A

SYSTEMATIC DESCRIPTION

OF

PARASITIC COPEPODA

FOUND ON

FISHES,

WITH AN ENUMERATION OF THE KNOWN SPECIES.

BY

P. W. BASSETT-SMITH, Staff-Surgeon R.N.,
F.Z.S., F.R.M.S.

[*From the* Proceedings of the Zoological Society of London,
April 18, 1899.]

A Systematic Description of Parasitic Copepoda found on Fishes, with an Enumeration of the known Species.

By P. W. Bassett-Smith, Staff-Surgeon R.N., F.Z.S., F.R.M.S.

(Plate XXVI.)

The number of known Copepoda parasitic upon fishes has been gradually increasing of late years: and their peculiar modes of life, extraordinary forms, and the remarkable positions in which they are found have caused them to be an interesting study to those naturalists who are working in marine zoology, especially if they ave been in the habit of handling fishes when recently caught.

From a morphological point of view the lower types are the more interesting, as exemplifying the effect of parasitism on the females, which lose more and more their ordinary appendages, becoming nothing better than fixed saccular animals, capable of imbibing nourishment and producing progeny; while the male, though often of very minute size, retains its general crustacean appearance. These points have repeatedly been investigated by Carl Vogt, Kurz, Claus, and others.

The literature on the subject is widely scattered, and many of the animals have exceedingly long lists of synonyms. It has been my object in this paper, which I trust will be of use to future workers, to gather together this material, and to put it into a workable form, as a basis for further investigation.

The latest attempt to systematize this group was made by A. Gerstäcker in Bronn's 'Class. und Ordn. des Thier-reichs,' 1866–1879, Crustacea, vol. v., Copepoda, which admirable work I have followed very closely, excepting in some groups which are mentioned later on. He has very largely based his classification on the structure of the articulate organs, which appears to be the most certain and scientific method. As the more lowly organized groups are reached, viz., those in which the female has lost almost all its articulate appendages, the characters and conformation of the males become most valuable guides: these being often very minute or pigmy-like. In many cases they are quite unknown, and are therefore a good field for further work, the discovery of new forms being very pleasing. There is no doubt that continued research, especially on the non-edible fish, in different parts of the world, would be rewarded by the discovery of a great number of new forms, and, what is badly wanted, further specimens to establish genera, many of which have been recorded by a single observer only, and not infrequently from one specimen only.

In a large number of cases the descriptions and plates found in the older works are most indefinite, making the diagnosis of the

species referred to at the time very doubtful. Those, however, of Nordmann, Steenstrup & Lütken, Kröyer, and Heller, besides those in many monographs which have appeared since, are beautiful records of patient investigation, the latest being by Thomson in 1889, from specimens taken in waters near New Zealand. Some of the errors that have been made are very remarkable. Gesner in his 'Historia Animalium, de aquatilibus,' 1658, states that a parasite, which he calls *Asilus marinus*, "is found on the Tunny and Swordfish, and is so small as to be easily overlooked, it being seldom to be seen except at the rising of the dog-star." He gives a figure: it is what is now known as *Brachiella thynni*, and was mentioned by Aristotle, Pliny, and Rondeletius. Strom, a long time ago, mistook the tail for the head of a *Caligus*, and the egg-tubes for antennæ. De Blainville thought the eye of a Sprat was the head of *Lernæenicus sprattæ*; and more recently M. P. Van Beneden (as Carl Vogt has pointed out) has described the *Leposphile* of Hesse as an Isopod.

The frequency with which some of these parasites are protected from their enemies by being covered with adventitious growths, especially those which, from their degenerate form, have become most fixed, is noteworthy. The Lernæas often have the body (which is soft, and generally of a reddish colour, from the hæmic fluid inside, and therefore not bad food for small fish) covered with a growth of algæ and sertularians, &c., quite masking their character; these, in one specimen in the British Museum, are so long as to resemble the real processes of *Lernæolophus*, and not until examined with a lens was their true nature detected. The body-portion of *Sphyrion* is often entirely hidden with this secondary parasitic growth, and as they themselves are furnished with hard processes, like bunches of calcareous algæ, they become very inconspicuous when in the water.

The bodies of *Lernæenicus* are pale yellow, with green external thread-like ovarian tubes. Most of the small scale-like *Caligidæ* found on the exterior of the fish are extremely difficult to detect, the larger members of this family being hidden under the fins or in the branchial cavities; but never have I seen so great a disproportion in the size of the parasite to the cavity as is sometimes the case with Isopods.

After a very considerable experience in examining fishes, several convictions are forced upon me: (1) that almost all fishes are infested with one or more species of parasite; (2) that as a rule these parasites are peculiar to them, though the difficulty of knowing when they are only varieties or distinct species always dogs one's steps in making a classification; (3) also that, as C. Vogt remarks, they may be divided into those which are blood-suckers and those which are mucus-eaters. A few specimens have been found free, taken in tow-nets when searching for Plankton; one species of *Caligus* has been taken on a Nautilus, but the genera commonly found in Tunicates and other invertebrates are not treated here.

The young attached condition of some of the Caligidæ has been

well demonstrated by Hesse; and the very interesting metamorphosis that the *Lernæa branchialis* goes through before becoming a fixed inert sac has been beautifully worked out by C. Claus, who has shown that copulation takes place when the animals are of very small size, the maturity of the ovules keeping pace with the increased growth of the female. The young unattached forms of this species have been taken in the tow-net by Mr. I. C. Thompson on more than one occasion; the juvenile conditions of other genera have been taken free, having been described as *Baculus* and *Hersellia*, which are probably the young of *Penella*.

In the family Ergasilidæ (p. 441), the genus *Thersites* Pagenst. does not appear to me to be distinct from *Ergasilus*, the only species of the former having been described from the gills of *Gasterosteus aculeatus*, from which, too, a species of the latter genus is taken; I have therefore united them together.

In the family Caligidæ (p. 444), the number of described species of *Caligus* is very large, and some of them have undoubtedly been known by many names; these I have endeavoured to place in their proper places. The genus *Papulina* of Van Beneden has been relegated to *Lepeophtheirus*, from which it has no marked differences; his genus *Calina* has been established, but the specimen described by him as *Caligeria* belongs to the old-formed genus *Alebion* of Kröyer. The *Lepeophtheirus huttoni* of Thomson, taken in New Zealand, a specimen of which he has been good enough to send me, should be placed with *Gloiopotes* Stp. & Lütk. Examples of the same species are present (unnamed) in the British Museum, taken at Madras. The genus *Nogagus* has been entirely left out, as it contains only male forms of other genera. The name *Perissopus* has been retained for Dana's *Lepidopus*, which is already in use, and Van Beneden's *Chlamys* is of more recent origin.

In the family Dichelestiidæ (p. 468), the genus *Epachthes* has been kept for a single species described by Nordmann, though the generic differences of this from *Lernanthropus* are very doubtful. Two new genera described by me in 1898 (*Cybicola* and *Pseudoclavella*) have been added.

The family Philichthyidæ (p. 477) has been formed to include all those parasites which are found only in the mucous canals and sinuses of various fish, and are so constructed as to be able to move freely in these spaces, the female having neither articulate limbs nor strong organs of attachment; the male is, however, of a distinct and rather high crustacean type. The first form found was the *Philichthys xiphiæ*, Stp.; it was placed in the last-mentioned family, though the female resembled much a *Chondracanthus*. Hesse was the first to discover the minute forms, which he divided into two genera, *Leposphile* and *Colobomatus*. Since then Richiardi has described eight species of *Philichthys*, but they differ so much from the original that I have made for them a new genus, giving to it his name. Hesse, Richiardi, and Carl Vogt were strongly of opinion that these peculiar animals were worthy of being formed nto a family of their own, especially as the known males are much alike and distinct.

In the family Lernæidæ, I have united the two genera *Lernæenicus* and *Lernæonema* under the older name, following the views set forth in the able paper by Richiardi in 1876. Five genera of this family are represented by single species.

In the family Chondracanthidæ (p. 488). the older name of *Sphyrion* has been retained for Krøyer's *Lesteira*. Two species are given, specimens of both being now in the British Museum—one, the larger (by far the largest of all these Copepod parasites), is from New Zealand, and is probably of the same species as that obtained by Guérin off the Cape of Good Hope, having few lobed processes on the float-like head. The second was taken off Dungeness; it is much smaller, with a greater number of lobe-like processes, and is described as *S. lumpi* Kr.

The position of the long known *Chondracanthus triglæ* has been for many years a disputed point. Linnæus placed it with the Lernæas; Blainville described it as a *Lernentoma*, Milne-Edwards as a *Chondracanthus*, Heller thought it probably a species of *Medesicate*, and J. Steenstrup placed it between *Lesteira* and *Medesicate*. The animal differs from every other, except *Therodamus*, in having the anterior part of the head with the hook-like posterior antennæ separated by a long neck-like process from the mouth, which is placed at the juncture of this with the thoracic portion—a peculiarity pointed out by Milne-Edwards and others, differing thus from *Medesicate* and *Chondracanthus*; I have therefore placed it in a genus of its own—*Oralien*.

In the family Lernæopodidæ, as I have pointed out before, it is impossible to differentiate the genus *Brachiella* from *Anchorella* by the female alone, the union, complete or otherwise, of the second pair of maxillipeds not being characteristic, though the males are quite distinct, and should be always looked for and recorded. Many of the *Anchorellæ* are very superficially described, and are very indefinite. The genus *Thysanote* has been made to embrace a number of peculiar forms which have been placed with *Brachiella*.

The genus *Cestopoda* of Kurz has been added. While in India I obtained on two occasions specimens of this peculiar genus from different fishes; these have not yet been described. I have provisionally placed here the *Naobranchia cygniformis* of Hesse, but it is insufficiently described.

Family I. ERGASILIDÆ.

Cephalothorax pyriform or flattened, first segment the largest; nearly or wholly provided with limbs. Anterior antennæ of moderate length, 5- or 6-jointed, alike in both sexes. Posterior antennæ with 3 or 4 joints. Second maxillipeds in the form of hooks, generally 3-jointed. Fifth pair of thoracic limbs one-branched or sometimes rudimentary. Eye median, with two lenses. Sex-organs paired. Female with two egg-sacs. Young as a free-swimming larva. Male smaller than female and less freely locomotive.

