1-5.


*Hab.*—Duddingston Loch (Baird, Norman, and myself); Kilconquhar Loch; Kinghorn Loch (common); Lochgelly

Genus (5) Cyprinotus, G. S. Brady, 1886.

12. *Cyprinotus prasina* (Fischer).


_Hab._—Pools in an old brickfield at Seafield, near Dunbar, August 1890; in pools at the mouth of the Peffer Burn, near Aberlady, August 1893. *Cyprinotus prasinus* was obtained by the late James Bennie, of the Geological Survey, in material excavated from the bed of the Old “Nor Loch,” Edinburgh (cf. _Proc. Roy. Phys. Soc. Edin._, vol. x. p. 139, 1889).

Genus (6) Herpetocypris, G. S. Brady and A. M. Norman, 1896.

_Erpetocypris_, idem, 1889.


_Hab._—Duddingston Loch, Loch Leven, Linlithgow Loch, Loch Lubnaig, pools on Gullane Links, and various other places throughout the district. Loch Ard (Evans).


1785. *Cypris strigata*, O. F. Müller, Entomostraca, p. 54, pl. iv. figs. 4-6.

_Hab._—Duddingston Loch, Loch Leven, Black Loch near L. Glow; pools at Kingsknowe near Edinburgh, May 1888; Loch Coulter; and about Howietoun, Stirlingshire, 1889.

15. *Herpetocypris tumefacta*, G. S. Brady and D. Robertson.


_Hab._—Duddingston Loch, Loch Leven, pools on Luffness Links, Loch Achray, Loch Vennachar, Loch Coulter, and pools near Howietoun, etc. Ben Ledi, at 2500 feet (Evans).


*Hab.*—Duddingston Loch, Kinghorn Loch, Black Loch near L. Glow.

17. *Ilyodromus Robertsoni*, G. S. Brady and A. M. Norman.

*Hab.*—Linlithgow Loch; Black Loch near L. Glow, 14th September 1889.

Genus (8) *Cypridopsis*, G. S. Brady, 1867.

18. *Cypridopsis villosa* (Jurine).

*Hab.*—Duddingston Loch, Loch Leven, and in various other lochs and ponds throughout the district

   1853. *Cypris aculeata*, Lillj., De Crust. ex Ord. trib., p. 117, taf. xi. figs. 15, 16.
   1868. *Cypridopsis aculeata*, Brady, l. c., p. 376, pl. xxiv. figs. 16-20; pl. xxxvi. fig. 10.

*Hab.*—Pools in an old brickfield at Seafield, near Dunbar; Gullane, near Aberlady, August 1893. Cramond Island, July 1901 (Dr and Miss Sprague).

Genus (9) *Pionocypris*, G. S. Brady and A. M. Norman, 1896.


*Hab.*—Duddingston Loch, Loch Leven, Loch Coulter, Loch
Achray; Loch Rusky (Evans); and generally throughout the district, especially in the smaller bodies of water.

Objection is taken to the separation of this species from the genus *Cypridopsis*, to which it was ascribed by Dr G. S. Brady in 1867, but, as pointed out by Brady and Norman in the Appendix to their valuable *Monograph*, pp. 725 and 726, its removal became necessary when it was found to differ materially in the principal character on which the genus was founded, viz., the caudal rami. These were described as “being quite rudimentary, consisting of two slender setiform processes springing from a common base.” Careful examination has shown that while *C. villosa*, *C. aculeata*, and one or two others agree so far with this definition, the caudal rami in *C. vidua* consists of four setiform processes, and also that the basal part of each pair of processes differs to some extent. Dr Kaufmann does not appear to attach much value to this difference, and therefore replaces *C. vidua* under *Cypridopsis*, but he at the same time removes the others to a new genus—*Cypridopsella*—the chief distinguishing character of which is that while the first has five the other has only two hairs on the branchial plate of the first maxilla.1 Though *C. vidua* was made the type of the genus *Cypridopsis* by Dr Brady, it was doubtless because he considered its furca to be similar to that of the two species associated with it, and as these two species agree with the definition of *Cypridopsis*, I think they ought to be retained in that genus, and *C. vidua* removed, as has been done by Brady and Norman.

Genus (10) *Potamocypris*, G. S. Brady, 1870.

*Hab.*—Duddingston Loch, Loch Leven, Raith Lake, Loch Gelly, and several other places. Ben Ledi, at 2500 feet (Evans).

1 *Cypridopsis*—Branchial platte des Kiefer fusses mit fünf Borsten.
Furka verkümmert mit geißelförmiger Borste.

*Cypridopsella*—Branchial platte des Kiefer fusses mit zwei Borsten.
Furke verkümmert mit geißelförmiger Borste.
Genus (11) Aglaia, G. S. Brady.

22. Aglaia complanata, G. S. Brady and D. Robertson.


Hab.—Forth at Bo’ness (David Robertson). The late Dr Robertson, who obtained this rare form among some material collected by himself at Bo’ness, informed me in lit. of its occurrence there, but I have not met with it myself.

Genus (12) Notodromas, Lilljeborg, 1853.


1785. Cypris monacha, Müller, Entomostraca, p. 60, taf. v. figs. 6-8.

Hab.—Pools on Luffness Links; in a pond near Musselburgh; Lochgelly Loch and Camilla Loch, Fifeshire. Burnt-island Reservoir and Loch Rusky, 1906 (Evans).

Genus (13) Cyprois, Zenker, 1854.


1889. Cyprois flavus, B. and N., l. c., Part I. p. 97, pl. viii. figs. 18, 19; pl. xii. figs. 13-21, 28.

Hab.—Duddingston Loch (A. M. Norman). In 1889 I found this species in moderate abundance at the upper end of the Loch—not in the Loch itself, but in little pools on the marshy ground behind the fringe of tall reeds. I observed it again in September 1898 on the same marshy ground, but not so plentiful as in 1889. I do not remember ever having found it in the loch itself. This species was collected by the late Mr James Bennie, of the Geological Survey, in a post-Tertiary fresh-water deposit at Kirkland of Leven, Fifeshire (cf. Proc. Roy. Phys. Soc., vol. x. pp. 335-337, 1890-91).
Genus (14) Candona, Baird, 1845.


*Hab.*—This appears to be a moderately common species throughout the whole district.


*Hab.*—I find this species generally distributed but not very plentiful, and the males appear to be more frequent and larger than the females. The following are some of the places where it has been obtained:—Duddingston Loch (*♂*); Loch Leven (*♀*); Linlithgow Loch (*♀*); Cocklemill Burn, near Largo (*♂* and *♀*); Lochgelly Loch (*♂*); Camilla Loch (*♂* and ? *♀*); Kinghorn Loch (*♂*).

27. *Candona lactea*, Baird.


*Hab.*—Duddingston Loch, Loch Leven, Camilla Loch, Linlithgow Loch, Loch Coulter, and other places within the area.


1900. "*, compressa*, Kaufmann, Cyprid. u. Darwinul., p. 371, taf. xxvii. figs. 4-6 et seq.

*Hab.*—Duddingston Loch (Brady and Norman), Lochgelly Loch, Loch Leven, and several other places within the district.


1891. "*ambigua*, T. Scott, Ninth Rept. F. B. S., pt. iii. p. 277, pl. iv. fig. 7 a-c.

_Hab._—Lochgelly Loch and Loch Fitty, Fifeshire; not common.


_Hab._—Duddingston Loch, Lurg Loch, Raith Lake, pond at Howietoun; not common. The larva of the tapeworm, *Tania gracilis*, has been found encysted in a specimen of this species collected in Duddingston Loch.¹

31. *Candona fabæformis* (Fischer).

1851. *Cypris fabæformis*, Fischer, Über das genus Cypris, p. 146, pl. iii. figs. 6-16.

_Hab._—Duddingston Loch; marl-pit, near Davidson’s Mains, Edinburgh; pools on Luffness Links; Loch Fitty, and other places in Fifeshire; Linlithgow Loch; and in a pool near Howietoun.

32. *Candona acuminata* (Fischer).


_Hab._—Ditch beside Harelaw Dam, Balerno; Threipmuir Reservoir; Loch Fitty; ponds at Howietoun; and Loch Coulter.

The specimens recorded here agree closely with the female of *Candona caudata*, figured by Kaufmann in *Cypriden u. Darwinuliden der Schweiz*, p. 365, taf. xxiv. figs. 16-20; taf. xxvi. figs. 17-23.

33. *Candona hyalina*, G. S. Brady and D. Robertson.


*Hab.*—Threipmuir Reservoir, near Balerno (♂); Loch Fitty and Loch Gelly, Fifeshire; Loch Dow, Kinross-shire (♀); Loch Katrine. The shell is much compressed, and of a white colour in living specimens. The dorsal edge is obtusely angular.

Genus (15) *Candonopsis*, Vavra, 1891.

34. *Candonopsis Kingsleii* (Brady and Robertson).


*Hab.*—Duddingston Loch, pools on Luffness Links, Loch Leven, Camilla Loch, Loch Coulter, Loch Katrine, and others. This is a well-marked and widely distributed species. The shell in living specimens is white and much compressed.


35. *Paracandona euplectella* (Robertson).


*Hab.*—Loch Dow, near Loch Glow, Kinross-shire, 14th September 1889. This is still the only record I have of *P. euplectella* from the district under consideration. It is the most beautiful of the species belonging to the British *Candonae*. The shell is cylindrical and very tumid, and its structure is suggestive of the glass.sponge *Euplectella*, as implied by the specific name.
Genus (17) *Ilyocypris*, Brady and Norman, 1889.

36. *Ilyocypris gibba* (Ramdohr).

*Hab.*—Union Canal, near Edinburgh, 4th September 1889. I obtained a number of specimens here—the only place where I have observed it within the district. The shell of this species is ornamented with prominent tubercles.

37. *Ilyocypris bistrigata* (Jurine).
    1838. *Cypris biplicata*, Koch, Deutschlands Crustaceen, H. 21 (161), fig. xvi.

*Hab.*—Duddingston Loch, Loch Leven, etc. This species is generally distributed throughout the district. I have occasionally observed specimens distinctly larger than some of the others, but could find no other difference sufficient to permit of their separation even as a variety.


38. *Pontocypris mytiloides* (Norman).

*Hab.*—Off Aberlady, off Musselburgh, and various other parts of the Forth estuary. Living specimens are usually moderately dark in colour.


*Hab.*—Off St Monans and one or two other places in the estuary, 1890; rare. Living specimens are brownish in colour, and the surface is minutely punctate.


*Hab.*—Largo Bay and other parts of the estuary, but not very common.

41. Argillæcia cylindrica, G. O. Sars.


Hab.—Firth of Forth (Brady and Robertson). Off St Monans, rare.

Family BAIRDIIÆ.

Genus (20) Bairdia, M'Coy (?1849).

42. Bairdia inflata (Norman).


1868. Bairdia inflata, Brady, Mon. rec. Brit. Ostrac., p. 388, pl. xxvii. figs. 9-17; pl. xxxviii. fig. 5.

Hab.—Dredged off St Monans, 1889; rare. The specimens were of a brownish colour, and tumid, as indicated by the name.

Family DARWINULIDÆ.

Genus (21) Darwinula, Brady and Robertson, 1885.

43. Darwinula Stevensoni, Brady and Robertson.


Family CYTHERIDÆ.

Genus (22) Cythere, O. F. Müller, 1785.

44. Cythere lutea, O. F. Müller.

1785. Cythere lutea, Müller, Entomostraca, p. 65, taf. vii. figs. 3, 4.

Hab.—Forth estuary, especially inshore—a common British species.
45. *Cythere pellucida*, Baird.


*Hab.*—Cramond Island, taken with hand-net at low water in 1889, and subsequently in other parts of the estuary, chiefly in brackish water.

46. *Cythere confusa*, Brady and Norman.


*Hab.*—Largo Bay, off Musselburgh, and other places; moderately frequent.

47. *Cythere porcellanea*, G. S. Brady.


*Hab.*—South Bay, off Musselburgh, and other places, but for the most part in shallow water that is slightly brackish.


*Hab.*—South Bay, and deep water west of May Island; not common.

49. *Cythere semipunctata*, G. S. Brady.


*Hab.*—Aberlady Bay and Largo Bay; not common.

50. *Cythere crispata*, G. S. Brady.


*Hab.*—Off the west side of Inchkeith; scarce.

51. *Cythere gibbosa*, Brady and Robertson.


*Hab.*—Brackish pools at the mouth of the Cocklemill Burn, Largo Bay, 1890.
52. *Cythere semiovata*, T. Scott.


*Hab.*—Off St Monans, frequent. I had at first some doubt concerning the validity of this species, but as yet seen no described form with which it could agree, either as adult or young, it is retained in this Catalogue. In the original description of the species, “anterior” end should read “posterior” end, and *vice versa.*


*Hab.*—Off Bo’ness and throughout the estuary, but apparently not very plentiful.

54. *Cythere Robertsoni*, G. S. Brady.


*Hab.*—Dredged in the neighbourhood of Inchkeith, as well as in other parts of the estuary, but not very common.

55. *Cythere convexa*, Baird.


*Hab.*—Firth of Forth; distribution similar to that of *C. Robertsoni*, but it appears to be even scarcer. I have observed it only sparingly.


*Hab.*—South Bay, and in deep water west of May Island (1888). I find this to be a moderately rare species in the Firth of Forth.
57. *Cythere cuneiformis*, G. S. Brady.


_Hab._—Aberlady Bay in 3 fathoms, bottom muddy sand; rare.


_Hab._—Off St Monans; not common.


_Hab._—South Bay, off Inchkeith, and at various other places; frequent.

60. *Cythere pulchella*, G. S. Brady.


_Hab._—Firth of Forth (Brady and Norman). Off St Monans; not common. Without careful examination this species might be mistaken for the more common *C. villosa*.


_Hab._—Off the west side of Inchkeith (1888), and subsequently, but very sparingly, in other parts of the estuary.


_Hab._—Firth of Forth, taken from the stomach of a Sharp-tailed *Lumpenus, L. lampretiformis*, captured at Station III. (east of Inchkeith), 13th July 1901. This is the only record I have of *C. emaciata* for the Forth estuary.


_Hab._—South Bay; deep water west of May Island and other parts of the estuary; frequent.
64. *Cythere concinna*, Rupert Jones.

1856. *Cythere concinna*, Jones, Tert. Entom., p. 29, pl. iv. fig. 7 a-f.

_Hab._—South Bay, Largo Bay, west of May Island; not very common. Firth of Forth (Brady and Norman).


_Hab._—Off St Monans, frequent (1890).


_Hab._—Firth of Forth (Brady and Norman). Dredged in deep water west of May Island, not common; and subsequently in one or two other parts of the estuary.

67. *Cythere dunelmensis* (Norman).


_Hab._—Firth of Forth (Brady and Norman). Dredged in deep water west of May Island, 1888.

68. *Cythere antiquata* (Baird).


_Hab._—Firth of Forth (Brady and Norman). Dredged near Inchkeith and in South Bay; not common.

69. *Cythere Whitei* (Baird).

1850. *Cythereis Whitei*, Baird, l. c., p. 175, pl. xx. figs. 3, 3a.

_Hab._—Largo Bay; not common.

70. *Cythere Jonesii* (Baird).

1850. *Cythereis Jonesii*, Baird, l. c., p. 175, pl. xx. fig. 1.

_Hab._—South Bay, deep water west of May Island, and other places in the estuary; not common.
Genus (23) Limnicythere, G. S. Brady, 1867.


1850. *Cythere inopinata*, Baird, l. c., p. 172, pl. xxi. figs. 1, 1 a-e.

*Hab.*—Duddingston Loch, Loch Leven, Linlithgow Loch, Kilconquhar Loch, Lochgelly Loch, and other places. It is a small species that lives amongst the mud, and is easily missed.


*Hab.*—Loch Leven, moderately frequent. This is the only loch within the district where this species has been observed.

Genus (24) Cytheridea, Bosquet, 1852.

73. *Cytheridea elongata*, Brady.


*Hab.*—Firth of Forth (G. S. Brady). Off the west side of Inchkeith, and a few other parts of the estuary; not common.

74. *Cytheridea papillosa*, Bosquet.

1862. *Cytheridea papillosa*, Bosq., Entom. fossil des terrains de la France, p. 42, pl. ii. fig. 5 a-d.

*Hab.*—South Bay, off North Berwick, and some other places; not common.

75. *Cytheridea punctillata*, Brady.


*Hab.*—Aberlady Bay, Largo Bay, and other places.

76. *Cytheridea torosa* (Jones).


*Hab.*—Granton Harbour (D. Robertson); brackish-water
pools on the shore at Aberlady; pools in an old brickfield at Seafield, near Dunbar; mouth of the Cocklemill Burn, Largo Bay.

77. *Cytheridea lacustris* (G. O. Sars).


*Hab.*—Union Canal, near Edinburgh (D. Robertson); Loch Leven, moderately frequent.


78. *Eucythere declivis* (Norman).


*Hab.*—Off the west side of Inchkeith and various other places; frequent.

Genus (26) *Krithe*, G. S. Brady, Crosskey, and Robertson, 1874.


1856. *Cytherideis bartonensis*, Jones, *Mon. Ter. Entom.*, p. 50, pl. v. figs. 2a, b; 3a, b.

*Hab.*—Near the mouth of the Forth estuary; moderately common.


80. *Loxoconcha impressa* (Baird).


*Hab.*—Aberlady Bay, Largo Bay, and other parts of the estuary; frequent.

81. *Loxoconcha guttata* (Norman).


*Hab.*—Firth of Forth (Brady and Norman), South Bay and off North Berwick; frequent.
82. *Loxoconcha viridis* (O. F. Müller).

1785. *Cythere viridis*, Müller, Entomostraca, p. 64, taf. vii. figs. 1, 2.

*Hab.*—Granton Harbour (D. Robertson); Largo Bay, rather rare.

83. *Loxoconcha multifora* (Norman).


*Hab.*—Granton Harbour (D. Robertson). This is the only record for the Forth known to me. The species is, however, widely distributed, and is likely to occur in other parts of the estuary.

84. *Loxoconcha pusilla*, Brady and Robertson.


*Hab.*—Taken in the vicinity of Cramond Island where the water is somewhat brackish; apparently rare. Firth of Forth (Brady and Norman).


1856. *Cytherideis tamarindus*, Jones, Tert. Entom., p. 49, pl. iii. figs. 4a, 4b.

*Hab.*—Near Inchkeith, South Bay, and off North Berwick; frequent.


*Hab.*—Firth of Forth (Brady and Norman). This appears to be a rare species in the estuary. I have not myself observed it.


87. *Xestoleberis aurantia* (Baird).


*Hab.*—Off St Monans, Aberlady Bay, Largo Bay, etc., but not very plentiful.


*Hab.*—Off the west side of Inchkeith; rather rare.

**Genus (29) Cytherura, G. O. Sars, 1865.**

89. *Cytherura gibba* (O. F. Müller).

1785. *Cythere gibba*, Müller, Entomosbracea, p. 66, pl. vii. figs. 7, 8.
1889. *Cytherura gibba*, B. and N., *l. c.*, Part I., p. 190, pl. xviii. figs. 13-16; pl. xxii. figs. 6-12; pl. xxiii. fig. 8.

*Hab.*—Granton Harbour (D. Robertson), Largo Bay, and off Aberlady.

90. *Cytherura cornuta*, G. S. Brady.


*Hab.*—Near Fidra Island; off Musselburgh, and Burnt-island.


*Hab.*—Largo Bay, South Bay, and other parts of the estuary; moderately frequent.


*Hab.*—Dredged off the west side of Inchkeith. This is said to be one of the commonest species belonging to the *Cytheruræ*.


*Hab.*—Dredged off St Monans; rare. This species has also been obtained in the Firth of Clyde.

The authors of the Monograph referred to above are inclined to think that this form “must be regarded as the young of
Cytherura acuticostata," and in support of this view they state that though they do not have very young examples of that species to compare it with, a very fine series of the young of the C. cornuta shows that "the beak occupies a much larger proportion of shell, and is thus more prominently conspicuous" in the young of the Cytherura, and "that the lateral projections are also more acute than in the adult." ¹ These remarks are supported by an indifferent outline side-view of young forms of C. cornuta and C. nigrescens, but I think for the purpose of comparison a dorsal view should also have been given. I am, however, not extremely anxious whether the "species" stands or not, and therefore will not discuss its merits here. There are one or two points, however, that may be referred to—(1st) If a careful comparison of the original figures of C. bodotria be made with those of C. acuticostata given on plate xxxii. (figs. 12-15) of Dr Brady's excellent "Monograph of recent British Ostracoda," published in the Transactions of the Linnean Society, 1868, it will be seen that C. bodotria is proportionally more elongated and more depressed, and that, when seen from above, the lateral angles are remarkably prominent and not like the species it is said to be the young of; but (2nd), and leaving these differences meanwhile out of account, and taking for granted that Cytherura bodotria is the young of Cytherura acuticostata, then from what happens with other species one might expect these young to be smaller than the adult, but they are not so. The length of the specimen of C. bodotria represented by our drawings in Part III. of the Eighth Annual Report of the Fishery Board for Scotland was 0.5 mm., and the size of C. acuticostata as given in the Monograph already referred to at page 446, and which I suppose represents the adult size, is the \( \frac{1}{50} \) th of an inch, so that this supposed young form is as big as the one full grown.

But I had even a better and larger specimen of C. bodotria than the one figured, though it was similar in form and sculpture, and it would have been figured instead, but it was

¹ I have two smaller (younger) specimens of C. bodotria, and these have the lateral projections less developed than in the one figured, though otherwise similar to it.
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unfortunately accidentally crushed by the object-glass of the microscope having been lowered down on it. I have examined a considerable number of C. acuticostata and allied forms, but have failed to observe any with which C. bodotria could be incorporated.


*Hab.*—Off Musselburgh, Largo Bay, and other parts of the estuary; moderately frequent.

95. *Cytherura angulata*, G. S. Brady.


*Hab.*—Dredged off the west side of Inchkeith and other parts of the estuary, but not very plentiful.


*Hab.*—Dredged off Musselburgh, and off the west side of Inchkeith and other places. It appears to be generally distributed, but being very small (about the \(\frac{1}{6}\)th of an inch in length) it is easily overlooked.


1890., *mucronata*, T. Scott, Eighth Rept. F. B. S., pt. iii. p. 323, pl. xii. figs. 3-5 (? juv.).

*Hab.*—Dredged in Largo Bay and off St Monans, but not very common.

98. *Cytherura nigrescens* (Baird).


*Hab.*—South Bay, off Musselburgh, common. It has also been observed in other parts of the estuary.


*Hab.*—Off St Monans, frequent, in 12 to 15 fathoms, bottom partly clean sand and partly gravel.

100. *Cytherura similis*, G. O. Sars.


*Hab.*—Dredged off Musselburgh and in Largo Bay; not very common.


*Hab.*—Bo'ness, Firth of Forth (Brady and Robertson). Dredged off Bo'ness, off the west side of Inchkeith, and other parts of the Forth; not common.


*Hab.*—South Bay, and in other parts of the estuary, but apparently not common; but as it only measures $\frac{1}{10}$ of an inch (about $\cdot 36$ mm.) it may have frequently been overlooked.


103. *Cythereopteron latissimum* (Norman).


*Hab.*—Dredged in South Bay, and in deep water west of May Island; frequent.

104. *Cythereopteron nodosum*, G. S. Brady.


*Hab.*—Firth of Forth (Brady and Robertson). South Bay, off Musselburgh; not unfrequent.
105. *Cytheropteron punctatum*, G. S. Brady.

   figs. 45-48.

*Hab.*—Dredged off St Monans; rather rare.

106. *Cytheropteron angulatum*, Brady and Robertson.


*Hab.*—Largo Bay and off Aberlady; rare.


   figs. 32, 23.

*Hab.*—Largo Bay and off Aberlady; not common.


   figs. 4-7.

*Hab.*—Dredged off Limekilns and in Largo Bay. This small species, which measures only .33 mm., has also been found fairly plentiful in the Clyde in the crevices of partly decayed pieces of wood brought up in the dredge, and usually associated with an interesting species of Copepoda,*Harrietella simulans*, T. Scott.


*Hab.*—Dredged off Musselburgh and other places; not common. This moderately large species has sometimes been obtained in the stomachs of small fishes.


*Hab.*—Largo Bay and off Aberlady; frequent. This is a moderately common species in the Forth.
111. *Bythocythere simplex* (Norman).


*Hab.*—South Bay, in deep water west of May Island, and other places, but not very common. This is a fine large species, conspicuous from its white colour; it forms part of the food of young Gadoids, Rocklings, *Lumpenus*, Long Rough Dabs, and other fishes.

112. *Bythocythere recta*, G. S. Brady.


*Hab.*—Largo Bay; rare.


*Hab.*—Firth of Forth (Brady and Robertson). Off St Monans; frequent.

Genus (33) *Sclerochilus*, G. O. Sars, 1865.

114. *Sclerochilus contortus* (Norman).


*Hab.*—South Bay, and in deep water west of May Island; frequent.


115. *Cytherideis subulata*, G. S. Brady.


*Hab.*—Dredged off the west side of Inchkeith and other parts in the estuary; not very common.

Genus (35) *Cytherois*, W. Müller, 1884.


*Hab.*—Off Aberlady and St Monans; frequent.
Genus (36) *Paradoxostoma*, Fischer, 1851.


*Hab.*—Largo Bay, and generally throughout the estuary, especially in the littoral and laminarian zones.

118. *Paradoxostoma ensiforme*, G. S. Brady.


*Hab.*—Dredged off the west side of Inchkeith; off Musselburgh and elsewhere.


*Hab.*—Off Musselburgh; not very common. Easily distinguished from its being remarkably short in comparison to the height; there is also a perceptible difference in the contour of the shell when seen from the side.

120. *Paradoxostoma obliquum*, G. O. Sars.


*Hab.*—Off Fidra, Musselburgh, and Burntisland; moderately rare. This species is more tumid as viewed from above when compared with most of the other British species.


*Hab.*—Dredged off Musselburgh; moderately rare.


1868. *Paradoxostoma hibernicum*, Brady, l. c., p. 460, pl. xxxv. figs. 35, 36; pl. xl. fig. 7.

*Hab.*—Largo Bay; rather rare.

123. *Paradoxostoma arcautum*, G. S. Brady.

1868. *Paradoxostoma arcautum*, Brady, l. c., p. 461, pl. xxxv. fig. 37.

*Hab.*—Granton (Brady and Robertson). Off St Monans, Largo Bay, and vicinity of Inchkeith; rare.
124. Paradoxostoma orcadense, G. S. Brady and D. Robertson.  
Hab.—Off St Monans; rare.

125. Paradoxostoma Hodgei, G. S. Brady.  
Hab.—Off St Monans, frequent; also near Fidra.

126. Paradoxostoma flexuosum, G. S. Brady.  
Hab.—Firth of Forth (Brady and Robertson). Off Bo'ness, South Bay, and other parts of the estuary; frequent.

1896. B. and N., l. c., Part II. (Appendix) p. 739, pl. lxiii. figs. 10, 11.  
Hab.—Off St Monans; not common. The species which this form most closely resembles is the Paradoxostoma arcuatum of G. S. Brady, but it is not so narrow posteriorly, and its greatest breadth is nearer the posterior extremity. It has also been taken by Canon Norman near Inveraray, Loch Fyne.

Genus (37) Machærina, Brady and Norman, 1889.

128. Machærina tenuissima (Norman).  
Hab.—Dredged in deep water west of May Island; not common. Also observed in the stomach of a Five-bearded Rockling captured in the Forth on 13th May 1901. This species is remarkably compressed, and though moderately high in the middle, both ends taper gradually to a narrow point, imparting to the shell a very slender appearance.
Section II. **Myodocopa.**

**Family Asteropidae**, Brady and Norman.

**Genus (38) Asterope**, Philippi, 1840.

129. *Asterope mariae* (Baird).


*Hab.*—Dredged near the Bass Rock; not common.

**Family Cyprinidae**, Baird, 1850.

**Genus (39) Philomedes**, Lilljeborg, 1853.

130. *Philomedes interpuncta* (Baird).

1850. *Cypridina interpuncta*, Baird, l. c., p. 257, pl. xvii. figs. 8-10.

*Hab.*—South Bay, off west side of Inchkeith, and other parts of the estuary; sometimes taken with the tow-net, and often with the dredge.

Section III. **Cladocopa**, G. O. Sars, 1865.

**Family Polycopidae.**


*Hab.*—Dredged near Fidra, Firth of Forth; rare.

**Genus (41) Polycopsis**, G. W. Müller, 1894.

132. *Polycopsis compressa* (Brady and Robertson).


*Hab.*—Off St Monans; frequent.

It will be observed that the Ostracoda enumerated here amount to 132 species, and belong to 41 genera. There are
some others which, judging from their distribution, may also occur within the Forth area, though hitherto they have escaped notice. I have already mentioned that *Scottia Browniana* has been observed in a lacustrine deposit at Elie, Fifeshire, and as it appears to be very local in its distribution, it may yet be found living somewhere within the district. *Cypridopsis Newtoni* is another that may be expected to occur in some of the inland waters, and there are also a few marine forms that are likely to be met with.

About 170 species have, I think, been recorded from Scotland (including the Orkney and Shetland Islands), and if those which have hitherto been only observed in the neighbourhood of Shetland be excepted, it will be found that fully 84 per cent. of the Scottish species are represented within the Forth area.

**Order COPEPODA.**

The Copepoda comprise a much larger number of species than any of the other Crustacean orders. The species enumerated here amount to 306, and include both free-swimming and parasitic forms.

Various methods have been adopted for the scientific arrangement of these organisms. In that used by Professor G. O. Sars in his great work on the *Crustacea of Norway*, now in course of publication, and which for the sake of uniformity I propose to follow generally, the Copepoda are separated into seven divisions, viz.:—1st, the Calanoida, most of which are free-living and pelagic; 2nd, the Harpacticoida, which for the most part are free-living but demersal; 3rd, the Cyclopoida, some of which are free-living fresh-water species, while others are “semi-parasites,” and live as commensals or messmates with various other organisms; 4th, the Noto-delphyoida, which, for the most part, are “semi-parasites,” associated with various Ascidians; 5th, the Monstrilloida, a small but curious group, which appear to live a partly parasitic and partly free life; 6th, the Caligoida, chiefly parasitic on fishes, but some of which possess a certain freedom of movement; and 7th, the Lernæoida, fish para-
sites, which, in the adult stage, are more or less permanently fixed on some part of the fish.

This arrangement does not differ greatly from that of Professor G. S. Brady's excellent Monograph of the Free and Semi-Parasitic Copepoda of the British Islands, except that the Cyclopidæ and Notodelphydæ are in that work placed between the Calanoids and Harpacticoids.