G. 1. Bomolochus Nordm.

Cephalothorax rounded in front; segments rapidly decreasing in size. Anterior antennæ with enlarged and densely-bristled basal joints. Mouth-organs placed close behind the antennæ. Posterior antennæ 2- or 3-jointed, not unciform at the end. First four thoracic limbs biramose, triarticulate, setiferous; fifth pair uniramose, biarticulate. Abdomen 3- or 4-jointed, provided with two caudal plates. Male small, resembling the female, but with delicately plumose anterior antennæ.

(1) Bomolochus gracilis. ♀.

Bomolochus gracilis Heller, Reise d. Novara, 1865, p. 157, pl. xiii. fig. 3.

Host: gills of *Zygæna malleus*, from Java.

(2) Bomolochus belones. ♀.

Bomolochus belones Burmeister, Abhandl. Kais. Leopoldinischen Akademie, 1835, vol. xvii. p. 300.
" " M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 479.

Host: gills of *Esox belone* [Belone vulgaris][1].

(3) Bomolochus ardeolæ. ♀.

Bomolochus ardeolæ Kr. Bidrag til Kundskab, 1863, p. 220, pl. xi. fig. 3.

Host: gills of *Belone ardeola*. New Orleans.

(4) Bomolochus chatoëssi. ♀.

Bomolochus chatoessi Kr. Bidrag til Kundskab, 1863, p. 214, pl. xi. fig. 5.

Host: gills of *Chatoëssus* sp. East Indies.

(5) Bomolochus tetrodontis. ♀.

Bomolochus tetradonis B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 4, pl. i. fig. 2.

Host: gills of *Tetrodon oblongus*. Bombay.

(6) Bomolochus scomberesocis. ♀.

Bomolochus scomberesocis Kr. Bidrag til Kundskab, 1863, p. 217, pl. x. fig. 5.

Host: *Scomber esox*. Atlantic.

(7) Bomolochus megaceros. ♀ ♂.

Bomolochus megaceros Heller, Reise d. Novara, 1865, p. 153, pl. xiii. fig. 3.
" " B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 51, pl. x. fig. 1.

In Coll. Brit. Mus.

Hosts: *Stromateus niger* and *Caranx djeddaba*. East Indies.

[1] The names of the fishes printed in italics are those used by the authors in the papers quoted. Synonyms added in square brackets are those adopted by Günther in the British Museum Catalogue of Fishes.

(8) Bomolochus triceros. ♀.

Bomolochus triceros B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 2, pl. i. fig. 1.
In Coll. Brit. Mus.
Host: gills of *Stromateus cinereus*. Bombay.

(9) Bomolochus denticulatus. ♀.

Bomolochus denticulatus B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 78, pl. iii. fig. 1.
Hosts: gills of *Sphyræna jello* and *Hemirhamphus far* [H. commersonii]. Ceylon.

(10) Bomolochus glyphisodontis. ♀.

Bomolochus glyphisodontis Kr. Bidrag til Kundskab, 1863, p. 223, pl. xi. fig. 4.
Host: gills of *Glyphisodon saxatilis*. Nicaragua.

(11) Bomolochus parvulus. ♀.

Bomolochus parvulus Nordm. Mikrog. Beiträge, 1832, p. 135.
Host: gills of *Amphacanthus rivulatus*.

(12) Bomolochus cornutus. ♀.

Bomolochus cornutus Claus. Zeit. f. wiss. Zool. XIV. p. 378. pl. xxxv. fig. 21. 18
Host: *Astrodermus coryphænoides* [Diana semilunata].

(13) Bomolochus soleæ. ♀.

Bomolochus solea Claus. Zeit. f. wiss. Zool. XIV. p. 374. pl. XXXV. fig. 1
Host: *Pleuronectes solea* [Solea vulgaris].

G. 2. Ergasilus Nordm.

Cephalothorax elongated, with five distinct segments, first large. Anterior antennæ 6-jointed, setaceous. Posterior antennæ triarticulate, very long, arm-like; mouth placed some distance behind these. First four pairs of thoracic limbs biramose, triarticulate, setiferous; fifth pair aborted or uniramose. Abdomen consisting of three joints, terminating in caudal plates provided with long bristles.

(1) Ergasilus sieboldi. ♂.

Ergasilus sieboldii Nordm. Mikrog. Beiträge, 1832, p. 15, pl. ii. fig. 1.
" " Kr. Bidrag til Kundskab, 1863, p. 237, pl. xiii. fig. 2.
" " M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 478.
" " C. Claus, ~~Neue Beiträge, parasit. Copepoda,~~ 1875, pl. xiii. fig. 12. Z. f. wiss. Zool. XXV, p. 339
Hosts: gills of *Cyprinus carpio*, *Esox lucius*, *Silurus glanis*.

(2) ERGASILUS TRISETACEUS. ♀.

Ergasilus trisetaceus Nordm. Mikrog. Beiträge, 1832, p. 16, pl. iii. fig. 7.
" " " M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 478.
Host: gills of *Silurus glanis*.

(3) ERGASILUS GIBBUS. ♂.

Ergasilus gibbus Nordm. Mikrog. Beiträge, 1832, p. 16, pl. iii. fig. 1.
" " M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 478.
Host: gills of *Anguilla vulgaris*.

(4) ERGASILUS LONGIMANUS. ♂.

Ergasilus longimanus Kr. Bidrag til Kundskab, 1863, p. 231, pl. xiii. fig. 1.
Host: gills of *Mugil* sp. Brazil.

(5) ERGASILUS FUNDULI. ♀.

Ergasilus funduli Kr. Bidrag til Kundskab, 1863, p. 228, pl. xi. fig. 1.
Host: gills of *Fundulus limbatus*. New Orleans.

(6) ERGASILUS LABRACIS. ♀.

Ergasilus labracis Kr. Bidrag til Kundskab, 1863, p. 229, pl. xi. fig. 2.
Host: gills of *Labrax lineatus*. ~~West Indies.~~ Baltimore, Md.

(7) ERGASILUS LIZÆ. ♂.

Ergasilus lizæ Kr. Bidrag til Kundskab, 1863, p. 232.
Host: gills of *Mugil liza*. New Orleans.

(8) ERGASILUS PEREGRINUS. ♀.

Ergasilus peregrinus Heller, Reise d. Novara, 1865, p. 152, pl. xiii. fig. 1.
Host: gills of *Perca chuatsi*. Shanghai.

(9) ERGASILUS GASTEROSTEI. ♀.

Ergasilus gasterostei Kr. Bidrag til Kundskab, 1863, p. 233, pl. xii. fig. 2.
Thersites " Pagenst. Archiv f. Natur. 1860, p. 120, pl. v. fig. 8.
Host: gills of *Gasterosteus aculeatus*. Norway.

Family II. CALIGIDÆ.

Carapace broad, compressed. Cephalothorax incompletely provided with limbs, the free thoracic segments frequently overlapped or hidden by paired dorsal plates. Anterior antennæ short, with two or three joints. Posterior antennæ in the form of an articulate

hooked claw, not extending beyond the carapace. Mouth as a more or less elongated suctorial beak, formed out of the upper and lower lip, in which is seen the slender mandible. Maxillipeds free, both in the form of hooks, the posterior being the most powerful; the first four pairs of thoracic limbs mostly biramose, but not infrequently the first and fourth uniramose, fifth pair rudimentary. Eye median, simple, frequently suppressed. Generative organs paired. External ovaries as two cord-like tubes. Male generally smaller than female; both sexes in the young of some genera attached by a slender frontal filament.

DIVISION i. *Caliginæ*.—Terminal joints of most of the thoracic limbs fringed with plumose hairs.

G. 1. HERMILIUS Heller.

Carapace deeply notched in the centre, the two halves folding together like the valves of a mussel. First and fourth pairs of thoracic limbs uniramose, second and third biramose. Fourth thoracic segment small, free, not provided with dorsal plates.

(1) HERMILIUS PYRIVENTRIS. ♀.

Hermilius pyriventris Heller, Reise d. Novara, 1865, p. 186, pl. xviii. fig. 1.

Host: gills of *Arius acutus* [A. argyropleuron]. Java.

(2) HERMILIUS LONGICORNIS. ♀.

Hermilius longicornis B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 80, pl. iii. fig. 2.

In Coll. Brit. Mus.

Host: *Arius acutirostris*. Trincomalee.

G. 2. PARAPETALUS Stp. & Lütk.

Carapace rounded, scutiform. Frontal border with lunulæ. First and fourth pairs of thoracic limbs uniramose, second and third biramose. Genital segment of large size, covered over by two dorsal plates; also with two elongated flattened processes projecting backwards from the posterior border and origin of abdominal portion; which latter is biarticulate, terminating in two small caudal plates.

(1) PARAPETALUS ORIENTALIS. ♀.

Parapetalus orientalis Stp. & Lütk. Bidrag til Kundskab, 1861, p. 365, pl. v. fig. 10.

Host: gills of *Mene maculata*. Indian Ocean.

G. 3. SYNESTIUS Stp. & Lütk.

Carapace rounded, scutiform. Frontal border with lunulæ. First and fourth thoracic limbs uniramose; second and third biramose. Genital segment large, not covered by dorsal plates, but prolonged

backwards on either side by two elongated blunted processes. Abdomen long, consisting of two joints terminating in two minute caudal plates.

(1) SYNESTIUS CALIGINUS. ♀.

Synestius caliginus Stp. & Lütk. Bidrag til Kundskab, 1861, p. 364, pl. vi. fig. 11.

Host: gills of *Stromateus paru* Bl. [S. niger]. Indian Ocean.

G. 4. CALIGODES Heller.

Carapace very small, rounded. Frontal border with minute lunulæ. First and fourth thoracic limbs uniramose; second and third biramose. Genital segment flask-shape, produced forwards as a long neck, posteriorly elongated into two divergent leaf-like processes. Abdomen large, broad, with two minute caudal plates.

(1) CALIGODES LACINIATUS. ♀.

Chondracanthus laciniatus Kllr.
Sciænophilus „ Kr. Bidrag til Kundskab, 1863, p. 153, pl. viii. fig. 3.
Caligodes „ Heller, Reise d. Novara, 1865, p. 180.

Host: *Belone* sp. Indian Ocean.