The species recorded in the sequel are distributed among the seven divisions as follows:

1st. The Calanoida, represented by 30 species.
2nd. The Harpacticoida, " " 170 "
3rd. The Cyclopoida, " " 59 "
4th. The Notodelphyoida, " " 9 "
5th. The Monstrilloida, " " 5 "
6th. The Caligoida, " " 12 "
7th. The Lernæoida, " " 21 "

Total number, 306 "

Division Calanoida.

In the arrangement and nomenclature of the species under this division, Professor G. O. Sars' work—An Account of the Crustacea of Norway, vol. iv., Copepoda Calanoida—is generally followed. See also Professor G. S. Brady's Monograph of the Free and Semi-Parasitic Copepoda of the British Islands, vol. i.

Family Calanidae.

Genus (1) Calanus, Leach, 1816.

1. Calanus septentrionalis (Goodsir).

1863. Calanus helgolandicus, Claus, Die frei-lebenden Copepoden, p. 171, pl. xxvi. figs. 2-9.

Hab.—Common in the Firth. Previously recorded as C. finmarchicus (Gunn.), but, as indicated by G. O. Sars, that species is slightly larger, and differs in some structural details, and its distribution appears for the most part to
be confined to the arctic or subarctic seas. There seems to be little doubt that *Cetochilus septentrionalis* is identical with *Calanus helgolandicus*, Claus, and having priority in publication, it should have preference over *C. helgolandicus*.

Family **Paracalanidae**, G. O. Sars, 1902.

Genus (2) **Paracalanus**, Boeck, 1864.

2. *Paracalanus parvus* (Claus).


*Hab.*—Occasionally taken with the tow-net near the seaward limits of the Forth estuary, sometimes in moderate abundance, but usually it is a rather scarce species.

Family **Pseudocalanidae**.

Genus (3) **Pseudocalanus**, Boeck, 1872.


*Hab.*—Common throughout the estuary. Boeck described this species as *Clausia elongata*, but as that generic name had been previously used by Claparède for a genus of parasitic Copepods, he withdrew it and substituted the name *Pseudocalanus*.

Family **Ætideidae**.

Genus (4) **Bradyidius**, Giesbrecht, 1897.


*Hab.*—Off St Monans and a few other places near the
seaward limits of the estuary. I have given several synonyms for this species, as there appears to be some doubt about the name that should be used for it.

**Family Stephidae.**

**Genus (5) Stephos, T. Scott, 1892.**


_Hab._—Off St Monans and other parts of the estuary; not common. Dredged in 7 fathoms off the east side of Inchkeith, 23rd May 1901.


_Hab._—Obtained in a gathering collected in 1892, but not examined till 1902; also in a gathering from an old quarry near Granton to which the sea has access, collected in 1894; rather rare.

**Family Pseudocyclopiidae.**

**Genus (6) Pseudocyclopia, T. Scott, 1892.**


_Hab._—Off St Monans, 1891; off the east side of Inchkeith in May 1901, and at a few other places; not common.


_Hab._—Off St Monans, 1891; not common. This is a smaller, and apparently a rarer species than the last.

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*Hab.—* Off St. Monans in 1893; off the east side of Inchkeith, in about 5 fathoms, in May 1901.


*Hab.—* West of Queensferry; rare. A single male was dredged to the west of Queensferry, 17th November 1893, but was only recently identified. A female (the one he describes and figures) was taken by Dr Wolfenden with a surface tow-net off the island of Bressay, Shetland, in March 1900.

Family **Centropagidae**.

Genus (7) *Centropages*, Kröyer, 1848.


*Hab.—* Not uncommon in the seaward portion of the estuary, especially during summer; but it appears to become rarer in the winter months.


1853. *Ichtyophorba hamata*, Lillj., De Crust. ex ord. tribus in Scania occurrentibus, p. 185, pl. xxii.; pl. xxvi. figs. 9-12.

*Hab.—* This species, which is rather more common than the last, has a seasonal distribution somewhat similar to it.

Family **Diaptomidae**.

Genus (8) *Diaptomus*, Westwood, 1836.


*Hab.—* In an old quarry on the Braid Hills, Edinburgh, in April 1888: this quarry is now included within the public
park. Roslin Curling Pond (♂ and ♀), 3rd March 1906 (Evans).


*Hab.*—Duddingston Loch, Loch Leven, and in most of the fresh-water lochs within the area; common. Loch a Chroin, 2500 feet, September 1906 (W. Evans).


*Hab.*—Loch Katrine, Trossachs, 16th March 1898; rather rare.


1891. ,, *serricornis*, Lillj., Brady, l. c., p. 36, pl. ix. figs. 3-10.

*Hab.*—Loch Achray, Trossachs, 27th November 1897. Though this is the only loch within the area of the Forth basin in which I have obtained *Diaptomus Wierzejskii*, it is a widely distributed species in the north of Scotland, Shetland, and the Outer Hebrides.

Family *Temoridae*.

Genus (9) *Temora*, Baird, 1830.


*Hab.*—Common, and generally distributed throughout the estuary.

Genus (10) *Eurytemora*, Giesbrecht, 1881.


*Hab.*—In the estuary near South Queensferry.


_Hab._—Taken in the vicinity of Culross, and between Kincardine-on-Forth and Alloa, in July 1891 and February 1892; moderately common.

**Family Metridiidae.**


_Hab._—Obtained sparingly near the mouth of the estuary, and from there west to near Inchkeith.

**Family Pseudocyclopidae.**


_Hab._—Off St Monans, 1893; rare.


_Hab._—Taken sparingly with the dredge off St Monans. Also off the north-west end of Inchkeith, in about 5 fathoms, on 23rd May 1901.
Family Candaciidae.

Genus (13) Candacia, Dana, 1846.

23. Candacia armata, Boeck.

1878. pectinata, Brady, Monograph, vol. i. p. 49, pl. viii. figs. 14, 15; pl. x. figs. 1-12.

Hab.—Occasionally captured with the tow-net between Inchkeith and May Island. This species appears to be more frequent in winter and spring than during the summer months.

Family Pontellidae.

Genus (14) Anomalocera, Templeton, 1837.


Hab.—This species is, at times, moderately frequent in the Forth estuary, especially during summer and autumn.

Genus (15) Labidocera, Lubbock, 1853.


Hab.—Off the east side of Inchkeith; collected 8th June 1891, but not examined till 1899.

Family Parapontellidae.

Genus (16) Parapontella, G. S. Brady, 1878.


Hab.—This species has been observed above Queensferry, off Musselburgh, in the neighbourhood of Inchkeith, off the Wemyss, and in the neighbourhood of Dunbar.
Family Acartiidae.

Genus (17) Acartia, Dana, 1846.

27. Acartia longiremis (Lilljeborg).


Hab.—Generally distributed throughout the estuary; not usually uncommon, but at some seasons it appears to be more numerous than at others.


Hab.—The distribution and frequency of this species is somewhat similar to the last.


1882. ,, ,, Giesb., Die frei-leb. Copep. der Kieler Föhrde, p. 147, pl. iii. figs. 4, 22, 23 et seq.

Hab.—Taken in the vicinity of Culross, near the head of the estuary, in 1891.

30. Acartia discaudata, Giesbrecht.


Hab.—Collected with a tow-net between Portobello and Cockenzie in 1890, and on several subsequent occasions, chiefly in the same part of the estuary. The female of this species is readily distinguished by the character of the furcal joints, which are of the form of broad flattened plates fringed with stout and not very long setæ.
Division HARPACTICOIDA.

I have decided to omit the separating of the Harpacticoida into families, because Professor G. O. Sars, in his work now in course of publication, is creating an entirely new arrangement of these Copepoda. The reader is therefore referred to vol. v. of The Crustacea of Norway, part of which is already published, for the systematic distribution of this group.

Genus (18) Misophria, Boeck, 1864.

31. Misophria pallida, Boeck.


Hab.—Dredged off St Monans, west of Queensferry, and other parts of the estuary, but not very common.

Genus (19) Longipedia, Claus, 1863.

32. Longipedia Scotti, G. O. Sars.


Hab.—Moderately common throughout the estuary.

33. Longipedia minor, T. and A. Scott.


1904. "" minor, G. O. Sars, l. c., vol. v. p. 12, pl. v. fig. 2.

Hab.—Not uncommon in various parts of the estuary, as off Musselburgh, Largo Bay, etc.
Genus (20) Canuella, T. and A. Scott, 1893.

34. *Canuella perplexa*, T. and A. Scott.


Hab.—Frequent in material dredged off Musselburgh, Largo Bay, Aberdour Bay, and other places.

Genus (21) Neobradya, T. Scott, 1892.


Hab.—Dredged off the north end of Inchkeith in November 1889, and also off St Monans in 1891. This species appears to have a fairly wide distribution, as it has been found in the Clyde by myself, and off the Isle of Man by the late I. C. Thompson of Liverpool.

Genus (22) Zosime, Boeck, 1872.


Hab.—Taken off Musselburgh; frequent.

Genus (23) Ectinosoma, Boeck, 1864.


Hab.—Moderately common throughout the estuary.


*Hab.*—Moderately common, especially among weeds in shallow inshore water.


*Hab.*—Taken off Musselburgh, not very common; but as it is somewhat similar to *E. Sarsi* in size and general appearance, it is easily overlooked.


*Hab.*—Moderately common in material dredged in Aberdeen Bay and off Musselburgh; taken also sparingly off St Monans.


*Hab.*—Dredged sparingly off Burntisland.

42. *Ectinosoma curticorne*, Boeck.


1896 " " T. and A. Scott, *op. cit.*, p. 430, pl. xxxvi. figs. 22, 30, 34 et seq.

*Hab.*—Taken off Burntisland and Musselburgh, and a few other inland parts of the estuary.

43. *Ectinosoma erythrops*, G. S. Brady.


*Hab.*—Off St Monans; moderately rare.
44. *Ectinosoma gothiceps*, Giesbrecht.


1896. ,, *pygmaeum*, T. and A. Scott, *op. cit.*, p. 433, pl. xxxvi. figs. 15, 41 et seq.

_Hab._—Off St Monans; not common.


_Hab._—Obtained off the west side of May Island in moderately deep water; rare.


_Hab._—Dredged off St Monans; rare.

47. *Ectinosoma longicorne*, T. and A. Scott.


_Hab._—Dredged off St Monans; rare.


_Hab._—Dredged off St Monans; rare.


_Hab._—Dredged off St Monans; not very common.
Genus (24) Microsetella, Brady and Robertson, 1873.

50. Microsetella norvegica (Boeck).


Hab.—Taken near Inchkeith, with the surface tow-net, in November 1890, and subsequently in various parts of the estuary, sometimes in considerable numbers.


51. Pseudobradya minor (T. and A. Scott).


Hab.—Taken off St Monans and near Musselburgh, but apparently not very common.

52. Pseudobradya elegans (T. and A. Scott).


Hab.—Taken sparingly in Largo Bay and off Musselburgh.

53. Pseudobradya hirsuta (T. and A. Scott).

1896. Bradya hirsuta, T. and A. Scott, op. cit., p. 423, pl. xxxv. figs. 2, 8, 17 et seq.

Hab.—Taken in Largo Bay in 1891, and afterwards in other parts of the estuary, but always very sparingly.

54. Pseudobradya similis (T. and A. Scott).


Hab.—The distribution of this species is similar to the last, but it is a smaller species, being little more than half the
size. It resembles that species in having the furcal joints comparatively long and spreading.

55. *Pseudobradya fusca* (T. and A. Scott).

1896. *Bradya fusca*, T. and A. Scott, *op. cit.*, p. 424, pl. xxxv. figs. 6, 12, 18, 20 et seq.

*Hab.*—Taken very sparingly in Largo Bay. This is a moderately stout species, but the abdominal part of the body tapers more gradually towards the furcal joints than does some of the others.

Genus (26) *Bradya*, Boeck, 1872.

56. *Bradya typica*, Boeck.


*Hab.*—Obtained off the west side of May Island, and in some other parts of the estuary; not very rare.


57. *Harpacticus chelifer* (O. F. Müller).


*Hab.*—This species appears to be moderately common throughout the estuary, especially in the littoral and laminarian zones.


*Hab.*—Taken in the vicinity of Dunbar on 26th April 1894, but not previously recorded.
59. Harpacticus flexus, Brady and Robertson.


Hab.—Obtained off St Monans, in Largo Bay, and off Musselburgh, but not very common.

60. Harpacticus obscurus, T. Scott.


Hab.—Taken sparingly in an old quarry at Granton, open to the sea. This species has a superficial resemblance to the last, but is smaller, and the posterior foot-jaws (second maxillipeds) are different.

Genus (28) Tigriopus, Norman, 1868.

61. Tigriopus fulvus (Fischer).


Hab.—Moderately common in pools about high-water mark on Cramond Island.

Genus (29) Zaus, Goodsir, 1845.


Hab.—Frequent in dredged material collected off Musselburgh, in Largo Bay, and various other places.

63. Zaus Goodsiri, G. S. Brady.


Hab.—Frequent in dredged material collected off St Monans, and also occasionally off the east side of Inchkeith.
Genus (30) Alteutha, Baird, 1845.

64. *Alteutha interrupta* (Goodsir).


_Hab._—Frequent in tow-net gatherings collected amongst Laminaria, and also in inshore dredgings.

Genus (31) Eupelte, Claus.


_Hab._—Taken off Musselburgh, off the north end of Inchkeith, and at other parts of the estuary, but not very common.

Genus (32) Tegastes, Norman, 1903.


_Hab._—Found sparingly throughout the estuary. This curious species was first recorded for the Forth in Part III. of the Sixth Annual Report of the Fishery Board for Scotland (1888). The _A. sphærica_ of Claus (_A. nigrans_, T. and A. Scott) has not yet been observed in the Forth.

Genus (33) Porcellidium, Claus, 1860.

67. *Porcellidium fimbriatum*, Claus


_Hab._—Obtained in Largo Bay on seaweed brought up
with the dredge. This species frequents the fronds of Laminaria and other seaweeds, to which it can adhere very firmly; and from its colour and very flattened form it is, though not uncommon, easily missed unless the weed be carefully examined.

Genus (34) Aspidiscus, Norman, 1868.

68. Aspidiscus littoralis, G. O. Sars.


Hab.—This species was obtained very sparingly in a shore gathering near the mouth of the estuary.

Genus (35) Tisbe, Lilljeborg, 1853.

69. Tisbe furcata (Baird).

1850. Canthocamptus furcatus, idem, Brit. Entomostraca, p. 210, pl. xxv. figs. 1 and 2; pl. xxx. figs. 1-6.
1880. Idya furcata, G. S. Brady, i. c., vol. ii. p. 172, pl. lxvii. figs. 1-11.

Hab.—Various parts of the estuary. Common, especially within the littoral and laminarian zones.

70. Tisbe gracilis (T. Scott).


Hab.—In an old quarry at Granton, open to the sea; rare. Collected by hand-net near low-water.

Genus (36) Thalestris, Claus, 1863.

71. Thalestris longimana, Claus.

1863. Thalestris longimana, Claus, Die frei-lebenden Copepoden, p. 130, pl. xviii. figs. 1-11.

Hab.—In rock pools near high-water on Cramond Island;
in the neighbourhood of Inchkeith; at Station VII. and other parts of the estuary; usually not very plentiful.


72. Parathalestris Clausi (Norman).

1888. , , G. S. Brady, Monograph vol. ii. p. 128, pl. lxii. figs. 1-12.