(2) CALIGODES CARANGIS. ♀.

Caligodes carangis B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 364, pl. xi. fig. 4.
In Coll. Brit. Mus.

Host: *Caranx ferdau*. Aden.

G. 5. CALIGUS Müller.

Carapace large, scutiform. Frontal border provided with lunulæ. First and fourth thoracic limbs uniramose; second and third biramose. Fourth thoracic segment free, small, without dorsal plates. Genital segment without plates or processes. Abdomen with two terminal caudal plates.

Division 1. Abdomen with single joint.

(1) CALIGUS ABBREVIATUS. ♀ ♂.

Caligus abbreviatus Kr. Bidrag til Kundskab, 1863, p. 61, pl. iii. fig. 4.

Host: *Labrus bergylta* [L. maculatus]. Bergen.

(2) CALIGUS PARVUS. ♀ ♂.

Caligus parvus B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 5, pl. ii. fig. 1.
In Coll. Brit. Mus.

Host: gills of *Tetrodon oblongus*. Bombay.

(3) CALIGUS BREVIPEDIS. ♀.

Caligus brevipedis B.-S. Ann. & Mag. N. H. ser. 6, vol. xviii. 1896, p. 11, pl. iii. fig. 1.

Host: gills of *Motella tricirrata*. Plymouth.

(4) CALIGUS CENTRODONTI. ♀ ♂.

Caligus centrodonti Baird, Brit. Entom. 1850, p. 272, pl. xxxii. figs. 6–7.

Host: *Pagellus centrodontus*. British seas.

(5) CALIGUS CURTUS. ♀ ♂.

Caligus curtus Müll. Entomostraca, 1785, p. 130, pl. xxi. fig. 1.
„ „ Kr. Tidsskrift, 1837, vol. i. p. 623, pl. vi. fig. 5.
„ „ Desmarest, Consid. sur les Crust. 1825, p. 340.
„ „ M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 451.
„ *mulleri* Leach, Encycl. Brit. Suppl. 1816, p. 405, pl. xx.
„ „ Desmarest, Consid. sur les Crust. 1825, p. 342, pl. l. fig. 4.
„ „ M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 450.
„ „ Baird, British Entom. 1850, p. 271, pl. xxxii. fig. 4.
„ *bicuspidatus* Nordm. Mikrog. Beiträge, 1832, p. 28.
„ *elegans*? V. Bened. Annal. de Scien. Nat. 3 ser. vol. xvi. 1851, p. 91.
„ *diaphanus* Baird, British Entom. 1850, p. 269, pl. xxxii. fig. 1. ♂.
„ *americanus* Dana, Amer. Journ. of Sc. & Art, 1838, vol. xxxiv. pls. 3, 4, 5.
&c.

In Coll. Brit. Mus.

Hosts: *Gadidæ*, *Trigla* spp., *Rhombus maximus*, *Mugil* &c.

(6) CALIGUS ÆGLEFINI. ♀ ♂.

Caligus æglefini Kr. Bidrag til Kundskab, 1863, p. 89, pl. vii. fig. 3.

Host: *Gadus æglefinus* Linn.

(7) CALIGUS MINIMUS. ♀ ♂.

Caligus minimus Otto, Nov. Act. Acad. Cæs. Leop. 1828, vol. xiv. p. 354, pl. xxii. fig. 7.
„ *minutus* M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 450.
„ „ Heller, Reise d. Novara, 1865, p. 163.

In Coll. Brit. Mus.

Host: gills of *Labrax lupus*. European seas.

(8) CALIGUS NANUS. ♀ ♂.

Caligus nanus Kr. Bidrag til Kundskab, 1863, p. 86, pl. ii. fig. 4.

Host:—?

(9) CALIGUS GURNARDI. ♀ ♂.

Caligus gurnardi Kr. Bidrag til Kundskab, 1863, p. 76, pl. ii. fig. 3.

Host: *Trigla gurnardus*. British seas.

(10) CALIGUS HÆMULONIS. ♀ ♂.

Caligus hæmulonis Kr. Bidrag til Kundskab, 1863, p. 48, pl. iv. fig. 3.

Host: *Hæmulon elegans*. West Indies.

(11) CALIGUS RAPAX. ♀ ♂.

Caligus rapax M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 453, pl. xxxviii. fig. 9.
„ „ Baird, Brit. Entom. 1850, p. 270, pl. xxxii. fig. 2.
„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 359, pl. ii. fig. 4.
„ „ Kr. Bidrag til Kundskab, 1863, p. 71.
„ „ B.-S. Journ. M. B. Assn. Plymouth, 1896, p. 156.
„ *elongatus* Nordm. Mikrog. Beiträge, 1832, p. 24.
„ *leptochilus* Leuckart, in Frey und Leuckart, Beitrag, p. 165.

In Coll. Brit. Mus.

Hosts: *Gadidæ*, *Trigla*, *Pleuronectes*, *Zeus faber*, *Salmo*.

(12) CALIGUS LACUSTRIS. ♀.

Caligus lacustris Stp. & Lütk. Bidrag til Kundskab, 1861, p. 355, pl. i. fig. 2.

Hosts: *Leuciscus rutilus*, *Esox lucius*, *Perca fluviatilis*.

(13) CALIGUS BALISTÆ. ♀ ♂.

Caligus balistæ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 356, pl. i. fig. 1.

Host: *Balistes* sp. West Indies.

(14) CALIGUS KROEYERI. ♀.

Caligus kröyeri M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 452.
„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 357.

In Coll. Brit. Mus.

Host: *Diodon* sp.

(15) CALIGUS TENAX. ♀ ♂.

Caligus tenax Heller, Reise d. Novara, 1865, p. 172, pl. xv. fig. 3.
„ „ B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 393, pl. xi. fig. 3.

In Coll. Brit. Mus.

Hosts: *Lobotes erate*, Java, and *Caranx* spp., Indian Ocean.

(16) CALIGUS CARANGIS. ♀ ♂.

Caligus carangis Kr. Bidrag til Kundskab, 1863, p. 69, pl. v. fig. 2.
„ „ B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 364.

In Coll. Brit. Mus.

Host: *Caranx* sp. East Indies.

(17) CALIGUS TRACHYNOTI. ♀. ♂.

Caligus trachynoti Heller, Reise der Fregatte Novara, 1865, p. 169, pl. xv. fig. 1.

Host: gills of *Trachynotus* sp. Brazil.

(18) CALIGUS CHILODACTYLI. ♀ ♂.

Caligus chilodactyli Kr. Bidrag til Kundskab, 1863, p. 52, p. iv. fig. 5.

Host: *Chilodactylus* sp. Valparaiso.

(19) CALIGUS LUMPI. ♂.

Caligus lumpi Kr. Bidrag til Kundskab, 1863, p. 73, pl. ii. fig. 2.

Host: *Cyclopterus lumpus*. Europe.

(20) CALIGUS TRACHYPTERI. ♀.

Caligus trachypteri, Kr. Bidrag til Kundskab, 1863, p. 57, pl. iii. fig. 1.

Host: *Trachypterus* sp. Mediterranean.

(21) CALIGUS STROMATEI. ♀ ♂.

Caligus stromatei Kr. Bidrag til Kundskab, 1863, p. 43, pl. iv. fig. 1.

Host: *Stromateus* sp. East Indies.

(22) CALIGUS ALALONGÆ. ♂.

Caligus alalonga Kr. Bidrag til Kundskab, 1863, p. 55, pl. iv. fig. 6.

Host: gills of *Thynnus alalonga* Cuv.

(23) CALIGUS PHIPSONI. ♀ ♂.

Caligus phipsoni B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 7, pl. iii. fig. 3.

In Coll. Brit. Mus.

Host: *Cybium guttatum*. Bombay.

(24) CALIGUS BELONES. ♀.

Caligus belones Kr. Bidrag til Kundskab, 1863, p. 81, pl. vii. fig. 1.

Host: *Raja batis*?

(25) Caligus murrayanus. ♂.

Caligus murrayanus T. Scott, Tr. Linn. Soc., Zool. vol. vi. 1895, p. 129, pl. xiv. fig. 20.

Host:— ? Gulf of Guinea.

(26) Caligus dubius. ♀.

Caligus dubius T. Scott, Tr. Linn. Soc., Zool. vol. vi. 1895, p. 130, pl. xiv. fig. 22.

Host:— ? Gulf of Guinea.

(27) Caligus platytarsi. ♀.

Caligus platytarsis B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 83, pl. iv. fig. 2.

In Coll. Brit. Mus.

Host: gills of *Mugil* sp. Muscat.

(28) Caligus isonyx. ♀.

Caligus isonyx Stp. & Lütk. Bidrag til Kundskab, 1861, p. 358, pl. iii. fig. 5.

Host: gills of *Sphyræna baracuda* [S. picuda]. West Indies.

(29) Caligus dakari. ♀.

Caligus dakari V. Ben. Bull. Acad. Roy. Belg. vol. xxiii. 1892, p. 243, pl. i. figs. 1–4.

Host:— ?

(30) Caligus scomberi. ♀.

Caligus scomberi B.-S. Ann. & Mag. N. H. vol. xviii. 1896, p. 11, pl. iii. fig. 2.

In Coll. Brit. Mus.

Host: gills of *Scomber scomber*. Plymouth.

(31) Caligus monacanthi. ♀.

Caligus monacanthi Kr. Bidrag til Kundskab, 1863, p. 59, pl. iii. fig. 2.

Host: *Monacanthus* sp. West Indies.

(32) Caligus hirsutus. ♀ ♂.

Caligus hirsutus B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 6, pl. iii. fig. 1.

In Coll. Brit. Mus.

Host: gills of *Polynemus tetradactylus*. Bombay.

Division 2. Abdomen articulate, 2-jointed.

(33) Caligus vexator. ♀.

Caligus vexator Heller, Reise d. Novara, 1865, p. 165, pl. xiv. fig. 2.

Host: gills of *Dentex vulgaris*. Mediterranean.

(34) CALIGUS INFESTANS. ♀ ♂.

Caligus infestans Heller, Reise d. Novara, 1865, p. 167, pl. xiv. figs. 3, 4.
„ „ B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 360.

Hosts: gills of *Scomber* sp., and *Cybium commersoni*. Indian Ocean.

(35) CALIGUS CHORINEMI. ♀.