Hab.—Largo Bay, washed from seaweed brought up by the dredge, frequent; dredged also in shallow water off Musselburgh.

73. Parathalestris harpactoides (Claus).

1863. Thalestris harpactoides, Claus, i. c., p. 133, pl. xix. figs. 2-12.

Hab.—Dredged off St Monans in 1891, but only a few specimens were observed.

Genus (38) Phyllothalestris, G. O. Sars, 1905.

74. Phyllothalestris mysis (Claus).

1863 Thalestris mysis, Claus, i. c., p. 130, pl. xviii. figs. 12-16.

Hab.—Firth of Forth, 1894,—a fine species, very sparingly but widely distributed.


75. Halithalestris Croni (Kröyer).

1849. Harpacticus Croni, Kröyer, in Gaimard’s Voyages en Scand., Zool., pl. xliii fig. 3 a-n.
1880. Thalestris serrulatus, G. S. Brady, l. c., vol. ii. p. 133, pl. lix. figs. 2-11.

Hab.—East of Inchkeith, several taken with surface tow-net in 1889; and in surface tow-net in June 1891 at Station IX. This appears to be a truly pelagic species, and widely distributed, but which only occasionally enters the Forth
estuary. As the colour of these Copepods is bright red they are easily noticed, but the colour quickly disappears when they are preserved in alcohol.

Genus (40) Rhynchothalestris, G. O. Sars, 1905.

76. Rhynchothalestris rufocincta (Norman).


Hab.—In pools between tide-marks about Joppa and Granton, 1887, frequent, and subsequently in various other parts of the estuary, but more common in the littoral zone than in deep water.

77. Rhynchothalestris helgolandica (Claus).

1863. Thalestris helgolandica, Claus, l. c., p. 131, pl. xvii. figs. 12-21.

Hab.—Washed from some seaweed obtained while dredging in Largo Bay in April 1891. Also obtained in dredged material collected off the north-east end of Inchkeith in May 1901.


78. Microthalestris forficula (Claus).

1863. Thalestris forficula, Claus, l. c., p. 131, pl. xvii. figs. 7-12.

Hab.—In pools near low-water between Leith and Portobello, not very common. The part of the shore where the specimens were chiefly obtained was opposite Seafield, where there is a good deal of mud.
Genus (42) Amenophia, Boeck, 1864.

79. Amenophia peltata, Boeck.


Hab.—Dredged off Musselburgh; not common. The species differs from the typical Thalestris in the body being very depressed and in the structure of some of the appendages, as shown by the drawings in the works referred to.

Genus (43) Westwoodia, Dana, 1855.

80. Westwoodia nobilis (Baird).


Hab.—Taken at Cramond Island in rock-pools between tide-marks, and in dredged material collected off Musselburgh in 3 to 4 fathoms; not common.

Genus (44) Pseudothalestris,1 Brady, 1883.

81. Pseudothalestris Andrewi (T. Scott).


Hab.—Dredged off Burntisland in 3 to 4 fathoms water; frequent.

This group of Copepods have so close a general resemblance to Westwoodia, Dana, that I ascribed the first species to a new genus, Pseudowestwoodia, which recognised that resemblance, but afterwards I discovered that they were identical.

1 The genus Pseudothalestris is closely related to Westwoodia, Dana, but as it contains a group of species which differ distinctly in the structure of the first pair of thoracic feet, I prefer to retain it as a separate genus.
with the genus *Pseudothalestris*, Brady, described by that author in his "Report on the Challenger Cephalopoda."\(^1\)

82. *Pseudothalestris pygmcea* (T. and A. Scott).


*Hab.*—Dredged sparingly in the neighbourhood of Dunbar.

83. *Pseudothalestris major* (T. and A. Scott).


*Hab.*—Dredged in the neighbourhood of Granton, and near Dunbar.

Genus (45) *Dactylopusia*, Norman, 1903.\(^3\)

84. *Dactylopusia tisboides* (Claus).


*Hab.*—Shore-pools at Cramond Island; dredged off Musselburgh and other parts of the estuary; frequent in the littoral and laminarian zones.


*Hab.*—This brackish-water form was observed in the lagoon at the mouth of the Cocklemill Burn (east end of Largo Bay).


\(^2\) See remarks on this species and also on the genus in Part III. of the *Twenty-fourth Annual Report of the Fishery Board for Scotland*, at page 277 (1906).

\(^3\) The name *Dactylops*, Claus, being preoccupied by Gill for a genus of fishes, was by Canon Norman changed to *Dactylopusia*. 


**Hab.**—Forth, west of Queensferry, washed from lumps of hardened mud; not very common. According to G. O. Sars, this is not the *Canthocamptus Strömi*, Baird, as Claus supposed it to be.


**Hab.**—Obtained in pools between tide-marks at Musselburgh in 1894, but not recorded till 1903. This seems to be a rare species.


1903. ,, *mixtus*, T. Scott, Twenty-first *F. B. Rept.*, pt. iii. (pub. 20th July 1903), p. 126, pl. iii. figs. 9-16.

**Hab.**—This *Dactylopsia* was first described from specimens obtained in East Finmark, within the Arctic Circle, in a collection made by Canon Norman in the summer of 1890. The species was also observed in a gathering collected in 1894 in the old quarry at Granton, where several other interesting Copepoda have been captured. This gathering was not thoroughly examined till 1903, when the *Dactylopsia* was by an oversight redescribed as a "new species," under the name of *D. mixtus*.

89. *Dactylopsia debilis* (Giesbrecht).


**Hab.**—This species occurred very sparingly in a gathering dredged off Musselburgh in 4 to 5 fathoms.
90. *Dactylopusia brevicornis* (Claus).


*Hab.*—Dredged in Largo Bay and in the old quarry at Granton; not common.


91. *Dactylopodella flava* (Claus).

1866. *Dactylopus flavus*, Claus, l. c., p. 28, pl. iii. figs. 13-16.

*Hab.*—Taken very sparingly with the dredge in Largo Bay and at Station III.


92. *Idomene forficata*, Philippi.


*Hab.*—I have occasionally dredged this species in the Forth estuary, but it was usually passed over as the male of *Dactylopodella flava*.


This genus has a general resemblance to *Idomene*, Philippi. The antennules (anterior antennæ) short, six- or seven-jointed.

Posterior antennæ tolerably well developed, and composed of two joints.

Mandibles, with masticatory edge, moderately broad, and armed with several stout but irregular teeth. Mandible-palp well developed, and furnished with two uniarticulate branches of moderate size, the outer one wanting the strong spines that appear to be characteristic of species belonging to *Idomene*. 
Maxillae similar in structure to those of the genus mentioned. The first and second maxillipeds are also similar to those of the same species.

The first pair of thoracic feet resemble those of *Idomene*, but the first joint of the inner branch is not nearly so robust, and the terminal setæ of the end joint are not so strongly clawed.

The second, third, and fourth pairs in the female are similar to those of *Idomene*, but the second pair in the male has the inner branch armed with a strong claw-like spine.

The fifth pair comparatively small, lamelliform, and the primary and secondary joints are sub-equal, and only moderately developed (cf. Twelfth Annual Report Fishery Board for Scotland, pt. iii. p. 255, pl. lx. fig. 19, etc.).

Furcal joints short. One ovisac.

The differences that separate this genus from *Idomene* are comparatively small; but in the following two species, which I have ascribed to it, the armature of the mandible-pulp, and the structure of the inner branch of the first pair of thoracic feet, preclude them from a place in Philippi's genus.


*Hab.*—The specimens from which this species was described were obtained by carefully washing shells inhabited by the common hermit crab, *Eupagurus*, Bernhardus, which were dredged off the west side of Inchkeith.

94. *Idomenella coronata*, T. Scott.


*Hab.*—Dredged near the Bass Rock and also in Largo Bay; not common. It has also been obtained very sparingly off Musselburgh, and at the north end of Inchkeith.
Genus (49) *Amphiascus*, G. O. Sars, 1905.

95. *Amphiascus minutus* (Claus).


*Hab.*—In dredged material from Largo Bay,—the only place within the estuary where this species has been noticed.

96. *Amphiascus Catharineae*, T. Scott.¹


*Hab.*—Collected by hand-net in an old quarry at Granton, open to the tide, where many interesting forms have been obtained.

97. *Amphiascus tenuiremis* (Brady and Robertson).


*Hab.*—Dredged in Largo Bay, where it occurred very sparingly.

98. *Amphiascus similis* (Claus).


*Hab.*—Dredged west—off Queensferry, 17th November 1893; not common.


*Hab.*—Collected near Cramond and North Berwick in 1887, and near Inchkeith in 1901, but apparently not very common.

¹ Named in compliment to a friend of the author.
Genus (50) Stenhelia, Boeck, 1864.

100. Stenhelia hispida, G. S. Brady.


_Hab._—This Copepod was observed sparingly in some material dredged off St Monans in 1893, and off North Berwick in July 1901.


1893. Stenhelia hirsuta, I. C. Thompson, Revised Rept. on the Copepoda of L—pool Bay, p. 20, pl. xxxi.

_Hab._—Dredged off St Monans in 1893, and in the neighbourhood of Inchkeith in 1901. The female of this species carries two ovisacs instead of one, and thus differs from some of the other forms grouped under this genus.

102. Stenhelia dispar, T. and A. Scott.


_Hab._—Dredged in the neighbourhood of the Bass Rock in 1893; apparently rare.

103. Stenhelia denticulata, I. C. Thompson.

1893. Stenhelia denticulata, I. C. Thompson, _l. c._, p. 20, pl. xxx. figs. 1-11.

_Hab._—This very distinct species was dredged off St Monans in 1893, and it has also been obtained near Inchkeith, but appears to be somewhat rare in the estuary.

104. Stenhelia reflexa, T. Scott.


_Hab._—This species was obtained in pools between tide-marks on the shore north-east of Dunbar in 1894. Only a few specimens were observed. It resembles _Amphiascus imus_ in some respects, but differs in the structure of the anterior antennæ and of the first and fifth pairs of thoracic feet, as pointed out in the description.


*Hab.*—This tolerably distinct form was dredged off St Monans in 1896. The species was described from specimens obtained in some material dredged off Arisaig, Argyleshire, in 1892. Although this form appears to be widely distributed, it does not seem to be very common.


1906. " " idem, Crust. of Devon and Cornwall, p. 142, pl. x. figs. 1-3; pl. xi. figs. 1, 2 et seq.

*Hab.*—Station II., Forth, dredged 26th December 1894. This species, which is very small, appears to be widely distributed, as the type specimens were collected by the Rev. Canon Norman near Eddystone Lighthouse.


*Hab.*—Dredged at Station III., 7th June 1901. Apparently rare.

Genus (51) *Ameira*, Boeck, 1864.


*Hab.*—Dredged off St Monans and in other parts of the estuary, but not very common.


*Hab.*—Taken in various parts of the estuary. First noticed
in material dredged off St Monans in 1891. This species appears to be moderately frequent in the Firth.


1894. *", T. Scott, Twelfth F. B. Rept., pt. iii. p. 242, pl. ix. fig. 30; pl. x. figs. 1-12.

*Hab.*—This moderately large and distinct species was taken in shore-pools, near low-water, at Seafield, Leith; it was subsequently obtained at Musselburgh and near Dunbar, and in a somewhat similar situation.

111. *Ameira longiremis*, T. Scott.


*Hab.*—This *Ameira* was taken very sparingly off St Monans in 1893, and this is the only record of it that I have for the Forth estuary, but it has since been obtained in the Clyde in Kilbrannan Sound.


*Hab.*—Off St Monans, not very common. This species, like the last, has also been obtained in the Clyde.


*Hab.*—Dredged off St Monans; rather rare.


1902. *Ameira propinqua*, T. Scott, *op. cit.*, p. 460, pl. xxii. figs. 36-42; pl. xxiii. fig. 1; pl. xxiv. figs. 10-18.

*Hab.*—Dredged off St Monans; rare.


*Hab.*—This, which appears to be the smallest member of the genus, was taken sparingly, in shallow water, off Musselburgh; it has not, so far, been noticed anywhere else.


*Hab.*—Taken off Musselburgh, in shallow water; apparently rare.


*Hab.*—Collected with hand-net in pools on the shore near low-water, north-west from Dunbar, and also in a shore gathering collected the same year near Musselburgh.

Genus (52) *Robertsonia*, G. S. Brady, 1880.

118. *Robertsonia tenius* (G. S. Brady and Robertson).


*Hab.*—This species, which was first noticed in material dredged off North Berwick in 1887, appears to be sparingly distributed throughout the estuary.

Genus (53) *Heteropsyllus*, T. Scott, 1894.


*Hab.*—Dredged off Musselburgh and near Aberdour; frequent. This species, though extensively distributed, having been observed in the Firth of Clyde and on the south
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cost of England, is readily passed over from its resemblance to more widely-known forms.

Genus (54) Delavalia, G. S. Brady, 1868.

120. Delavalia palustris, G. S. Brady.


Hab.—Taken in the neighbourhood of Culross, west of Queensferry, where the water is brackish, and also in brackish-water pools at the mouth of the Peffer Burn, Aberlady Bay, 1895.

121. Delavalia robusta, Brady and Robertson.


Hab.—In pools at the mouth of the Cocklemill Burn at the east end of Largo Bay, 16th August 1890; rare.

122. Delavalia reflexa, Brady and Robertson.


Hab.—Dredged off Burntisland in November 1893; moderately rare.

Genus (55) Beatricella,¹ T. Scott, 1905.


Hab.—Dredged in the neighbourhood of Granton and off

¹ This genus has been named in compliment to Miss Beatrice Sprague, daughter of Dr T. B. Sprague, Edinburgh, whose names are so frequently referred to in this Catalogue as successful students of Scottish fresh-water Crustacea.
Musselburgh; not very rare. Dredged also off the north-west end of Inchkeith.


_Hab._—Dredged in Largo Bay, and subsequently in one or two other places.

Genus (56) Tachidius, Lilljeborg, 1853.

125. Tachidius discipes, Giesbrecht.

1880. ,, ,, Brady (non C. brevicornis, Müller), Monograph, vol. ii. p. 20, pl. xxxvii.
1881. ,, discipes, Giesb., Die frei-leb. Copep. der Kieler Föhrde, p. 108, pl. ii. fig. 4; pl. iv. figs. 25, 28 et seq.

_Hab._—Brackish-water pools at the mouth of the Cockle-mill Burn at the east end of Largo Bay, 1890. This is a moderately common species in places such as that referred to.

126. Tachidius littoralis, Poppe.


_Hab._—Dredged near Culross, west of Queensferry, 1892; not very rare. This, like _T. discipes_, is a brackish-water species, and appears to be generally distributed where the conditions are favourable.
Genus (57) Pontopolites, T. Scott, 1894.


Hab.—This species was described from specimens dredged off Musselburgh in 1893, and was at that time regarded as rare; subsequently, however, it was found to be moderately frequent in gatherings collected in shallow inshore waters. Like Tachidius discipes, this species has the fifth pair of thoracic feet composed each of a single lamelliform joint, but it differs very markedly in the structure of the other thoracic legs, so much so that it is with some hesitation I have placed it under this family.

Genus (58) Canthocamptus, Westwood, 1836.

128. Canthocamptus minutus (Müller).


Hab.—Moderately common, and generally distributed in lochs, ponds, etc., throughout the district.

129. Canthocamptus horridus, S. Fischer.


Hab.—Duddingston Loch, 1892; Lochgelly Loch, Fife-shire, 19th August 1896. “Vicinity of Edinburgh” (Dr and Miss Sprague). This species does not appear to be very common in Scotland.