Caligus chorinemi Kllr. Mus. Cæs. Wien. (vide Heller).
„ „ Kr. Bidrag til Kundskab, 1863, p. 67, pl. v. fig. 1.
„ „ Heller, Reise der Fregatte Novara, 1865, p. 174, pl. xv. fig. 4.

Host: gills of *Chorinemus saliens*. Brazil.

(36) CALIGUS FALLAX. ♀.

Caligus fallax Kr. Bidrag til Kundskab, 1863, p. 92, pl. xvii. fig. 3.

Host:— ?

(37) CALIGUS CORYPHÆNÆ. ♀ ♂.

Caligus coryphænæ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 360, pl. iv. fig. 7.
„ *bengoensis* Scott, Entomostr. G. of Guinea, Trans. Linn. Soc., Zool. vi. 1895, p. 130, pl. xiv. fig. 19.
„ *thynni*? Dana, Expl. Exp. U.S., Crust. ii. 1854.
„ *scutatus*? M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 453.

Host: *Coryphæna* sp. East Indies.

(38) CALIGUS TORPEDINIS.

Caligus torpedinis Heller, Reise d. Novara, 1865, p. 176, pl. xv. fig. 6.

Host: gills of *Torpedo* sp. Indian Ocean.

(39) CALIGUS ROBUSTUS. ♀ ♂.

Caligus robustus B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 361, pl. xi. fig. 1.

In Coll. Brit. Mus.

Host: gills of *Caranx* spp. Indian Ocean.

(40) CALIGUS COSSACKI. ♀ ♂.

Caligus cossackii B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 85, pl. iv. fig. 3.
„ *constrictus*? ♂, Heller, Reise d. Novara, 1865, p. 175, pl. xv. fig. 5.

In Coll. Brit. Mus.

Host: gills of *Chrysophrys sarba* and *Stromateus*. Indian Ocean.

(41) Caligus longipes. ♀ ♂.

Caligus longipedis B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 359, pl. x. fig. 2.

Host: gills of *Caranx melampygus*. Aden.

(42) Caligus cybii. ♀.

Caligus cybii B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 6, pl. ii. fig. 3.

In Coll. Brit. Mus.

Host: *Cybium lineolatum*. Bombay.

(43) Caligus diaphanus. ♀.

Caligus diaphanus Nordm. Mikrog. Beiträge, ii. 1832, p. 26.
„ „ Kröyer, Bidrag til Kundskab, 1863, p. 79, pl. vii. fig. 5.
„ „ B.-S. Journ. M. B. Assn. Plymouth, 1896.

In Coll. Brit. Mus.

Not Baird, not M.-E.

Host: gills of *Trigla* spp. British seas.

(44) Caligus arii. ♀.

Caligus arii B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 82, pl. iv. fig. 1.

In Coll. Brit. Mus.

Host: gills of *Arius acutirostris*. Trincomalee.

(45) Caligus irritans. ♀ ♂.

Caligus irritans Heller, Reise d. Novara, 1865, p. 177, pl. xv. fig. 7. ♀ ♂

In Coll. Brit. Mus.

Hosts: gills of *Serranus*, Brazil (Heller); *Caranx*, East Indies (B.-S.).

(46) Caligus pelamydis. ♀.

Caligus pelamydis Kr. Bidrag til Kundskab, 1863, p. 50, pl. iv. fig. 4.

Host: gills of *Pelamys sarda*.

(47) Caligus productus. ♀.

Caligus productus Dana, Expl. Exp. U.S., Crust. ii. 1854, pl. xc. fig. 4.
„ „ ? Kr. Bidrag til Kundskab, 1863, p. 64, pl. iii. fig. 4.
„ „ Stp. & Lütk. Bidrag til Kundskab, 1863, p. 357, pl. iii. fig. 6.

Not Müller.

Hosts: *Coryphæna* and *Balistes*. West Indies.

(48) CALIGUS TRICHIURI. (♂ Kr., ♀ B.-S.)

> ♂. *Caligus trichiuri* Kr. Bidrag til Kundskab, 1863, p. 46, pl. iv. fig. 2.

Host: *Trichiurus haumela*. East Indies.

> ♀ (?). *Caligus longicaudus* B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 8, pl. iv. fig. 1.

In Coll. Brit. Mus.

Hosts: *Trichiurus haumela* and *Chirocentrus dorab*. Bombay.

Division 3. Abdomen with 3 joints.

(49) CALIGUS ANGUSTATUS. ♀.

> *Caligus angustatus* Kr. Bidrag til Kundskab, 1863, p. 84, pl. vii. fig. 2.

Sub-G. SCIÆNOPHILUS Van Beneden.

Cephalothorax proportionally very small, rounded. Genital segment elongated. Abdomen having a total length equal to the remainder. Second maxillipeds very large, massive; other limbs as in *Caligus*.

(1) SCIÆNOPHILUS TENUIS. ♀.

Sciænophilus tenuis V. Ben. Bull. Acad. Roy. Belg. xix. 1852, pt. 3, p. 464.

„ „ V. Ben. Recherch. sur les Crust. Belg. 1861, p. 148, ~~fig. xxi~~.

> „ „ B.-S. Journ. M. B. Assn. Plymouth, 1896, p. 156.

In Coll. Brit. Mus.

Host: gills of *Sciæna aquila*. Europe.

(2) SCIÆNOPHILUS BENEDENI. ♀.

> *Sciænophilus benedeni* B.-S. Ann. & Mag. N.H. ser. 7, vol. i. 1898, p. 9, pl. iv. fig. 3.

Host: gills of *Sciæna diacanthus*. Bombay.

G. 6. LEPEOPHTHEIRUS Nordm.

Carapace large, rounded, scutiform. Frontal border without lunulæ. Fourth thoracic segment small, simple. Genital segment without plates or lobes. Abdomen projecting, terminating in two caudal plates. Thoracic limbs as in *Caligus*.

Division 1. Abdomen consisting of a single joint.

(1) LEPEOPHTHEIRUS BRACHYURUS. ♀.

> *Lepeophtheirus brachyurus* Heller, Reise d. Novara, 1865, p 185, pl. xvi. fig. 4.

Host: gills of *Tetrodon calamaria* [T. stellatus]. Java.

(2) LEPEOPHTHEIRUS COSSYPHI. ♀.

Lepeophtheirus cossyphi Kr. Bidrag til Kundskab, 1863, p. 115, pl. vii. fig. 6.

Host: gills of *Cossyphus bodjanus* [C. rufus].

(3) LEPEOPHTHEIRUS ROTUNDIVENTRIS. ♀ ♂.

Lepeophtheirus rotundiventris B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 86, pl. v. fig. 1.

Hosts: gills of *Lutjanus* sp. and *Serranus* sp. Indian Ocean.

(4) LEPEOPHTHEIRUS SUHMI. ♀.

Lepeophtheirus suhmi Brady, Challenger, viii. p. 132, pl. lv. fig. 2.

Host: *Scarus* sp. St. Vincent, Cape Verde Is.

(5) LEPEOPHTHEIRUS PECTORALIS. ♀ ♂.

Lernea pectoralis Müll. Zool. Dan. 1776, p. 41, pl. xxxiii. fig. 7.
Caligus pectoralis Kr. Tidsskrift, ii. 1838, p. 8, pl. vi. fig. 4.
„ „ M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 454.
„ „ Thompson, Ann. & Mag. N. H. ser. 1, vol. xx. 1847, p. 247.
Lepeophtheirus pectoralis Nordm. Mikrog. Beiträge, ii. 1832, p. 30.
„ „ Baird, Brit. Entom. 1850, p. 275, pl. xxxii. fig. 10
„ „ B.-S. Jour. M. B. Assn. Plymouth, 1896, p. 158.

In Coll. Brit. Mus.

Hosts: gills of *Pleuronectidæ* and *Scomber scomber*. Europe.

(6) LEPEOPHTHEIRUS NORDMANNI. ♀ ♂.

Lepeophtheirus nordmannii M.-E. Hist. Nat. Crust. iii. 1840, p. 455.
„ „ Heller, Reise d. Novara, 1865, p. 180, pl. xvi. fig. 1.
Caligus nordmannii Atlas, Règne An. de Cuv., édit. Crochart, pl. lxxvii. fig. 1.
„ „ Thompson, Ann. & Mag. N. H. ser. 1, vol. xx. 1847, p. 248.

Host: *Orthagoriscus mola*.

(7) LEPEOPHTHEIRUS HIPPOGLOSSI. ♀ ♂.

~~*Caligus*~~ *hippoglossi* Kr. Bidrag til Kundskab, 1863, p. 131, pl. vi. fig. 5.
Caligus „ M.-E. Hist. Nat. Crust. iii. 1840, p. 456.
Lepeophtheirus hippoglossi Baird, Brit. Entom. 1850, p. 276, pl. xxxii. fig. 12.
Binoculus piscinus? Fabr. Fauna Grœnlandica, 1780, p. 239.

In Coll. Brit. Mus.

Host: *Hippoglossus maximus* [H. vulgaris]. North Sea, &c.

(8) LEPEOPHTHEIRUS ORNATUS. ♀.

Caligus ornatus M.-E. Hist. Nat. Crust. vol. iii. 1840, p. 455.
„ „ Nordm. Coll. du Mus. du jard. du Roi (vide Milne-Edwards).

Host:—? Valparaiso.

(9) LEPEOPHTHEIRUS THOMPSONI. ♂ ♀.

Lepeophtheirus thompsoni Baird, Brit. Entom. 1850, p. 278, pl. xxx. fig. 2.
Caligus gracilis, V. Ben. Ann. de Scien. Nat. vol. xvi. 1851, p. 90, pl. ii.

In Coll. Brit. Mus.
Host: gills of *Rhombus maximus*. British seas.

(10) LEPEOPHTHEIRUS STROMI. ♀ ♂.

Lepeophtheirus stromii Baird, Trans. Berwick. Nat. Club, 1847.
„ Baird, Brit. Entom. 1850, p. 274, pl. xxxii. fig. 8, ♀.
„ „ B.-S. Jour. M. B. Assn. 1896, p. 157.
Laxe lusis Ström, Kjöbenh. Selsk. Skrift. x. p. 23, pl. vii. fig. 1.
Caligus vesper? M.-E. Hist. Nat. Crust. iii. 1840, p. 456.
Lepeophtheirus salmonis Kr. Bidrag til Kundskab, 1863, p. 137, pl. xvii. fig. 1.
„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 355.