130. Canthocamptus gracilis, G. O. Sars.


Hab.—Linlithgow Loch, Upper Elf Loch (near Edinburgh),
Loch Achray (Trossachs); not very rare. It appears to be more frequent in small lakes or ponds than in large bodies of water.

131. Canthocamptus lucidulus, Rehberg.

1863. Canthocamptus minitus, Claus, Die frei-lebenden Copep., p. 122, pl. xii. figs. 1-3 (name preoccupied by O. F. Müller).


Hab.—Duddingston Loch, Upper Elf Loch, Loch Katrine, and others; Humbie Reservoir, near Winchburgh (Evans); moderately frequent, and generally distributed.


Hab.—In brackish-water pools at the mouth of the Cocklemill Burn at the east end of Largo Bay. This species is sometimes not uncommon where the conditions are favourable.

133. Canthocamptus palustris, G. S. Brady.


Hab.—In pools on May Island, 1889.


Hab.—Between tide-marks at Aberlady, and dredged in shallow water off Musselburgh; not common.


*Hab.*—Off Musselburgh, 1894; rare. This species was described from specimens found in the Moray Firth.


*Hab.*—Loch Leven, Kinross; moderately frequent.


*Hab.*—Frequent in lochs and ponds throughout the district.

Genus (59) *Attheyella*, G. S. Brady, 1880.


*Hab.*—Moderately common, and generally distributed throughout the district.

139. *Attheyella Zschokkei* (Schmeil).


*Hab.*—Loch Leven, Duddingston Loch, Upper Elf Loch; not very rare, but easily overlooked. Ben Ledi, at about 2500 feet (Evans).
140. *Attheyella Duthiei*, T. and A. Scott.


1902. *Canthocamptus Duthiei*, Lillj., Synops. sp. huc usque in aquis dulcis Sueciae observ. Fam. Harpact., p. 41, pl. iii. figs. 5-10.

*Hab.*—Loch Leven is the only locality within the district where this species has been observed; it was obtained in gatherings collected by hand-net in 1890, 1897, and 1898.

141. *Attheyella cuspidata* (Schmeil).


*Hab.*—Loch Vennachar, Perthshire; not common. In spring at 2500 feet on Ben Ledi, September 1906 (W. Evans).

Genus (60) *Nitocra*, Boeck, 1864.


1882. *Nitocra tau*, Giesb., Die frei-leben. Copep. der Kieler Foehrde, p. 117, pl. i. figs. 9, 13; pl. iii. fig 13; pl. iv. figs. 2, 11, 29 et seq. .

*Hab.*—In pools overflowed by the tide at the mouth of the Cocklemill Burn at the east end of Largo Bay; not common.


*Hab.*—Loch Vennachar, Loch Leven, Duddingston Loch, and the Upper Elf Loch are some of the places where this species has been obtained.


*Hab.*—Loch Lubnaig, Loch Achray, Loch Vennachar.

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Hab.—The only locality within the district where I have found this species is Loch Vennachar.

Genus (63) *Mesochra*, Boeck, 1864.


Hab.—Frequent in rock-pools near high-water, Cramond Island (1888); in pools at the mouth of the Cocklemill Burn, Largo Bay, 1890; and subsequently in other parts of the estuary.


Hab.—Shore at Musselburgh, in pools near low-water; frequent.


Hab.—Shore at Musselburgh, in pools near low-water, not uncommon, 1894; and also in a gathering dredged off St Monans in July 1901.


Hab.—In pools between tide-marks at Aberlady Bay, collected by hand-net.
Genus (64) Danielssenia, Boeck, 1872.

150. Danielssenia typica, Boeck.

1876, Zosime spinulosa, Brady and Robertson, British Assoc. Rept. for 1875, p. 196.
1880, Jonesiella spinulosa, G. S. Brady, i. c., vol. ii. p. 41, pl. xlviii. figs. 14-17; pl. xlix. figs. 14, 15.

Hab.—Largo Bay, 1890, and afterwards in other parts of the estuary, but nowhere very plentiful. The food in the stomachs of a sample of small plaice, Pleuronectes platessa, measuring off and on about 2 inches in length, sent from Annan on the Solway in 1900, consisted entirely of this species.

Genus (65) Thompsonula, T. Scott, 1905.


Hab.—Dredged near the island of Fidra in February 1893, and later off Musselburgh; not common. The species appears to be widely distributed, but not very plentiful.

Genus (66) Laophonte, Philippi, 1840.

152. Laophonte lamellifera (Claus).

1863, Cleta lamellifera, Claus, Die frei-lebenden Copepoden, p. 123, pl. xv. figs. 21-25.

Hab.—Dredged off Musselburgh; collected by hand-net in rock-pools between tide-marks at Cramond Island; and dredged at various other parts of the estuary; frequent.


*Hab.*—Rock-pool on the shore, Cramond Island; dredged off North Berwick and in other parts of the estuary.


*Hab.*—Dredged off St Monans in 1889; scarce.


*Hab.*—In an old quarry at Granton which is open to the sea, collected 25th August 1894. Apparently rare.

156. *Laophonte thoracica*, Boeck.


*Hab.*—Dredged in the neighbourhood of Inchkeith; off Musselburgh and other parts of the estuary; not very common.


*Hab.*—In rock-pools between tide-marks at Cramond Island and in one or two other places, but not common.
158. *Laophonte horrida* (Norman).


*Hab.*—Dredged off St Monans, and at Station V., to the west of May Island; not common. Dredged at the west end of Station VI., 22nd May 1901.


*Hab.*—Dredged off St Monans, 1889; dredged off Musselburgh, 30th May 1891; and at Station III. (near the west end, in 5 fathoms), 23rd May 1901.


*Hab.*—Off the west side of May Island. Several specimens were washed from a large “root” of sea-weed brought up in the trawl-net of the fishery cruiser “Garland” while at work in the neighbourhood of May Island in 1891; males and females carrying ovisacs were obtained. *L. inopinata* appears to be a rare species in the Forth.


*Hab.*—Shore at Musselburgh, in pools near low-water; dredged off the same place in 3 to 4 fathoms. Obtained also near Granton in an old quarry open to the sea. This is a distinct and easily recognised species.


*Hab.*—In brackish pools at the mouth of the Peffer Burn, near Aberlady.


*Hab.*—Collected by hand-net near Granton, in an old quarry open to the sea.


*Hab.*—Off St Monans and Musselburgh; very sparingly in dredged material from both places.

165. *Laophonte hispida* (Brady and Robertson).


*Hab.*—Largo Bay, frequent; dredged also off Musselburgh and at various other parts of the estuary.


*Hab.*—Off West Wemyss and other places. The first specimens were obtained inside the valves of a dead *Cyprina*, among trawl refuse; but specimens were found afterwards to be moderately frequent in the crevices of partly decayed pieces of wood brought up in the dredge or trawl-net.

Genus (68) *Laophontodes*, T. Scott, 1894.


*Hab.*—Dredged at the north end of Inchkeith. This

¹ This genus has been named in complement to Miss Harriet Richardson, M.A., D.Phil., Washington, U.S.A., author of *A Monograph on the Isopods of North America.*
species, which is very small—scarcely \( \frac{1}{3} \) of an inch in length—but quite distinct, is apparently very rare in the Firth of Forth. I have only met with it in the neighbourhood of Inchkeith; it seems, however, to have a fairly extensive distribution. Frequent in a gathering of small Crustacea from an old quarry at Granton collected in 1894.

Genus (69) Normanella, G. S. Brady, 1880.

168. *Normanella dubia* (Brady and Robertson).


*Hab.*—Dredged off Musselburgh; not very rare, but easily overlooked.


*Hab.*—Dredged off St Monans, in about 10 fathoms; rare. This species was described from specimens dredged off Spanish Head, Isle of Man, in 1895.

Genus (70) Cletodes, Brady, 1872.


*Hab.*—Dredged off North Berwick, off Musselburgh, and off the east side of Inchkeith, but not very common. It seems to be sparingly distributed throughout the estuary.
171. Cletodes propinqua, Brady and Robertson.


1880. '' '' Brady, Monograph, vol. ii. p. 94, pl. lxxvii. figs. 9-17.

*Hab.*—In pools between tide-marks at Newhaven and Cramond Island; also dredged off Musselburgh; not very common.


*Hab.*—Firth of Forth, 1901; rare. This species was one of several in a bottle containing specimens from various parts of the estuary collected during 1901.


*Hab.*—Dredged in Largo Bay; dredged off the east side of Inchkeith, and a few other places; not very rare. In this species the rostrum is distinctly, though not strongly, recurved.


*Hab.*—Dredged in 1893 in the neighbourhood of the Bass Rock. It seems to be a rare species, as I have observed it on only one or two occasions since; but it has also been taken in the Clyde and the Moray Firth.

175. Cletodes tenuipes, T. Scott.


*Hab.*—Off Musselburgh, dredged in 3 to 4 fathoms, in 1891; rare. The species was described from specimens
taken in the Clyde in 1896. The Forth examples, which had been put aside when collected, were not identified till later.


*Hab.*—Dredged off St Monans, off Musselburgh, and other parts of the estuary; not common.


*Hab.*—In the same gatherings with the last, as well as in pools between tide-marks, but always sparingly distributed. This species has a somewhat close resemblance to *C. lata*, and was at first regarded as a variety of it, but afterwards it was found to be quite distinct.

178. *Cletodes longicaudata*, Brady and Robertson.


*Hab.*—Dredged off St Monans in 1889; dredged off the east side of Inchkeith in June 1901; rare.


*Hab.*—Dredged in Aberlady Bay in 1895; not common. This species, which has been known to me for a considerable time, is somewhat intermediate between *C. longicaudata* and *C. limicola*; the furcal joints are about half as long as those of *C. longicaudata*; it thus differs from both the species named. Though collected in 1895, this is the first time it has been recorded for the Forth. The species was described from Moray Firth specimens.
Genus (71) *Itunella*, Brady, 1894.

180. *Itunella tenuiremis* (T. Scott).


*Hab.*—Dredged in the neighbourhood of Inchkeith in February 1893; and subsequently, but very sparingly, in several other places.

Genus (72) *Fultonia*, T. Scott, 1902.


*Hab.*—Dredged very sparingly off St Monans, in 14 to 15 fathoms, on 22nd May 1901.

Genus (73) *Enhydrosoma*, Boeck, 1872.

182. *Enhydrosoma curvatum* (Brady and Robertson).


*Hab.*—Largo Bay and other parts of the estuary; moderately frequent.


*Hab.*—Musselburgh, pools on the shore near low-water; moderately rare. This is a smaller species than *E. curvatum*.

Genus (74) *Nannopus*, G. S. Brady, 1880.


*Hab.*—Brackish-water pools at the mouth of the Cocklemill
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Burn at the east end of Largo Bay, also in shore-pools at Musselburgh, and in an old quarry near Granton which is open to the sea; not common.

Genus (75) *Platychelipus*, G. S. Brady, 1880.


*Hab.*—Sparingly in a gathering of dredged material collected near Culross, and in an old quarry at Granton; dredged in shallow water off Musselburgh and in Aberlady Bay; scarce.

Genus (76) *Cylindropsyllus*, G. S. Brady, 1880.

186. *Cylindropsyllus laevis*, G. S. Brady.


*Hab.*—Dredged off St Monans; frequent. I have found this species in other parts of the estuary, but much less frequently than in the "Fluke Hole" off St Monans.


*Hab.*—Dredged off St Monans along with *C. laevis*, but not so common.

Genus (77) *Leptopontia*, T. Scott, 1902.


*Hab.*—Dredged off St Monans; not very common.
Genus (78) Leptastacus, T. Scott. 1906.


*Hab.*—Dredged off St Monans in 1891, and again in May 1901; not very common.

Genus (79) Evansula, T. Scott, nov. nom.

(Syn. *Evansia*, T. Scott, preoccupied for a genus of Spiders.\(^1\))


*Hab.*—Dredged off St Monans in 1891, and again in May 1901; not common.


*Hab.*—Collected near Musselburgh in 1894. This differs from the last by its smaller size, and in the structure of fifth thoracic feet and caudal joints.

\(^1\) In the *Annals and Magazine of Natural History* for May 1906 I instituted a genus of the Copepoda under the name of *Evansia*, in compliment to William Evans, Edinburgh, a successful investigator in various departments of Scottish natural history. I find, however, that the name *Evansia* is preoccupied for a genus of spiders, described by the Rev. O. Pickard Cambridge in *Proc. Dorset Nat. Hist. and Antiquarian Field Club*, vol. xxi. p. 37, and I therefore adopt the modified form *Evansula* for the Copepod genus referred to.
Genus (80) Tetragoniceps, G. S. Brady, 1880.

192. Tetragoniceps (?) maleolata, G. S. Brady.


Hab.—Dredged off St Monans in 1892, apparently not very rare; and again on 22nd May 1901, several specimens were obtained. This form differs from the *T. maleolata* described by Dr Brady in the structure of fifth pair of thoracic feet, but is otherwise identical with it.


Hab.—This species was obtained somewhat sparingly in material dredged off St Monans in 1896, and again in 1901. It has a general resemblance to *T. maleolata*, but the furcal joints are distinctly shorter.


Hab.—Dredged off St Monans in 1891, and again in 1901; apparently rare. This species and the next are easily distinguished by the large size and leaf-like form of the fifth pair of thoracic feet of the female.


1894. Tetragoniceps consimilis, T. Scott, Twelfth F. B. Rept., pt. iii. p. 244, pl. vii. figs. 4-12.


Hab.—Dredged off St Monans; rare. This species is
similar in its general appearance to T. Bradyi, but there are a few structural differences, one of the most important being the three-jointed inner branches of the first pair of thoracic feet: in T. Bradyi these branches are only two-jointed.


*Hab.*—West of Queensferry, washed from lumps of hardened mud, which were composed for the most part of the agglutinated tubes of a species of *Sabella*, collected 25th January 1894; rare.


*Hab.*—In pools between tide-marks at Musselburgh, 20th August 1894; rare.


*Hab.*—In pools between tide-marks at Musselburgh, taken at the same time as *L. Robertsoni*; moderately rare.


*Hab.*—In pools between tide-marks at Musselburgh, in company with *L. minor*, *L. Robertsoni*, and a few of the other rare things mentioned elsewhere in this Catalogue. This species appeared to be rather more frequent than the other two.

Genus (84) *Paramesochra*, T. Scott, 1892.


*Hab.*—Dredged off the west side of May Island in February
1892, and off St Monans, in 13 fathoms, on 22nd May 1901. This curious form was also taken near Port Erin, Isle of Man, by the late I. C. Thompson of Liverpool.

Division CYCLOPOIDA.

Family CYCLOPIDÆ.

Genus (85) Oithona, Baird, 1843.


_Hab._—Generally distributed in the Firth of Forth, and sometimes common. This is the form which, in my earlier papers on “Scottish Marine Copepoda,” is recorded under the name of *Oithona spinifrons*, Boeck.


_Hab._—Obtained in a bottom tow-net gathering collected east of Inchkeith in March 1891, and again on 22nd April 1901.

Genus (86) Cyclopina, Claus.


1878. „ „ „ Brady, Monograph, vol. i. p. 93, pl. xxiv. figs. 1-9; vol. ii. pl. xci. figs. 10, 11.


_Hab._—Generally, though somewhat sparingly, distributed in the Firth of Forth. I have taken it as far west as Charlestown, as well as near the outside limits of the estuary.
204. *Cyclopina littoralis* (G. S. Brady).