In Coll. Brit. Mus.
Host: *Salmo* spp.

(11) LEPEOPHTHEIRUS POLLACHII. ♀ ♂.

Lepeophtheirus pollachius B.-S. Ann. & Mag. N. H. ser. 6, vol. xviii. 1896, p. 12, fig. 1.

In Coll. Brit. Mus.
Hosts: *Gadus pollachius* and *Molva vulgaris*. Plymouth.

(12) LEPEOPHTHEIRUS STURIONIS. ♀.

Lepeophtheirus sturionis Kr. Tidskrift, i. 1837, pl. vi. fig. 6.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 457.
„ „ Stp. & Lütk. Bidrag til Kund. 1861, p. 355.

In Coll. Brit. Mus.
Host: *Acipenser sturio*.

(13) LEPEOPHTHEIRUS FLORESI. ♀.

Pupulina flores V. Beneden, Bull. Acad. Roy. Belg. vol. xxiv. 1892, p. 254, pl. iii.

Host: *Ceratopterus* sp. Azores.

(14) LEPEOPHTHEIRUS ~~ERICHSONI~~. ♀ ♂.

Lepeophtheirus erichsoni Thomson. Trans. N. Z. Inst. vol. xxiii. 1890, p. 227, pl. xxiii.

Host: *Latris ciliaris*. New Zealand.

Division 2. Abdomen with two articulations.

(15) LEPEOPHTHEIRUS INTERCURRENS. ♀ ♂.

Lepeophtheirus intercurrens Kr. Bidrag til Kundskab, 1863, p. 126, pl. v. fig. 4.

Host:—?

(16) LEPEOPHTHEIRUS CRABRO. ♀ ♂.

Lepeophtheirus crabro Kr. Bidrag til Kundskab, 1863, p. 129, pl. vi. fig. 3.

Host:—? North Sea.

(17) LEPEOPHTHEIRUS ROBUSTUS. ♀.

Lepeophtheirus robustus Kr. Bidrag til Kundskab, 1863, p. 135, pl. vi. fig. 6.

Host: gills of *Raja* sp. Greenland.

(18) LEPEOPHTHEIRUS QUADRATUS. ♀.

Lepeophtheirus quadratus Kr. Bidrag til Kundskab, 1863, p. 113, pl. vii. fig. 7.

Host: *Bagrus* sp. China.

(19) LEPEOPHTHEIRUS MONACANTHUS. ♀.

Lepeophtheirus monacanthus Heller, Reise d. Fregatte Novara, 1865, p. 183, pl. xvi. fig. 3.

Host: gills of *Pimelodus* sp. Brazil.

(20) LEPEOPHTHEIRUS GROHMANNI. ♀.

Lepeophtheirus grohmanni Kr. Bidrag til Kundskab, 1863, p. 108, pl. v. fig. 3.

Host: *Pleuronectes* [*Arnoglossus*] *grohmanni*. Mediterranean.

(21) LEPEOPHTHEIRUS BRANCHIALIS. ♀ ♂.

Caligus branchialis Malm. MSS.

" " Stp. & Lütk. Bidrag til Kundskab, 1861, p. 362, pl. ii. fig. 3.

Lepeophtheirus rhombi Kr. Bidrag til Kundskab, 1863, p. 118, pl. v. fig. 5.

Host: gills of *Rhombus maximus*.

(22) LEPEOPHTHEIRUS OBSCURUS. ♂ ♀.

Lepeophtheirus obscurus Baird, Brit. Entom. 1850, p. 277, pl. xxxii. fig. 11.

" " ? B.-S. Jour. M. B. Assn. Plymouth, 1896, p. 157.

(*Caligus*) " B.-S. Ann. & Mag. N. H. ser. 6, vol. xviii. 1896, pl. iv. fig. 2.

In Coll. Brit. Mus.

Host: *Rhombus lævis*. Plymouth.

(23) LEPEOPHTHEIRUS GIBBUS. ♀.

Lepeophtheirus gibbus Kr. Bidrag til Kundskab, 1863, p. 121, pl. xvii. fig. 2.

Host: *Pleuronectes rhombus* [Rhombus lævis].

(24) LEPEOPHTHEIRUS LONGIPALPUS. ♀.

Lepeophtheirus longipalpus B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 88, pl. v. fig. 2.

Host: *Arius acutirostris*. Trincomalee.

(25) LEPEOPHTHEIRUS GRACILESCENS. ♀.

Lepeophtheirus gracilescens Kr. Bidrag til Kundskab, 1863, p. 124, pl. vi. fig. 2. *a–i*.

Host: *Rhombus vulgaris* [Rhombus lævis].

(26) LEPEOPHTHEIRUS BAGRI. ♀ ♂.

Lepeophtheirus bagri Dana, Proc. Amer. Acad. Arts & Sc. ii. 1848, p. 57.

Host: *Bagrus* sp. Rio de Janeiro.

G. 7. ANURETES Heller.

Carapace rounded as in last genus. First and fourth thoracic limbs uniramose, second and third biramose, rudiments of fifth pair well represented. Genital segment rounded, cut away posteriorly. Abdomen hidden or with caudal plates only slightly projecting.

(1) ANURETES HECKELI. ♀.

Caligus heckelii Kllr.

Lepeophtheirus heckelii Kr. Bidrag til Kundskab, 1863, p. 110, pl. vii. fig. 4.

Anuretes heckelii Heller, Reise d. Novara, 1865, p. 186.

Host: gills of *Ephippus gigas*. Brazil.

(2) ANURETES PERPLEXUS. ♀.

Anuretes perplexus B.-S. Ann. & Mag. N. H. 1898, ser. 7, vol. ii. p. 89, pl. v. fig. 3.

In Coll. Brit. Mus.

Host: gills of *Lutjanus* sp. Ceylon.

G. 8. CALINA Van Beneden.

Carapace large, oval, scutiform. Frontal plates well marked, no lunulæ. Fourth thoracic segment free, without dorsal plates. Genital segment rounded, with two horny dentate processes directed backwards as in *Pandarus*. Abdomen indistinctly biarticulate. First three pairs of thoracic limbs biramose, fourth uniramose, both branches of the first with two joints, those of the second and third with three.

(1) Calina brachyura. ♀.

Calina brachyura V. Ben. Bull. Acad. Roy. Belg. vol. xxiv. 1892, p. 249, pl. ii.

Host: skin of *Ceratopterus* sp. Azores.

G. 9. Gloiopotes Stp. & Lütk.

Carapace large, oval, scutiform. No lunulæ on the frontal border. Fourth thoracic segment with two dorsal plates partly covering the genital segment, the latter being produced backwards by two elongated curved processes having a styliform appendage projecting from the outer border, serrated at the edge. Abdomen long. Caudal plates lanciform. First and fourth thoracic limbs single-branched, second and third double.

(1) Gloiopotes hygomianus. ♀.

Gloiopotes hygomianus Stp. & Lütk. Bidrag til Kundskab, 1861, p. 363, pl. v. fig. 9.

Host:—? Atlantic.

(2) Gloiopotes huttoni. ♀ ♂.

Lepeophtheirus huttoni Thomson, Trans. N. Z. Inst. 1889, vol. xxii. p. 354, pl xxviii. fig. 10, *a–c*; xxix.

In Coll. Brit. Mus.

Hosts: *Histiophorus herschelii*, New Zealand, and *H.* sp., Madras.

G. 10. Luetkenia Claus. (*Cecropsina* Heller.)

Carapace short, obcordate. No frontal plates. Anterior antennæ biarticulate. Fourth thoracic ring covered by small dorsal plates. Genital segment prolonged backwards as lobes. Abdomen short not articulate, terminating with two small caudal plates. First pair of thoracic limbs uniramose, second and third biramose, biarticulate, fourth biramose, each branch with a single joint; setæ minute.

(1) Luetkenia astrodermi. ♀.

Lütkenia astrodermi Claus. Zeit. f. wiss. Zool. XIV. p. 369, pl. XXXIV. figs

Host: *Astrodermus* sp. [Diana sp.]. Mediterranean.

(2) Luetkenia glabra. ♀ ♂.

Cecropsina glabra Heller, Reise d. Novara, 1865, p. 209, pl. xix. fig. 1.

In Coll. Brit. Mus.

Host:—? Mediterranean.

G. 11. ~~Nesippus~~ Heller.

Carapace broad. First two free rings of the thorax distinctly

articulate and lobed laterally. Frontal plates conspicuous. Anterior antennæ biarticulate. Posterior antennæ unciform, with a spur on base of the terminal joints. Rostrum elongated; palp articulated; second maxilliped with short toothed end-claw. Fourth thoracic ring without dorsal plates. Genital segment elongated. Abdomen short. Caudal plates small, with plumose setæ. All the thoracic limbs biramose, first three biarticulate, fourth uniarticulate.

(1) NESSIPUS ORIENTALIS.

Nessipus orientalis Heller, Reise d. Novara, 1865, p. 194, pl. xviii. fig. 2.

Host: gills of *Prionodon menisorrah*. Java.

(2) NESSIPUS CRYPTURUS.

Nessipus crypturus Heller, Reise d. Novara, 1865, p. 196, pl. xviii. fig. 4.

Host: gills of *Zygæna malleus*. Java.

NOGAGUS Leach.

Only male forms of this genus have been described, which have been divided into two groups by Steenstrup and Lütken, and by Gerstäcker—(1) Those in which the fourth pair of thoracic limbs are biramose and biarticulate, like the first three pairs, and also having the abdomen with two joints. (2) Those in which the fourth pair are biramose, but with only a single joint, the first three being biramose and biarticulate; abdomen of a single joint. The first are in many cases proved to be the male forms of various species of *Pandarus*; the second are most probably the males of species of *Nessipus*, *Demoleus*, *Ecthrogaleus*, and *Dinematura*. I have here enumerated the species which have so far been described, but as a distinct genus *Nogagus* should not appear.

When taking these parasites from Sharks, among specimens of *Pandarus*, some of the male forms are almost invariably found. As has been pointed out by Thomson, the amount of pigment in them varies very considerably, from almost black to light yellow; but no observations have been made as to whether the lighter forms are mostly found on the white undersurface of the fish, and the dark forms above, a point which would be interesting to elucidate.