*Hab.*—Collected at Cramond Island in rock-pools; dredged off Musselburgh and other parts of the estuary, especially in the littoral and laminarian zones; not uncommon.


*Hab.*—This species has been taken off St Monans, but not common.

Genus (87) *Pterinopsyllus*, G. S. Brady, 1880.

(Syn. *Lophophorus*, Brady, 1878, a name preoccupied by Temminck in 1815 for a genus of Birds.)


1878. *Lophophorus insignis*, G. S. Brady, Monograph, vol. i. p. 122, pl. xiii. figs. 1-10; pl. xv. fig. 10.


*Hab.*—This species was on several occasions observed moderately frequent in dredged material collected to the west of Queensferry, but appeared to be rare near the seaward limits of the estuary.

Genus (88) *Cyclops*, O. F. Müller, 1776.

The members of this genus are, with few exceptions, fresh-water or brackish-water species. Those recorded here
may be conveniently arranged according to the number of joints in the antennules.

(a) Species with Seventeen-Jointed Antennules.

207. *Cyclops strenuus*, Fischer.


*Hab.*—Duddingston Loch, and most of the other lochs within the district, where it occurs nearly all the year round. *Cyclops pulchellus* and *Cyclops abyssorum* are other names by which the species is known.


*Hab.*—Loch Vennachar and Loch Voil, Perthshire; frequent. (See also note on this species in Appendix, p. 380.)


*Hab.*—Loch Achray (Trossachs), Loch Leven, Duddingston Loch, ponds on the Braid Hills, Edinburgh (April 1888), as well as in other lochs and ponds throughout the district, but usually not very common.


1892. *vernalis*, Schmeil, l. c., p. 88, taf. ii. figs. 4-7.

*Hab.*—The distribution of this species is somewhat similar

1 *Cyclops Ewarti*, Brady, was described in the *Sixth Annual Report of the Fishery Board for Scotland*, p. 232, pl. viii. figs. 1-6, from specimens obtained above Queensferry. I am now inclined to consider this as representing a scarcely mature stage of *C. strenuus*, Fischer
to that of *C. bicuspidatus*. It has been obtained in several localities near Edinburgh, *i.e.*, Upper Elf Loch, Braids (Scott and Lindsay), and pond at Bonaly Golf Course (Dr and Miss Sprague). Ben Ledi, at 2500 feet (W. Evans).

211. *Cyclops bisetosus*, Rehberg.


*Hab.*—Loch Achray, Loch Leven, and Duddingston Loch. Pond on House-o’-Hill Farm, Midlothian (Dr and Miss Sprague).

212. *Cyclops viridis* (Jurine).


*Hab.*—Loch Katrine, Loch Leven, Duddingston Loch, etc. Burntisland Reservoir and Loch a Chroin (Evans). A common and generally distributed species.


1888. *Cyclops signatus*, Koch, Deutschlands Crustaceen, Myriapoden, und Arachniden, Heft. 21, fig. 8.

*Hab.*—Loch Katrine, Loch Achray, Loch Lubnaig, Perthshire. Ravelston Cottage Quarry, May 1900 (Dr and Miss Sprague). Side of river Teith, near Callander (W. Evans).


1888. *Cyclops annulicornis*, Koch, Deutschlands Crustaceen, Myriapoden, und Arachniden, Heft. 21, pl. vi.

*Hab.*—This is a common and generally distributed species throughout the entire area.
(b) Species with Sixteen-Jointed Antennules.


1901-1902. " , Dr and Miss Sprague, l. c., p. 255, pl. xxxi. figs. 1-7.

*Hab.*—This species, which was observed for the first time in Scotland in Loch Doon, in Ayrshire,\(^1\) was obtained in a pond near Tynehead, Midlothian, on 30th March 1901 (Dr and Miss Sprague).

(c) Species with Twelve-Jointed Antennules.

216. Cyclops serrulatus, Fischer.


*Hab.*—The *Cyclops*, generally referred to as "*Cyclops serrulatus*, Fischer," is common in lochs and ponds throughout the district. A form with short furcal joints, which appears to be the var. *brachyurus* of *Cyclops varius*, Lilljeborg, has been observed in Duddingston Loch and other places. Another form with the furcal joints elongated, and which may be the var. *speratus* of the same species, has also been observed, but they approximate so closely to the species described by Fischer, that I prefer, for the present, to regard them as varieties of that species.


*Hab.*—Loch Vennachar, Loch Katrine, Loch Leven, Black Loch near Loch Glow (Kinross-shire), and Loch Lubnaig.

(d) Species with Eleven-Jointed Antennules.


1878. "" Brady, Monograph, vol. i. p. 112, pl. xv. figs. 11-14; pl. xxiv. figs. 10-15.

*Hab.*—Raith Lake, near Kirkcaldy, Fifeshire, 1890. Elf Loch, and ponds in Penicuik grounds, 1900 (Dr and Miss Sprague). Humbie Reservoir, near Winchburgh, June 1906 (W. Evans).


1853. *Cyclops diaphanus*, Fischer, l. c., vol. xxvi. p. 93, pl. iii. figs. 6-12.
1863. "" *nanus*, G. O. Sars, l. c., p. 42.

*Hab.*—This small species, first added to the British fauna in 1899, was obtained at Auchencorth Moss, Midlothian, in April 1901, by Dr and Miss Sprague.

(e) Species with Ten-Jointed Antennules.

220. Cyclops phaleratus, Koch.


*Hab.*—Duddingston Loch; Lochgelly Loch and Raith Lake, Fifeshire. Marl-pit, Davidson’s Mains, near Edinburgh, June 1900 (Dr and Miss Sprague). This species also occurs in some material from the marl-pit collected by myself in May 1888. Teith at Callander (Evans).
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(f) Species with Eight-Jointed Antennules.

221. Cyclops finibriatus, Fischer.

1853. Cyclops finibriatus, Fischer, l. c., p. 94, pl. iii. figs. 19-28 and 30.
1878. ″ crossicornis, Brady, Monograph, vol. i. p. 118, pl. xxiii. figs. 1-6.

Hab.—Moderately common in ponds and lakes throughout the district.

Genus (89) Halicyclops, Norman, 1903.

222. Halicyclops oquoreus (Fischer).

1878. ″ ″ Brady, Monograph, vol. i. p. 119, pl. xix. figs. 8-10; pl. xxi. figs. 10-17.

Hab.—Cramond Island, in pools above high-tide mark, 1888; and in brackish-water pools at Aberlady in May 1895. Dr and Miss Sprague have also collected this species in a rock-pool on Cramond Island in July 1901.

Genus (90) Euryte, Philippi, 1843.

223. Euryte longicauda, Philippi.

1843. Euryte longicauda, Philippi, Archiv. fur Naturh., Jahrg. 9, p. 63, pl. iii. fig. 3, a-d.
1872. ″ ″ Brady, op. cit., vol. i. p. 95, pl. xvi. figs. 1-10.

Hab.—Moderately frequent throughout the estuary.

Family Lichomolgidae.

For further information concerning the Lichomolgidae and Hersiliidae, the reader is referred to Dr Canu's work, Les Copepodes du Boulonnais.
Genus (91) Lichomolgus, Thorell, 1859.

224. Lichomolgus fucicolus, G. S. Brady.


_Hab._—Firth of Forth; moderately rare. It has usually been obtained in shallow inshore water, amongst Laminaria, etc.

225. Lichomolgus furcillatus, Thorell.

1859. Lichomolgus furcillatus, Thorell, Om Krustaceer i Ascidier, p. 74, taf. 13, fig. 30.

1880. , , , Brady, l. c., vol. iii. p. 49, pl. lxxxviii. figs. 10-14.

_Hab._—Collected near May Island and in the vicinity of Inchkeith, in the branchial cavity of large Ascidians; not common.


_Hab._—Taken with the dredge a short distance north of the Bass Rock, and off the North Craig; rather rare. On one occasion I found a considerable number of specimens adhering to the outside surface of the tubes of a large species of _Sabella_ brought up on the hooks when line-fishing in 1895, in 15 to 20 fathoms, where the bottom consisted of mud. The Copepods were white, and therefore easily noticed on the mud-tubes made by the Annelids.¹

227. Lichomolgus agilis (Leydig).


_Hab._—Dredged off St Monans in 1891; rare. Taken also

in the neighbourhood of Granton in 1893, on the branchial appendages of *Doris (?) tuberculatus*.1

Genus (92) *Pseudanthessius*, Claus, 1889.


*Hab.*—Dredged off Musselburgh in 1891; not common.

229. *Pseudanthessius liber* (Brady and Robertson).


1880. , , Brady, Monograph, vol. iii. p. 44, pl. lxxxvi. fig. 197.

*Hab.*—Dredged very sparingly off the north end of Inchkeith in 1894. Also dredged in the neighbourhood of Inchkeith on 23rd May, and off North Craig on 4th July 1901.

230. *Pseudanthessius Thorelli* (Brady and Robertson).


*Hab.*—Dredged very sparingly off St Monans in 1893-1894. Also off the east side of Inchkeith on 23rd May 1901; rare.


*Hab.*—Dredged off St Monans in 1894; rare. During 1895 the fishery steamer "Garland" was engaged in some line-fishing experiments, when various things were brought up on the hooks, and the common Sea-Urchin, *Echinus*

esculentus, among others. Some of these urchins I put into a bottle containing strong methylated spirit; after washing them in this spirit, an examination of the residue revealed a considerable number of specimens of this rare Copepod, and of little else.

Genus (93) Modiolicola, Aurivilius, 1883.

232. Modiolicola insignis, Aurivilius.


Hab.—Frequent in the shells of living “Horse Mussels,” Mytilus modiolus. The species was obtained in most of the large mussels examined.

Genus (94) Herrmannella, Canu, 1891.

233. Herrmannella rostrata, Canu.


Hab.—Frequent in the shells of living Cockles, Cardium edule, found in the cockle-beds at Cramond.


Hab.—Frequent in the shells of the Clam, Pecten opercularis, dredged on the clam-beds to the east of Inchkeith, but this Copepod was first observed by I. C. Thompson in the shell of living Pecten maximus, hence its name. This is not a true Lichomolgus, and as it agrees very closely with Herrmannella, I place it meanwhile under that genus.
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235. Herrmannella arenicola (G. S. Brady).

1892. ,

Hab.—Dredged off St Monans in 1891; rare.

Genus (95) Sabelliphilus, M. Sars, 1862.

236. Sabelliphilus Sarsi, Claparède.


Hab.—Collected off St Monans, 7th July 1897, on the plumes of Sabella sp. (?S. pavonina); rare.

Family CLAUSIIDÆ.

Genus (96) Hersiliodes, Canu, 1888.

237. Hersiliodes aberdonensis (T. and A. Scott).


Hab.—Dredged off the east side of Inchkeith on 23rd May 1901. The specimens from which the species was described in 1892 were obtained in a tow-net gathering collected in Aberdeen Bay.

238. Hersiliodes littoralis (T. Scott).


Hab.—Collected in the neighbourhood of Culross in 1891. This appears to be a rare species in the Forth estuary, and is probably parasitic on some other invertebrate.
Family **Asterocheridæ**\(^1\)

Genus (97) **Asterocheres**, Boeck, 1859.

239. *Asterocheres Lilljeborgi*, Boeck.


*Hab.*—Firth of Forth; rare (cf. Giesbrecht, *Asterocheridae*, pp. 70 and 73).

240. *Asterocheres echinicola* (Norman).


1880. *Cyclopicera lata*, Brady, *l. c.*, vol. iii. p. 56, pl. lxxxix. fig. 12; pl. xc. figs. 11-14.


*Hab.*—Obtained, in 1889, by washing a number of Sponges in methylated spirit; the sponges were dredged in Aberlady Bay.


*Hab.*—Obtained at Granton Harbour in the water-passages of Sponges (*Chalina oculata*) growing on the walls of the pier; frequent.

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\(^1\) In *Fauna und Flora des Golfes von Neapel*, Monograph 25, the Asterocheridæ, by Dr W. Giesbrecht (1899), the Forth species belonging to this family are for the most part described and figured by the author; and he also refers to their Scottish habitats in his remarks on the distribution of the various forms. The reader should consult this fine work, which contains a full synonymy and other information.
Genus (98) Dermatomyzon, Claus, 1889.

242. *Dermatomyzon nigripes* (Brady and Robertson).


1880. " " " Brady, i. c., vol. iii. p. 54, pl. lxxxix. figs. 1-11.


*Hab.*—Collected in the neighbourhood of May Island in 1892. Dredged at Station I. on 30th August 1894, and subsequently captured at a few other places, but always very sparingly.

Genus (99) Rhynchomyzon, Giesbrecht, 1895.


*Hab.*—Dredged on the “Rath ground,” to the north of the Bass Rock, on 20th November 1889, and off the east side of Inchkeith on 23rd May 1901. This species, which appears to be rare in the Forth estuary, has a wide distribution, having been recorded not only from various parts of the British seas, but also from the Gulf of Naples.

Genus (100) Collocheres, Canu, 1893.

244. *Collocheres gracilicauda* (G. S. Brady).

1880. *Cyclopicera gracilicauda*, Brady, i. c., vol. iii. p. 58, pl. lxxxiii. figs. 1-10.

*Hab.*—Dredged off St Monans; rare.

Genus (101) Scottomyzon, Giesbrecht, 1897.


*Hab.*—Dredged in the neighbourhood of the Bass Rock in
In 1895 a number of specimens—adults and young—were obtained by washing specimens of the common Starfish, \textit{Asterias rubens}, in a bottle containing methylated spirit, and afterwards examining the residue. These specimens were of a brick-red colour on the back, but nearly white beneath. Their normal habitat is apparently on this kind of starfish.

Genus (102) \textit{Acontiophorus}, Brady, 1880.

246. \textit{Acontiophorus scutatus} (Brady and Robertson).

1880. \textit{Acontiophorus scutatus}, Brady, \textit{i. c.}, vol. iii. p. 69, pl. xc. figs. 1-10.

\textit{Hab.}—Collected near Inchkeith in 1888. Off Musselburgh, dredged 30th May 1891, and subsequently collected in various other parts of the estuary; moderately frequent.

247. \textit{Acontiophorus ornatus} (Brady and Robertson).

1880. \textit{Acontiophorus armatus}, Brady, \textit{i. c.}, vol. iii. p. 71, pl. lxxxvii. figs. 8-15.

\textit{Hab.}—Dredged off North Craig on 4th July 1901; rare.

Genus (103) \textit{Scottocheres}, Giesbrecht, 1897.

248. \textit{Scottocheres elongatus} (T. and A. Scott).


\textit{Hab.}—Obtained in 1893 in material dredged in the neighbourhood of the Bass Rock; frequent.
Genus (104) *Cribropontius*, Giesbrecht, 1899.

249. *Cribropontius Normani* (Brady and Robertson).


*Hab.*—Taken off the North Craig in material dredged on 4th July 1901; rare. This large and sometimes highly-coloured species appears to be rare in Firth of Forth.

Genus (105) *Bradypontius*, Giesbrecht, 1895.

250. *Bradypontius magniceps* (G. S. Brady).


*Hab.*—Dredged west of Queensferry in 1888, and at the north-west end of Inchkeith on 23rd May 1901. Several fine specimens were obtained in material dredged off the North Craig on 4th July 1901, when a few of the females were found with ovisacs attached.


1899. *Bradypontius papillatus*, T. Scott, Seventeenth F. B. Rept., pt. iii. p. 262, pl. xi. fig. 21; pl. xii. figs. 7-15

*Hab.*—Dredged in the neighbourhood of Inchkeith in 1888; apparently very rare. The specimen from which the description and drawings were prepared is the only one that has yet been observed in the Forth estuary. This specimen is, I think, certainly identical with the *Bradypontius chelifer* described by Dr Giesbrecht in his fine work on the Asterocheridae.
Genus (106) *Dyspontius*, Thorell, 1859.


1859. *Dyspontius striatus*, Thorell, Om Krustaceer i Acidier, p. 81, pl. xiv. fig. 22.

*Hab.*—Dredged at the north-west end of Inchkeith on 23rd May 1901. *D. striatus* has not previously been noticed within the limits of the Forth estuary, but it is a widely distributed species in our seas, though not very plentiful.


*Hab.*—Dredged in the vicinity of Culross, a few miles above Queensferry; rare.

Genus (107) *Parartotrogus*, T. and A Scott, 1893.


*Hab.*—Dredged near Fidra in 1889, but not recorded till 1893. It has subsequently been dredged off St Monans, in Largo Bay, and one or two other places, but nowhere very common.

Family *Corycæidae*.

Genus (108) *Corycæus*, Dana, 1845.


1880. " " Brady, *l. c.*, vol. iii. p. 34, pl. lxxxi. figs. 16-19 et seq.

*Hab.*—Dredged in the "Fluke Hole" off St Monans; also washed from trawl refuse collected off West Wemyss,
October 1895. This species appears to be of rare occurrence in the Forth estuary.

Family **Nicothoidae**.

Genus (109) **Nicothoe**, Audouin and Milne-Edwards, 1826.


_Hab._—Found adhering to the gills of a Lobster sent from Dunbar. I am indebted to my colleague, Dr H. C. Williamson, for the specimens of the **Nicothoe**. The distribution of the parasite appears to be co-extensive with that of its host.

Family **Ergasilidae**.

Genus (110) **Bomolochus**, Nordmann, 1832.

257. **Bomolochus soleæ**, Claus.


_Hab._—Firth of Forth; found on the back of a Black Sole, _Solea vulgaris_, and among dredged material, but in this case the specimens must, in some way, have been detached from the fish. Found in the nostrils of a Cod-fish by John Lindsay, Edinburgh. This **Bomolochus** has been obtained in the nasal fosse of several kinds of fishes, but it is most frequent in those of the cod.

258. **Bomolochus onosi**, T. Scott.


_Hab._—Firth of Forth, on the inside of the gill-covers of a Five-bearded Rockling, _Onos mustelus_ (Linn.), captured in the estuary in May 1901. This **Bomolochus** has also been
obtained on a specimen of the same kind of fish captured off Kinnaird Head in July 1901.

Genus (111) Thersitina, Norman, 1905.
(Syn. Thersites, Pagenstecher, 1861, preoccupied by Spence Bate in 1857 for a genus of Amphipods.)

259. Thersitina gasterostei (Pagenstecher).


Hab.—On the inside of the gill-covers of a Three-spined Stickleback, Gasterosteus aculeatus, captured in the river Forth, near Alloa, in February 1896. I have also taken this minute Copepod on the same species of fish captured in a small loch in Barra, Outer Hebrides; and in brackish-water ditches at Aberdeen, as well as on a Fifteen-spined Stickleback, Gasterosteus spinachia, captured in Loch Etive, on the west of Scotland.

Division NOTODELPHYOIDA.
Family NOTODELPHYDÆ.

Genus (112) Notodelphys, Allman, 1847.


1878. , , , Brady, Monograph, vol. i. p. 126, pl. xxv. figs. 1-10.

Hab.—In the branchial cavity of Ascidians found adhering to the walls of Granton Harbour, and dredged in the neighbourhood of Inchkeith and elsewhere; moderately frequent.

261. Notodelphys agilis, Thorell.

1860. Notodelphys agilis, Thorell, l. c., p. 40, pl. iv.; pl. v. fig. 6.
1878. , , , Brady, l. c., vol. i. p. 130, pl. xxvi. figs. 1-10.

Hab.—In the branchial cavity of Ascidians found adhering to the pier at Granton.
Family DOROPYGIDÆ.
Genus (113) Doropygus, Thorell, 1859.

262. Doropygus Normani, G. S. Brady.

Hab.—In the branchial cavity of Ascidians dredged off Musselburgh, not uncommon, but apparently rare in other parts of the estuary.

263. (?) Doropygus porcicauda, G. S. Brady.
1878. Doropygus porcicauda, Brady, l. c., vol. i. p. 138, pl. xxvii. figs. 1-9; pl. xxxiii. figs. 14-16.
1888. (?) ,, ,, T. Scott, Sixth F. B. Rept., pt. iii. p. 239.

Hab.—A specimen that appeared to belong to this species was obtained among some material dredged near Inchkeith in 1887, but as it is not now in my collection, I am unable to verify the record.

Family ASCIDICOLIDÆ.
Genus (114) Ascidicola, Thorell, 1859.

264. Ascidicola rosea, Thorell.
1859. Ascidicola rosea, Thorell, l. c., p. 59, pl. ix.; pl. x. fig. 13.
1878. ,, ,, Brady, l. c., vol. i. p. 145, pl. xxx. figs. 1-10.

Hab.—Obtained occasionally in the branchial chambers of Ascidians dredged in the neighbourhood of Inchkeith, off Musselburgh, and at a few other places in the estuary.

Genus (115) Aplostoma, Canu, 1886.

265. Aplostoma affinis, T. Scott, nov. nom.

Hab.—A few specimens of this curious species were
obtained within the intestines of Ascidians found frequently adhering to the inside of the valves of dead mussels and other shells, dredged in various parts of the estuary. These specimens were mistakenly ascribed to Enterocola. van Beneden, but they more nearly resemble Aplostoma brevicauda, Canu. They differ, however, in some respects from that species, as shown by the description and drawings. I have therefore named the species as above.

Family **Lamippidae**.

Genus (116) **Lamippus**, Bruzelius, 1859.

266. **Lamippus proteus**, Claparède.


*Hab.*—On *Alcyonium digitatum*, dredged in various parts of the estuary; frequent. This curious species appears to live in the cells of the polyps. If an *Alcyonium* be broken into pieces, and the fragments washed in a bottle containing methylated spirit, numbers of the *Lamippus* will generally be found amongst the sediment.


*Hab.*—This, which is a larger and apparently a much rarer species than *L. proteus*, has been found along with it on *Alcyonium digitatum*, dredged in the Firth of Forth. It has been observed on the same *Alcyonium* from other parts of the Scottish coast, and my son has also obtained it in Liverpool Bay.1

(Syn. *Platypyllus*, T. Scott, 1902, a name preoccupied by Dr Ritsema and Prof. Westwood in 1869.)


*Hab.*—This somewhat remarkable species was obtained in a gathering dredged in about 8 fathoms in the neighbourhood of the North Craig on 4th July 1901. Only a few specimens—all females, and one or two carrying ovisacs—were observed.

**Division MONSTRILLOIDA.**

**Family MONSTRILLIDÆ.**

Genus (118) *Monstrilla*, Dana, 1848.


*Hab.*—Captured to the west of May Island, with a tow-net, on 26th July 1901, and also to the east of May Island on 20th August 1903, but only females were observed in both gatherings.


1904. *", longicornis*, T. Scott, *l. c.*, p. 244, pl. xiii. figs. 1-7 (♂ and ♀).

*Hab.*—This species was taken in the estuary very sparingly in 1890, 1891, 1893, 1894, and 1901.
271. Monstrilla gracilicauda, Giesbrecht.
1892. Monstrilla gracilicauda, Giesb., l. c., p. 587, pl. xlvi. figs. 9, 16, 18 et seq.
1904. """, T. Scott, Twenty-second F. B. Rept., pt. iii. p. 245, pl. xiii. figs. 8-10; pl. xiv. fig. 15.

Hab.—Taken with tow-net above Queensferry, 26th June 1890; and off Musselburgh, 29th September 1892. Also captured east of May Island on 20th August 1903. All the specimens were females.


Hab.—This species was captured east of Inchkeith on 14th August 1891, and is apparently rare. It resembles Monstrilla Dance, Claparède, but that author shows only three setæ instead of four on each furcal joint; there are also one or two other differences.

Genus (119) Thaumaleus, Kröyer, 1849.

1892. Thaumaleus Claparedi, Giesb., op. cit., p. 381, pl. xlv. figs. 5, 15, 21, 26.

Hab.—Captured off St Monans, by tow-net, on 6th September 1890; apparently rare.

Division CALIGOIDA.

Family CALIGIDÆ.

Genus (120) Caligus, O. F. Müller, 1785.

274. Caligus curtus, Müller.
1785. Caligus curtus, Müller, Entomostraca, p. 130, pl. xxi. fig. 1.
1850. """", diaphanus, Baird, British Entomostraca, p. 269, pl. xxxii. fig. 1 (♂).
1850. """", Müller, idem, l. c., p. 271, pl. xxxii. figs. 4 and 5.

Hab.—Frequent on different kinds of fishes, especially
Land, Fresh-Water, and Marine Crustacea.

Gadoids. The male Caligus, which Dr Baird describes and figures in his British Entomostraca under the name of Caligus diaphanus, Nordmann, is not Nordmann's species, but is the male of C. curtus, Müller.


Hab.—Common on several kinds of fishes, especially Gadoids, as well as on flat fishes, Skate, Dogfishes, and others. From Short Sunfish, North Berwick, September 1905 (W. Evans). It is also frequently captured by tow-net in the open sea.

276. Caligus minimus, Otto.


Hab.—Found inside the throat of a Bass, Labrax lupus, Cuv. and Valenc., captured in the Forth, above Queensferry, in February 1903.

277. Caligus diaphanus, Nordmann.


Hab.—Taken in the gill-cavity of Grey Gurnards, Trigla gurnardus, captured in the estuary; not very rare.

Genus (121) Pseudocaligus, A. Scott, 1900.

278. Pseudocaligus brevipedis (Bassett-Smith).


Hab.—Found inside the throat of a Three-bearded Rockling,
Onos tricirratus, captured at Dunbar in 1892. In this species the fourth pair of feet are more rudimentary than in typical Caligus.

Genus (122) Lepeophtheirus, Nordmann, 1832.

279. Lepeophtheirus pectoralis (O. F. Müller).

1850. Lepeophtheirus pectoralis, Baird, Brit. Entom., p. 275, pl. xxxii. fig. 10.

Hab.—Frequent under the pectoral fins of Plaice, Flounders, and Dabs.

280. Lepeophtheirus Thompsoini, Baird.

1850. Lepeophtheirus Thompsoini, Baird, Brit. Entom., p. 278, pl. xxxiii. fig. 2.
1900. " " " T. Scott, l. c., p. 152, pl. v. figs. 43-45.
1900. " " obscurus, idem, l. c., p. 153, pl. vi. figs. 16-19.

Hab.—Frequent on the gills of Turbot, Bothus maximus, captured off St Monans. The form I referred doubtfully to L. obscurus, Baird, appears to be identical with L. Thompsoini; it is sometimes common on the gills of the Brill, Bothus rhombus.

281. Lepeophtheirus pollachii, Bassett-Smith.


Hab.—Firth of Forth, on the gills of Lythe, Gadus pollachius, 8th February 1895; apparently not very rare.
282. *Lepeophtheirus salmonis* (Kröyer).

1850. *obscurus*, idem, ibidem, p. 277, pl. xxxii. fig. 11.  

*Hab.*—On Salmon caught in the salmon nets in Largo Bay and other parts of the estuary; frequent.

Genus (123) *Trebius*, Kröyer, 1838.


*Hab.*—Taken on the backs of grey (or blue) Skates, *Raia batis*; moderately frequent.

Genus (124) *Cecrops*, Leach, 1816.

284. *Cecrops Latreillei*, Leach.

1850. *", "*, Baird, Brit. Entom., p. 293, pl. xxxiv. fig. 1.  

*Hab.*—Found on the gills of a Short Sunfish, captured in the estuary in October 1890 (A. Scott). *Cecrops* appears to be a common parasite on the gills of this species of Sunfish.

Genus (125) *Orthagoriscola*, Franz Poche, 1902.  
(Syn. *Lcemargus*, Kröyer, 1838, name preoccupied for a genus of Fishes.)


*Hab.*—On the same Sunfish with the *Cecrops* just recorded
not, however, attached to the gills, but burrowing in hollows formed in the flesh of the fish, behind the anal fin (A. Scott). Off a Short Sunfish captured at North Berwick, 28th September 1905 (W. Evans). This appears to be a rarer species than the Cecrops.

Division LERNÆOIDA.

Family LERNÆIDÆ.

Genus (126) Lernæa, Linné, 1767.

286. Lernæa branchialis, Linné.


1850. ,, ,, Baird, Brit. Entom., p. 344, pl. xxxv. fig. 12.

Hab.—Frequent on the gills of Whitings and some other Gadoids.

Genus (127) Lernæenicus, Lesueur, 1824.

287. Lernæenicus spratta (Sowerby).


Hab.—On the eye of a Sprat, Clupea spratta, seen in one of the Leith Docks (J. Scott, August 1890). This Copepod is apparently seldom met with in the Firth of Forth, and this is the only record of its occurrence in the estuary known to me.

Genus (128) Hæmobaphes, Steenstrup and Lütken, 1861.

288. Hæmobaphes cyclopterinus (Fabricius).

1780. Lernæa cyclopterina, Fabr., Fauna Grönlandica, p. 337.


Hab.—Found on the gills of a Pogge, Agonus cataphractus, captured at Dunbar; and on a Butterfish, Pholis gunnellus, taken near Fidra in 1901.

Family **Chondracanthidae**.

Genus (129) *Oralien*, Bassett-Smith, 1899.

289. *Oralien asselinus* (Linne).


*Hab.*—Found on the gills of the Grey Gurnard, *Trigla gurnardus*; not uncommon. What appears to be the same species is also found on the gills of Plaice and one or two other fishes.

Genus (130) *Chondracanthus*, De la Roche, 1811.


*Hab.*—Found on the gills of Plaice, *Pleuronectes platessa*; not uncommon.


*Hab.*—Found on the gills of Lemon Dabs, *Pleuronectes microcephalus*, especially large fishes.


*Hab.*—Found on the gills of Long Rough Dabs, *Drepanopus setta platessoides*, captured in the estuary in 1891, and at Station III. in May 1901.
293. Chondracanthus soleae, Kröyer.


_Hab._—Found on the gills of the Black Sole, Solea vulgaris, captured in the estuary.


_Hab._—Found on the gills of Dabs, Pleuronectes limanda, Linn., captured in the estuary; not very common.

295. Chondracanthus merluccii (Holten).

(?) 1802. Lernæa merluccii, Holten, Mem. Soc. Hist. Nat. Copen-
hagen, vol. v., pl. viii. fig. 2.
1837. Chondracanthus merluccii, Kröyer, Naturh. Tidsskr., vol. i. p. 278, pl. iii. fig. 9a-d.

_Hab._—Found in the gill-cavity of a Hake, Merluccius vulgaris, landed at Newhaven in February 1885. This is a moderately common parasite on the Hake; it may frequently be found clinging to the roof and sides of the mouth, and sometimes on the underside of the tongue, as well as inside the gill-covers.