The *Nogagus angustatus* represented by Van Beneden[1] with a male attached would appear to be a species of *Dysgamus*, though the characters of the thoracic limbs are incompletely described, and poorly shown in the plates.

DIVISION I.

Nogagus latreillii Leach, Dict. des Sci. Nat. vol. xiv. p. 536 (1819).
„ *grandis* Stp. & Lütk. Bidrag til Kundskab, 1861, p. ~~338~~, pl. x. fig. 19.

[1] Bull. Acad. Roy. Belg. vol. xxiv. 1892, p. 245, pl. i.

Nogagus errans? Kr. Bidrag til Kundskab, 1863, p. 175, pl. x. fig. 3.

„ *braccatus* Heller, Reise d. Novara, 1865, p. 177, pl. xx. fig. 3.

„ *angustulus* Gerst. Arch. f. Naturg. xx. pt. 1, 1854, p. 192.

„ *validus* Dana, Proc. Amer. Acad. Arts & Sc. ii. 1852, p. 58.

Division II.

Nogagus elongatus Heller, Reise d. Novara, 1865, p. 206, pl. xx. fig. 5.

„ *cælebs* Heller, op. cit. p. 208, pl. xx. fig. 4.

„ *borealis* Stp. & Lütk. Bidrag til Kundskab, 1861, p. 387, pl. xi. fig. 21.

„ *tenax* Stp. & Lütk. op. cit. 1861, p. 388, pl. x. fig. 20.

„ *brevicaudatus* M.-E. Hist. Nat. Crust. iii. 1840, p. 460.

„ *gracilis* Burm. Acta Acad. Cæs.-Leop. vol. xvii. p. 284, pl. xxiii. fig. 1.

„ *lunatus* Stp. & Lütk. op. cit. 1861, p. 389, pl. ix. fig. 17.

G. 12. Demoleus Heller.

Carapace rounded. Frontal plates distinct. Anterior antennæ two-jointed. The first free thoracic joints lobed laterally, second without lobes, third prolonged backwards by two dorsal plates. Genital segment elongated. Abdomen small. Caudal plates very distinct. All four pairs of thoracic limbs biramose and biarticulate.

(1) Demoleus paradoxus. ♀ ♂.

Caligus paradoxus Otto, Acta Acad. Cæs. Leop. 1828, vol. xiv. p. 352, pl. xxii. fig. 5.

„ „ Nordm. Mikrog. Beiträge, 1832, p. 32.

„ „ Gerst. Arch. zur Naturg. 1853, xix. i. pl. iv. fig. 1–10.

„ *productus*? Müller, Entomostraca, 1785.

Nogagus grandis? ♂, vide Heller, op. cit. p. 202.

Host: "Dog-fish." Mediterranean.

G. 13. Dysgamus Stp. & Lütk.

Carapace large, rounded. Frontal lobes distinct. Anterior antennæ biarticulate. Rostrum long; palp articulate. Fourth thoracic joint free, without dorsal plates. Genital segment obcordate. Abdomen biarticulate, with small caudal plates. All four thoracic limbs biramose and biarticulate. This genus was made by Steenstrup from a male only; but in the Coll. Brit. Mus. there are a large number of specimens, some with external ovaries attached, which I have examined and have no doubt of their identity: therefore the genus is allowed to stand.

(1) DYSGAMUS ATLANTICUS. ♀ ♂.

Dysgamus atlanticus Stp. & Lütk. Bidrag til Kundskab, 1861, p. 368, pl. iv. fig. 8.

In Coll. Brit. Mus.

Host: "Shark." Atlantic and Indian Oceans.

G. 14. EURYPHORUS ~~Nordm.~~ M.-Edwds.

Carapace small, rounded. Frontal plates distinct. Fourth thoracic segment with two small dorsal plates. Genital segment large, oval, with two minute posterior lobes. Abdomen biarticulate, very elongated, spreading widely outwards and backwards as lamellar appendages. Caudal plates small. First pair of thoracic limbs biramose, biarticulate; second and third biramose, triarticulate; fourth biramose, the outer with three, the inner with two joints.

(1) EURYPHORUS NORDMANNI. ♀.

Euryphorus nordmannii M.-E. Hist. Nat. Crust. iii. 1840, p. 462, pl. xxxix. fig. 1.

Host:— ? Waters of Asia.

(2) EURYPHORUS NYMPHA. ♀ ♂.

Euryphorus nympha Stp. & Lütk. Bidrag til Kundskab, 1861, p. 366, pl. vi. fig. 12.

„ *coryphænæ* ♂ Kr. Bidrag til Kundskab, 1863, p. 161, pl. x. fig. 4.

Host: *Lampugus punctulatus* [Coryphæna punctulata] and *Coryphæna hippurus*. Atlantic.

G. 15. TREBIUS Kr.

Carapace oval, large. Frontal plates distinct. Anterior antennæ biarticulate. Third and fourth thoracic segments free, without dorsal plates. Genital segment short and broad. Abdomen long, simple. Thoracic limbs all with two branches, those of the first with two joints each, those of the second, third, and fourth triarticulate.

(1) TREBIUS CAUDATUS. ♀. ♂?

Trebius caudatus Kr. Tidsskrift, ii. 1838, p. 30, pl. i. fig. 4.

„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 458.

„ „ Thompson, Ann. & Mag. N. H. xx. p. 248 (1847).

„ „ Baird, Brit. Entom. 1850, p. 280, pl. xxxiii. fig. 3.

„ *spinifrons*? M.-E. Hist. Nat. Crust. iii. 1840, p. 458, pl. xxxviii. fig. 1.

„ *caudatus* Kr. Bidrag til Kundskab, 1863, p. 149, pl. x. fig. 1.

In Coll. Brit. Mus.

Hosts: *Raja* sp., *Galeus vulgaris* [G. canis], &c.

(2) Trebius tenuifurcatus. ♀.

Trebius tenuifurcatus Rath. Proc. U.S. Nat. Hist. Mus. 1887, x. p. 559.

Host: *Trygon* sp. Atlantic.

G. 16. Elytrophora Gerst.

Carapace rounded. Frontal plates distinct. Anterior antennæ two-jointed. Fourth thoracic segment with two dorsal plates. Genital segment large, lobed posteriorly. Caudal plates large. All four pairs of thoracic limbs biramose, the branches of the first biarticulate, of the second and third triarticulate, the fourth having the outer branch with three joints, the inner with two.

(1) Elytrophora brachyptera. ♀ ♂.

Elytrophora brachyptera Gerst. Arch. f. Naturg. 1853, xix. p. 60, pl. iii. fig. 12.

„ „ Heller, Reise d. Novara, 1865, p. 189, pl. xvii. fig. 1.

„ „ B.-S. Ann. & Mag. N. H. ser. 6, xviii. 1896, p. 12, pl. iv. fig. 3.

Dinematura thynni Kollar.

Arneus thynni Kr. Bidrag til Kundskab, 1863, p. 157, pl. viii. fig. 5.

Caligeria bella? Dana, Proc. Amer. Acad. Arts & Sc. 1848, p. 57.

In Coll. Brit. Mus.

Host: gills of *Thynnus* spp. European waters.

G. 17. Alebion Kr.

Carapace large, oval. Frontal plates well marked. Anterior antennæ two-jointed. Fourth thoracic segment with small dorsal plates. Genital segment broad, prolonged backwards in two elongated processes with the ends and outer margins dentate. Abdomen biarticulate. Caudal plates with long setæ. The first three pairs of thoracic limbs biramose, with lunate corneous bodies on outer branches; fourth pair of limbs quite rudimentary, hidden.

(1) Alebion carchariæ. ♀ ♂.

Alebion carchariæ Kr. Bidrag til Kundskab, 1863, p. 165, pl. xii. fig. 1.

„ „ B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 367, pl. xii. fig. 1.

Host: Shark? Atlantic and Indian Oceans.

(2) Alebion difficile. ♀.

Caligeria difficilis V. Ben. Bull. Acad. Roy. Belg. xxiv. 1892, p. 258, pl. iv.

Host:—? Azores.

G. 18. DINEMATURA ~~Latreille.~~ Burmeister. 1837

Carapace rounded, deeply excavated posteriorly. Frontal plate distinct. Anterior antennæ biarticulate. Rostrum long. Second maxillipeds massive and nodose. First free thoracic segment with a small lateral lobe; second of a square shape, free; third with two large dorsal plates. Genital segment oblong, winged, posteriorly produced in two short lobes and a small median process, partially covered by two narrow plates. Abdomen elongated, with lateral processes and two large foliaceous caudal appendages. All the thoracic limbs are biramose, the first biarticulate, the second and third triarticulate, all with plumose hairs on the margin; the fourth pair are changed into lamellar processes.

(1) DINEMATURA PRODUCTA. ♀.

Caligus productus Müll. Entomost. 1785, p. 132, pl. xxi. fig. 3. xxxiii, fig. 8

Pandarus lamnæ Johnst. Mag. Nat. Hist. 1835, viii. p. 203.

Dinemoura lamnæ Baird, Brit. Entom. 1850, p. 286, pl. xxxv. fig. 8.

Dinematura producta Stp. & Lütk. Bidrag til Kundskab, 1861, p. 34, pl. vii. fig. 13.

„ *lamna* Kr. Bidrag til Kundskab, 1863, p. 179.

~~*Dinematoura*~~ *elongata* V. Bened. Bull. Ac. Roy. Belg. 1860, p. 149, pl. xxiv.

„ „ ♂ V. Bened. Bull. Ac. Roy. Belg. 1892, p. 231.

In Coll. Brit. Mus.

Hosts: *Lamna cornubica*; *Scymnus glacialis* [Læmargus borealis]. (Berwick Bay)

(2) DINEMATURA FEROX. ♀.

Dinematura ferox Kr. Tidsskrift, ii. 1838, p. 40, pl. i. fig. 5.

Dinemoura ferox M.-E. Hist. Nat. Crust. iii. 1840, p. 465.

„ „ Stp. & Lütk. Bidrag til Kund. 1861, p. 379.

Dinematura carcharodonti Thomson, Trans. N. Z. Inst. 1889, vol. xxii. p. 360, pl. xxvi. fig. 2.