296. Chondracanthus lophii, Johnston.

1850. Lernentoma lophii, Baird, Brit. Entom., p. 330, pl. xxxv. fig. 3.

_Hab._—Common in the gill-chambers of the Angler-fish, Lophius piscatorius, captured in the estuary. This is one of the most common species of the Chondracanthi I have observed in the Firth of Forth.

297. Chondracanthus zei, De la Roche.


_Hab._—Found on the gills of a John Dory, Zeus faber, captured in the estuary in 1891.
Family Lernæopodidæ.

Genus (131) Charopinus, Kröyer, 1863.

298. Charopinus Dalmanni (Retzius).

1900. Charopinus Dalmanni, T. Scott, op. cit., p. 169, pl. viii. figs. 6-10.

Hab.—In the nasal fossæ of a large Grey Skate, Raia batis, captured near May Island in 1891. This curious parasite is frequent in the nasal fossæ of large skates, but seldom in small specimens.

Genus (132) Brachiella, Cuvier, 1817.

299. Brachiella insidiosa, Heller.

1865. Brachiella insidiosa, Heller, Reise der Novara, p. 239, pl. xxiv. fig. 1.

Hab.—Found on the gills of a Hake captured in the estuary. This species is less common than the Chondracanthus merluccii, which is also found on the Hake.

300. Brachiella triglæ, Claus.

1860. Brachiella triglæ, Claus, Zur Morp. der Copepoden, pl. i. fig. 6.

Hab.—Found on Trigla lineata captured at Station VIII in September 1897.

Genus (133) Anchorella, Cuvier, 1817.

301. Anchorella emarginata, Kröyer.

1887. Anchorella emarginata, Kröyer, Naturh. Tidsskr., R. i. B. i. p. 287, pl. iii. fig. 7.

Hab.—Found on the gills of a Twaites Shad, Clupea jinta, captured near Dunbar in February 1897. This appears to be a rare species.
302. Anchorella rugosa, Kröyer.

1837. Anchorella rugosa, Kröyer, l. c., p. 294, pl. iii. fig. 6.

*Hab.*—Found on gills and gill-covers and inside the throat of the Cat- or Wolf-fish, Anarrhichas lupus; not uncommon.

303. Anchorella uncinata (O. F. Müller).

1850. Anchorella uncinata, Baird, l. c., p. 337, pl. xxxv. fig. 9.

*Hab.*—Found on the gills and inside the throat of Cod-fish, and probably on other Gadoids, not uncommon; but the Anchorellae of these other Gadoids require further study, as they may not all belong to the same species.


*Hab.*—Found on a Haddock. The parasite was attached on the under side of the fish, and near the anal fin. Only one specimen was observed.

I add here two other interesting parasitic Copepods, each of which represents a different family, viz.:—

**Family Herpyllobiidae.**

Genus (134) Salenskya, Giard and Bonnier, 1893.

305. Salenskya tuberosa, Giard and Bonnier.


*Hab.*—Found in the marsupium of specimens of Ampelisca
spinipes, Boeck; several examples of this species of Amphipod were infested with the parasite.

Family **Choniostomatidae**.

Genus (135) *Aspidoeia*, Giard and Bonnier, 1889.


- 1897. H. J. Hansen, The Choniostomatidae, p. 187, pl. xii. figs. 3a, 3b.

*Hab.*—Found adhering to a specimen both of *Erythrops elegans* (G. O. Sars) and *Erythrops erythrophthalmus* (Goës), captured in 1901 to the west of May Island; rare.

**THE THYROSTRACA or CIRRIPEDEIA.**

Scarcely any addition has been made to the number of Forth Crustacea belonging to this group since the publication of Leslie and Herdman's work on the *Invertebrate Fauna of the Estuary*.

**THORACICA.**

Family **Lepadidae**.

Genus (1) *Lepas*, Linné, 1767.


- 1851. Darwin, Monogr. of the Cirripedia (The Lepadidae), p. 73, pl. i. fig. 1.

*Hab.*—Attached to floating timber (Edin. Mus., Leslie and Herdman). Aberlady Bay, on piece of stranded timber, September 1893 (Evans).
Genus (2) Conchoderma, Olfers, 1814.

2. Conchoderma aurita (Linné).

1851. Conchoderma aurita, Darwin, l. c., p. 41, pl. iii. fig. 4.

**Hab.**—Attached to floating timber (Edin. Mus., Leslie and Herdman).

3. Conchoderma virgata (Spengler).

1851. Conchoderma virgata, Darwin, l. c., p. 146, pl. iii. fig. 2; pl. ix. fig. 4.

**Hab.**—Attached to floating timber (Edin. Mus., Leslie and Herdman).

Family **Balanidæ**.

Genus (3) Balanus, Da Costa, 1778.


1854. , , Darwin, Monograph. Balanidæ, p. 256, pl. vi. figs. 4a-4e.

**Hab.**—Not uncommon attached to stones, etc. (Leslie and Herdman).

5. Balanus crenatus, Bruguière.

1854. , , Darwin, l. c., p. 261, pl. vi. figs. 6a-6g.

**Hab.**—Shore at Portobello (Leslie and Herdman). East side of Inchkeith.


1854. Balanus balanoides, Darwin, l. c., p. 267, pl. vii. figs. 2a-2d.

**Hab.**—Common on rocks and stones between tide-marks, and also in deep water.


*Hab.*—Largo Bay, and off the west side of Inchkeith, single specimens, and occasionally a cluster attached to pieces of wood.¹

Genus (4) *Verruca*, Schumacher, 1817.


*Hab.*—Frequent on stones, dead shells, etc., brought up in the dredge.

**Rhizocephala.**

**Family Sacculinae.**

Genus (5) *Sacculina*, Thompson.


*Hab.*—Attached to the abdomen of Shore Crabs, *Carcinus maenas*, at Joppa (J. Anderson ²); not very rare.

10. *Sacculina triangularis*, J. Anderson.²

*Hab.*—Firth of Forth (J. Anderson). Dunbar, attached to the abdomen of *Cancer pagurus*; rare (H. C. Williamson).

11. *Sacculina* sp.

*Hab.*—Attached to the abdomen of *Portunus holsatus*; this Sacculine has been observed very sparingly in different parts of the estuary.

¹ *Balanus tintinnabulum* (Linn.), from Leith Dock, in Leslie and Herdman’s *Invertebrate Fauna*, is, as stated by these authors, “a foreign importation,” and is not included with the others here.

Genus (6) Peltogaster, Rathke.


_Hab._—On the abdomen of the common Hermit (or Soldier) Crab, _Eupagurus bernhardus_ (J. Anderson). This Cirriped does not appear to be rare in the Forth estuary.


_Hab._—Firth of Forth, at Joppa (J. Anderson).

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**APPENDIX.**

The following are some alterations in names, and additions to the species and localities, recorded in Part I. The total number of species enumerated in this Catalogue is now 794.

**Genus Eupagurus,** Brandt, 1851 (p. 112).

The genus name _Pagurus_, Fabricius, 1793, has been restored, and included under it are the four species recorded in Part I. under _Eupagurus_. See *Crustacea of Devon and Cornwall*, by Canon A. M. Norman and T. Scott, p. 8 (1906).

*Leptognathia Lilljeborgia*, Stebbing (p. 132).

This species has been removed to another genus, viz., _Tanaissus_, Norman and Scott. See *Crustacea of Devon and Cornwall*, p. 34.

**Genus Idothea,** Fabricius (p. 135).

To the species recorded under _Idothea_, add _Idothea granulosa_, Rathke, _Beiträge zur Fauna Norwegens_, p. 23. In March 1906 Mr William Evans obtained near Aberdour, Fife, two

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specimens of an *Idiothea* that appear to me to belong to this species.

*After Porcellio pictus* (p. 140), add

The genus *Metoponorthus*, Budde-Lund, 1879, and the species *M. pruinosus* (Brandt). This Oniscozoidian species has been captured (in April this year) at Slateford, near Edinburgh, by Mr William Evans, and is recorded by him in the *Annals of Scottish Natural History* for July 1906, p. 187.

*Gammarus Duebeni*, Lillj. (p. 163).

To the localities for this species add: Brackish pools, Luffness, near Aberlady, July 1906 (W. Evans).

**Genus Jassa**, Leach (p. 170).

The two species, *Jassa falcata* (Montagu) and *Jassa pusilla* (G. O. Sars), have been removed to the new genus *Bruzeliella*, Norman. See *Crustacea of Devon and Cornwall*, p. 92.

*Corophium grossipes*, Linné (p. 172).

This species, under the name of *Cancer grossipes*, was described by Linné in 1767 in *Systema Naturae*, vol. i. part 2, p. 1055; but as Pallas had already, in 1766, described under the name of *Oniscus volutator*, what appears to be the same form (cf. *Miscellanea Zoologica*, p. 102, pl. xiv. fig. 20), the name of the species should be *Corophium volutator* (Pallas), with *C. grossipes* as a synonym.

*Protella phasma*, Montagu (p. 174).

Professor Mayer in his work on the “Caprellidæ of the Bay of Naples,” *Caprelliden des Golfes von Neapel, Nachtrag*, p. 19, refers this species to the new genus *Pseudoprotella*.
Scapholeberis mucronata, O. F. Müller (p. 179).

To the localities given for this species add:—Side of river Teith, at Callander, September 1906 (W. Evans).

Cyclops Leuckarti, Claus (Part II. p. 347).

While this part of the Catalogue was passing through the press, Mr W. Evans sent me numerous specimens of a Cyclops which he had recently captured at the Falls of Leny, by holding a net so that some of the falling water would pass through it. The identification of the specimens somewhat puzzled me at first, but on carefully dissecting one or two of them, I found them to be the young of Cyclops Leuckarti; they were in the penultimate or antepenultimate stage; the segmentation of the body being slightly incomplete, while the antennules were furnished with only eleven articulations. Loch Voil, one of the two lochs from which the species is recorded, is situated to the north of Ben Ledi, and the river Balvaig carries its overflow water to Loch Lubnaig; this, in turn, is the source of the river Leny. It is probable, therefore, that Cyclops Leuckarti occurs in this loch also, though I have not as yet found it there. The loch and river were in flood when Mr Evans visited the Falls, and the specimens were very likely carried from the loch by the increased force of the current.

The normal habitat of Cyclops, as of most fresh-water Entomostraca, is in the comparatively still waters of lochs, ponds, and other similar places, and their presence in the rapid currents of rivers is usually accidental. The occurrence of this Cyclops in the Leny is, therefore, of interest from its bearing on the question of distribution, and as showing that the species is probably present in Loch Lubnaig as well as in the other two lochs from which it has been recorded.
Additional Note.—As the second part of this Catalogue was ready to go to press, I received a copy of an important work on the Amphipoda Gammaridea by the Rev. T. R. R. Stebbing, M.A., F.R.S., etc. This work, which has just been published, forms the twenty-first of the series of Monographs that are being issued under the general title Das Tierreich. The Amphipoda are here divided into three legions, viz., the Gammaridea, the Hyperiidea, and the Caprellidea, and it is the first that forms the subject of Mr Stebbing’s volume. The number of known species belonging to the Gammaridea as given in it is 1333. Of these, 1076 are “accepted species,” while the remaining 257 are regarded as doubtful. Their classification differs to some extent from that of the Monograph by G. O. Sars. There are also a considerable number of changes in the nomenclature, and I take the opportunity to indicate the more important of these, so far as they concern the species recorded in this Catalogue.

In the work referred to—Talitrus locusta (Pall.) becomes T. saltator (Mont.), and Orchestia littorea (Mont.) O. gammarellus (Pall.), while Hyale Nilssonii (Rathke) takes the name of H. Prevosti (M.-E.). The genus Callisoma, A. Costa, becomes Scopelocheirus, Bate, and Orchomene humilis (A. Costa) becomes O. Batei, O. Sars. Tryphosella, Bonnier, is replaced by Tryphosa, Boeck, but Tryphosa nana (Kröy.) becomes Orchomenella nanaus (Kröy.). Anonyx mucax (Phipps) becomes A. lagena, Kröy., and the genus Tmetonyx, Stebb., replaces Hoplonyx, O. Sars. Phoxocepalus Fultonii, T. Scott, becomes Paraphoxus Fultonii (T. S.), Harpinnia neglecta, O. Sars, becomes H. antennaria, Meinart, and Amphilochoïdes serratipes (Norm.) resumes the name of A. Boeckii, O. Sars. Metopa Bruzelii (Göes) becomes M. sinuata, O. Sars, and M. robusta is restored to its place in the same genus. Synchelidium brevicarpum (B. & W.) becomes S. haplocheles (Grube), and Halimedon parvimanus (B. & W.) Westwoodilla caeula, Bate. The genus Parumphithoe, Bruz., becomes Neopleustes, Stebb., and Paratylus, O. Sars, Nototropis, A. Costa; N. uncinitus, O. Sars, is also made a synonym to N. falcatus (Meticz.). Iphimedia minuta, O. Sars, becomes Panopelea minuta (O. Sars). The genus Amahtilla, Bate, is replaced by Gammarella, Herbst, and GAMMAROPSIS, Lillj., by EURYSYTHES, Bate, while GAMMAROPSIS nana, O. Sars, becomes E. palmatus (Stebb. and Rob.). Podoceropsis excavata (Bate) becomes P. nitida, Stimpns., Jassa Herdmani (A. O. Walker) J. dentex (Czern.), and Jassa pelagica, Leach, PARAJASSA pelagica (Leach). ERICHTHONIUS abditus (Templ.) becomes E. brasiliensis (Dana), and Siphonoöcetes Whitei (Gosse) E. Colletti, Boeck.
The following two species are additions to my list, viz., *Peltocoxa Marioni*, Catta, and *Cressa minuta*, Boeck, both being recorded from the Forth. This raises the total to 796.

I need scarcely add that this important work, by one of the foremost of living Carcinologists, is indispensable to those engaged in the study of the Amphipoda.

Before closing I desire to take this opportunity to express my indebtedness to Mr William Evans, F.R.S.E., President of the Royal Physical Society, for the whole-hearted assistance he has given me while this Catalogue was passing through the press. I am also not forgetful of other friends who have shown an interest in my efforts to make this contribution to Scottish Natural History, unpretentious though it be, of some use to students of the Crustacea of Scotland.

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**Errata in First Part.**

Page 99. Near bottom; for *Homarus vulgarus* read *Homarus vulgaris*, and for *Crangon vulgarus* read *Crangon vulgaris*.

,, 103. Near top; for *Paramphithoe monocupsis* read *Paramphithoe monocupsis*.

,, 107. Near top; for "Stalked-eyed Crustacea" read "Stalk-eyed Crustacea."


,, 113. Near top; for *Turritella* read *Turritella*.

,, 120. Near top; for *Nyctiphanes* read *Nyctiphanes*.

,, 122. Near bottom; in the reference "Reise i Chr. oy," etc., "oy" should be "og."

,, 125. In footnote; for "Dr Welley" read "Dr Willey."

,, 137. In footnote; for *Leptospidia* read *Leptaspidia*.

,, 144. Near bottom; *Callisoma* should be *Callisoma* in each of the four lines where it occurs.

,, 165. Near top; the name *Platessoides limandoides* is a synonym of *Drepanopsetta platessoides*. (See also p. 150.)

,, 165. Middle; for *Cheirocrates* read *Cheirocratus* in four places.

,, 189. Near the middle; for "Sonntagshlatt." read "Sonntagsblatt."

Part of the cost of publication of the foregoing Catalogue has been defrayed by a Grant made to the Author by the Carnegie Trust for the Universities of Scotland.
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TO

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For some recent changes in nomenclature, see p. 381.