In Coll. Brit. Mus.

Host: *Scymnus microcephalus* [Læmargus borealis].

(3) DINEMATURA SERRATA. ♀.

~~*Dinemoura*~~ *serrata* Kr. Bidrag til Kundskab, 1863, p. 176, pl. viii. fig. 4.

Host:—?

(4) DINEMATURA LATIFOLIA. ♀.

Dinematura latifolia Stp. & Lütk. Bidrag til Kundskab, 1861, p. 38, pl. viii. fig. 16.

In Coll. Brit. Mus.

Host: *Oxyrhina* [Lamna] *glauca*.

(5) DINEMATURA HAMILTONI. ♀.

Dinematura hamiltoni Thomson, Trans. N. Z. Inst. vol. xxii. 1889, p. 357, pl. xxv. fig. 1.

Host: "Shark." New Zealand.

G. 19. ECHTHROGALEUS Stp. & Lütk.

Carapace as in *Dinematura*. Dorsal plates of last thoracic ring proportionally larger; no median processes posteriorly to genital segment; abdomen and caudal plates not projecting. Thoracic limbs as in the preceding genus, except that the inner branch of the second and third pairs has only two joints instead of three.

(1) ECHTHROGALEUS COLEOPTRATUS. ♂ ♀.

Dinematura ~~*Dinemoura coleoptratus*~~ Guérin, Icon. d. Règ. animal, iii. 1817, pl. xxxv. fig. 6.

Pandarus alatus Johnst. Loud. Mag. Nat. Hist. viii. 1836, p. 202.

> *Dinemoura alata* M.-E. Hist. Nat. Crust. iii. 1840, p. 464.

„ „ Baird, British Entom. 1850, p. 285, pl. xxxiii. fig. 8.

Dinematura alata (?). Guerin, opt. cit. fig. 7.

Nogagus? ♂.

Echthrogaleus coleoptratus Stp. & Lütk. Bidrag til Kundskab, 1861, p. 380, pl. viii. fig. 15.

In Coll. Brit. Mus.

Host: *Lamna cornubica*.

(2) ECHTHROGALEUS NEO-ZEALANICUS. ♀.

Dinematura neozealanica Thomson, Trans. N. Z. Inst. 1889, vol. xxii. p. 359, pl. xxv. fig. 2.

Host: "Shark." New Zealand.

(3) ECHTHROGALEUS AFFINIS. ♀ ♂.

> *Dinemoura affinis* M.-E. Hist. Nat. Crust. iii. 1840, p. 465, pl. xxxviii. fig. 15.

„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 382.

Dinematura braccata Dana, U.S. Expl. Exp., Crust. xii. 1848, 54 p. 1370, pl. 95. fig. 4.

Nogagus braccatus ♂, Heller, Reise d. Novara, 1865, p. 197, pl. xx. fig. 3. /ms.

In Coll. Brit. Mus.

Host: *Leptocarcharias* sp. New Zealand and Tongatabu.

(4) ECHTHROGALEUS INDISTINCTUS. ♀.

> *Dinematura indistincta* Kr. Bidrag til Kundskab, 1863, p. 183.

Host:—? Valparaiso.

DIVISION ii. *Pandarinæ*.—All the limbs provided with hook-like appendages, or with the edges quite smooth.

G. 20. CECROPS Leach.

Carapace oval, robust, deeply notched in front. Anterior antennæ small, hidden. Last thoracic segment with a pair of short dorsal plates. Genital segment as long as cephalothorax. Abdomen small. Caudal plates minute. All the thoracic limbs biramose, increasing

in size from first to fourth ; terminal joints of all with short hook-like setæ. External ovaries long, thread-like, twisted, concealed.

(1) CECROPS LATREILLII. ♀ ♂.

Cecrops latreillii Leach, Ency. Brit. Supp. i. 1816, pl. xx. figs. 1–5.
„ „ Lamarck, Anim. s. Vert. ed. i. t. 138, 1818.
„ „ Latreille, Encycl. méth. pl. 335, fig. 3–9.
„ „ Desmarest, Cons. sur les Crust. 1825, 338, pl. l. fig. 2.
„ „ Guérin. Icon. Règne An., Crust. 1817, pl. xxxv. fig. 8.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 474.
„ „ Baird, Brit. Entom. 1850, p. 293, pl. xxxiv. fig. 1.
„ „ Nordm. Mikrog. Beiträge, 1832, p. 39.
„ „ Kröyer, Bidrag til Kundskab, 1863, p. 190.
„ „ V. Bened. Rech. sur la faun. lit. Belg. 1861, p. 149, ~~pl. xx.~~
„ „ Thomson, Trans. N. Z. Inst. vol. xxii. 1889.

In Coll. Brit. Mus.

Host : *Orthagoriscus mola.* Mediterranean.

G. 21. PHYLLOPHORUS M.-E.

Carapace cordiform. Anterior antennæ projecting, triarticulate. Rostrum long. Thorax with three broad, spreading, overlapping plates. Genital segment rounded. Abdomen with short lateral blunt processes on either side of its base. All the limbs biramose and lamellar, without bristles or hooks.

(1) PHYLLOPHORUS CORNUTUS. ♀.

Phyllophorus cornutus M.-E. Hist. Nat. Crust. iii. 1840, p. 471, pl. xxxviii. fig. 13.

Host :—? Tongatabu.

G. 22. GANGLIOPUS Gerst.

Carapace broader in front than behind, not deeply notched in the centre. Anterior antennæ free, biarticulate ; first maxillipeds unciform. Three free thoracic segments with large dorsal plates, the first with the inner margins widely separated, those of the 2nd and 3rd with the inner borders approximated. All four pairs of thoracic limbs biramose, the first having the outer branch with one, inner with two joints, those of the second and third both two-jointed, the fourth single-jointed.

(1) GANGLIOPUS PYRIFORMIS. ♀ ♂.

Gangliopus pyriformis Gerst. Arch. für Naturg. xx. 1854, p. 192, pl. i. fig. 9.

Nogagus curticaudatus ♂, Dana ? vide Stp. & Lütk., Bidrag til Kund. 1861, p. 390.

Host :—? Atlantic.

G. 23. PANDARUS Leach.

Carapace broader behind than in front, not deeply notched. Anterior antennæ free, biarticulate; first maxilliped with a double end-claw; three pairs of small dorsal plates, first placed laterally, second and third median. Genital segment terminating in two minute points, and at the base of the abdomen are two lateral sharp dentate appendages. Thoracic limbs as in *Gangliopus*.

(1) PANDARUS BICOLOR. ♀.

Pandarus bicolor Leach, Encycl. Brit. Supp. i. 1816, p. 405, pl. xx. fig. 5.
„ „ Desmarest, Cons. sur les Crust. 1825, p. 339, pl. v. fig. 5.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 470.
„ „ Burm. Nov. Act. Acad. Nat. Cur. 1831, xviii. p. 331.
„ „ Kröyer, Bidrag til Kundskab, 1863, p. 187.
„ „ Baird, Brit. Entom. 1850, p. 288, pl. xxxvii. fig. 10.
„ „ B.-S. Journ. M. B. Assn. 1896, p. 156.
„ *bosci* Leach, Encycl. Brit. Supp. i. 1816, p. 406, pl. xx. fig. 1.
„ „ Baird, Brit. Entom. 1850, p. 289.
„ *fissifrons* M.-E. ? Hist. Nat. Crust. iii. 1840, p. 470.

In Coll. Brit. Mus.

Hosts: *Squalus* [Leuciscus] spp.; *Carcharias glaucus*; *Scyllium catulus*.

(2) PANDARUS DENTATUS. ♀ ♂.

Pandarus dentatus M.-E. Hist. Nat. Crust. iii. 1840, p. 469, pl. xxxviii. fig. 19.
„ *pallidus* ? M.-E. Hist. Nat. Crust. iii. 1840, p. 468.
Nogagus elongatus ? Heller, Reise d. Novara, 1865, p. 206, pl. xx. fig. 5.

In Coll. Brit. Mus.

Hosts: "Sharks." Indian and Pacific Oceans.

(3) PANDARUS CARCHARIÆ. ♀ ♂.

Pandarus carchariæ Leach, Dict. de Scien. Nat. 1819, vol. xiv. p. 535.
„ „ Desmarest, Cons. sur les Crust. 1825, p. 339.
„ „ Burm. Nov. Act. Acad. Nat. 1833.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 469.
„ *vulgaris* M.-E. op. cit. p. 469.
„ *cranchii* Leach, Dict. des Scien. Nat. vol. xiv. p. 535.
„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 390, pl. xi. fig. 22.
~~*Nogagus*~~ *cranchii* ♂, V. Beneden, Bull. Acad. Roy. Belg. xxiii. 1892, p. 221.

In Coll. Brit. Mus.

Host: *Carcharias* spp. Atlantic and Indian Oceans.

(4) PANDARUS ARMATUS. ♀ ♂.

Pandarus armatus Heller, Reise d. Novara, 1865, p. 202, pl. xix. fig. 4.
„ „ Thoms. Trans. N. Z. Inst. vol. xxii. 1889.
Nogagus latreillii ♂, M.-E. Hist. Nat. Crust. iii. 1840, p. 459.
„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 384, pl. ix. fig. 18.
In Coll. Brit. Mus.
Host: *Scyllium africanum*. Cape of Good Hope.

(5) PANDARUS LUGUBRIS. ♀.

Pandarus lugubris Heller, Reise d. Novara, 1865, p. 205, pl. xx. fig. 1.
Host: "Shark." Mediterranean.

(6) PANDARUS ZYGÆNÆ. ♀.

Pandarus zygæna Brady, Challenger Rep. vol. viii. pl. lv. fig. 3.
Host: *Zygæna malleus*. Cape de Verde Is.

(7) PANDARUS AFFINIS. ♀ ♂.

Pandarus affinis V. Bened. Bull. Ac. Roy. Belg. xxiii. 1892, p. 224.
Host: *Squalus* sp. Senegal.
Pandarus brevicaudatus Dana, Proc. Am. Acad. Arts & Sc. 1848, p. 59.
„ *satyrus*, id. ibid.
„ *cocinnatus*, id. ibid.
From "Sharks" in the Pacific Ocean: imperfectly described.

G. 24. LÆMARGUS Kr.

Carapace cordiform. Anterior antennæ triarticulate. Two narrow free articulate thoracic segments, followed by two pairs of large spreading dorsal plates, united in the middle line, covering the genital segment and abdomen. All the thoracic limbs biramose, lamellar, without setæ or hooks.

(1) LÆMARGUS MURICATUS Kr. ♀.

Læmargus muricatus Kr. Tidsskrift, 1837, p. 487, pl. v.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 475, pl. xxxix. fig. 2.
„ „ V. Bened. Recher. sur les Crust. Belg. 1861, p. 149, pl. xix. fig. 1–4.
In Coll. Brit. Mus.
Host: *Orthagoriscus mola*. Pacific.

G. 25. PERISSOPUS Stp. & Lütk. (*Lepidopus* Dana; *Chlamys* V. Ben.)

Carapace broad, produced backwards laterally. Anterior antennæ very small, biarticulate. Three pairs of dorsal plates, the first

placed laterally, the second small, central; third pair large, spreading. Genital segment as large as the cephalothorax. Abdomen small, hidden. Thoracic limbs very rudimentary.

(1) PERISSOPUS DENTATUS. ♀.

Perissopus dentatus Stp. & Lütk. Bidrag til Kundskab, 1861, p. 393, pl. xii. fig. 25.
„ *communis* Rath. Proc. U.S. N. H. Mus. 1887, x. p. 560.
Hosts: *Carcharias* sp. and *C. obscurus*.

(2) PERISSOPUS ARMATUS. ♀.

Lepidopus armatus Dana, Proc. Am. Acad. Arts & Sc. 1843, p. 60.
Perissopus armatus Stp. & Lütk. Bidrag til Kundskab, 1861, p. 394.
Host: *Mustelus vulgaris*. Rio Janeiro.

(3) PERISSOPUS INCISUS. ♀.

Chlamys incisus V. Ben. Bull. Acad. Roy. Belg. 1892, p. 227, pl. ii. fig. 1.
Host:—? Bay of Dakar, Senegal.

Family III. DICHELESTIIDÆ.

The body is as a rule elongated, and the head small. The free thoracic segments are simple (only exceptionally seen with dorsal plates). Abdomen generally rudimentary. The anterior antennæ are slender, mostly with many joints up to 15, rarely short with only 2 or 3 joints. Posterior antennæ unciform or cheliform, generally projecting beyond the border of the cephalothorax. Mouth-parts as in *Caligidæ*. Generally there are four pairs of thoracic limbs, frequently short, stump-like, or suppressed, or the posterior ones transformed into lamellar plates. Eye single, median, or absent. Genital organs as in *Caligidæ*. Male and female only relatively different. The majority are capable of a certain amount of locomotion.

G. 1. ANTHOSOMA Leach.

Head oval, infolding, broadest posteriorly. Two distinct dorsal thoracic plates, and three pairs of large overlapping ones which represent the limbs. Abdominal segment small, terminating in two long caudal appendages. Anterior antennæ long, multi-articulate. Posterior antennæ unciform, very large, and projecting. Rostrum elongated.

(1) ANTHOSOMA CRASSUM. ♀. ♂

Caligus crassus Abgd. Mém. de Copenhag. 1794. p. 46, Act. Soc. Nat. H 1794.
„ *imbricatus* Risso, Hist. Nat. Crust. Nice, 1816, p. 162, pl. iii. fig. 13.

Anthosoma smithii Baird, Brit. Entom. 1850, p. 299, pl. xxxiii. fig. 9.10
„ „ Leach, Enc. Brit. Suppl. 1816, p. 406, pl. xx. fig. 1.
„ „ Kröyer, Tidsskrift, ii. 1838, p. 295, pl. ii. fig. 2.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 483, pl. xxxix. fig. 5.
„ *crassus*, Stp. & Lütk. Bidrag til Kundskab, 1861, p. 397, pl. xii. fig. 24. ♂.

In Coll. Brit. Mus.
Host: *Lamna cornubica*. Pacific and Atlantic, &c.

G. 2. TUCCA ~~Nordm.~~ Kröyer. seg 15.

Head small, rounded, with a lamellar appendage on either side; neck distinct. No dorsal plates on thoracic ~~limbs.~~ Genital segment large, oval. Abdomen small, biarticulate. Anterior antennæ many-jointed, setaceous. Posterior antennæ small, unciform.

(1) TUCCA IMPRESSA. ♀.

Tucca impressus Nordm. Bull. Soc. Imp. Moscou, vol. xxxvii. pt. 2. p. 491. pl. vi. fig. 7 (1864).
„ „ Kr. Tidsskrift, i. 1837, p. ~~182.~~ 479.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 496.
Host: *Diodon hystrix*. Atlantic.

G. 3. NORION Nordm.

Head rounded, small; neck distinct. No dorsal thoracic plates, limbs converted into a divided ventral plate with wing-like expansions anteriorly.

(1) NORION EXPANSUS. ♀.

Norion expansus Nordm. Bull. Soc. Imp. Moscou, vol. xxxvii. pl. ii. (1864).
Host:—?

G. 4. EPACHTHES Nordm.

Cephalothorax as in *Lernanthropus*, the first pair of thoracic limbs being short, single-branched with three joints, the last three changed into lamellar plates.

(1) EPACHTHES PARADOXUS. ♀.

Epachthes paradoxus Nordm. Mikrogr. Beiträge, 1832, p. 45, pl. xii. fig. 2.
Lernanthropus paradoxus M.-E. Hist. Nat. Crust. iii. 1840, p. 499.
Host: *Mugil* sp. Cape of Good Hope.

G. 5. LERNANTHROPUS ~~Nordm.~~ Blainville. 1823.

Head oblong or pyriform, sides incurved; neck distinct. Thorax two-jointed, produced posteriorly in a lobe or a pair of lobes more

or less completely covering the genital segment, abdomen, and appendages. The abdomen articulate, ending in two small caudal non-setiferous plates. Anterior antennæ always 5- or 6-jointed. Posterior antennæ strong, unciform. Rostrum long. The first two thoracic limbs are biramose and rudimentary, the third and fourth converted into lamellar appendages. Male smaller than the female and without large posterior lobes.

(1) LERNANTHROPUS MUSCA. ♀.

Lernanthropus musca Blainv. Journ. de Physique, 1823, vol. xcv. p. 404. fig. 14.

" " M.-E. Hist. Nat. Crust. iii. 1840, p. 498, pl. xli. fig. 2.

Host: *Diodon* sp. Manila.

This reference belongs under L. pupa –

(2) LERNANTHROPUS PUPA. ♀.

Lernanthropus pupa Burm. Journ. de Physique, 1823, vol. xcv. p. 303, pl. xxiv. fig. 7.

Host: gills of *Platax*. Brazil.

(3) LERNANTHROPUS TEMMINCKI. ♀.

Lernanthropus temminckii Nordm. Bull. Soc. Imp. Moscou, 1864, ~~xxxvii. pl. ii.~~ pl. VI. figs. 11–13. p. 501.

Host: gills of *Saurus lacerta* [Scombresox saurus]. Ostend.

(4) LERNANTHROPUS KOENIGII. ♀ ♂.

Lernanthropus königii Stp. & Lütk. Bidrag til Kundskab, 1861, p. 395, pl. xii. fig. 23.

Hosts: gills of *Stromateus paru* [S. niger], *Cymothoa eremita*, &c.

(5) LERNANTHROPUS CARANGIS. ♀.

Lernanthropus carangis Hesse, Ext. de la Rev. de Scien. Nat. ii. 1878, pl. i.

Host: *Caranx* sp. Europe.

(6) LERNANTHROPUS BELONES. ♀.

Lernanthropus belones Kr. Bidrag til Kundskab, 1863, p. 205, pl. ix. fig. 4.

Host: gills of *Belone almeida* [B. truncata]. Brazil.

(7) LERNANTHROPUS ANGULATUS. ♀ ♂.

Lernanthropus angulatus Kr. Bidrag til Kundskab, 1863, p. 196, pl. ix. fig. 1.

Host: gills of *Serranus* sp.

(8) LERNANTHROPUS SCRIBÆ. ♀.

Lernanthropus scribæ Kr. Bidrag til Kundskab, 1863, p. 203, pl. ix. fig. 3.

Lernanthropus trigonocephalus Heller, Reise d. Novara, 1865, p. 226, pl. xxii. fig. 3.

Host: gills of *Serranus scriba*. Mediterranean.

(9) LERNANTHROPUS LATIVENTRIS. ♀ ♂.

Lernanthropus lativentris Heller, Reise d. Novara, 1865, p. 223, pl. xxi. fig. 4.

Host: gills of *Mesoprion phaiotæniatus* [M. vitta]. Java.

(10) LERNANTHROPUS LARVATUS. ♀ ♂.

Lernanthropus larvatus Heller, Reise d. Novara, 1865, p. 227, pl. xxii. fig. 4.

Host: gills of *Priacanthus ocellatus*. Indian Ocean.

(11) LERNANTHROPUS PERCIS. ♀.

Lernanthropus percis Thomson, Trans. N. Z. Inst. xxii. 1889, p. 366, pl. xxvii. fig. 2.

Host: gills of *Percis colias*. New Zealand.

(12) LERNANTHROPUS PAGELLI. ♀ ♂.

Lernanthropus pagelli Kr. Bidrag til Kundskab, 1863, p. 200, pl. ix. fig. 2.

Host: gills of *Pagellus penna* [? Chrysophrys calamus].

(13) LERNANTHROPUS ATROX. ♂ ♀.

Lernanthropus atrox Heller, Reise d. Novara, 1865, p. 221, pl. xxi. fig. 3.

" " B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 91, pl. vi. fig. 3.

Hosts: gills of *Pagrus guttulatus* [P. unicolor], N. Holland, and *Chrysophrys sarba*, Persian Gulf.

(14) LERNANTHROPUS PAGODUS. ♀.

Lernanthropus pagodus Kr. Bidrag til Kundskab, 1863, p. 208, pl. viii. fig. 2.

Host: gills of *Eques balteatus* [E. lanceolatus]. Brazil.

(15) LERNANTHROPUS TRIFOLIATUS. ♀.

Lernanthropus trifoliatus B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 12, pl. vii. fig. 3.

Host: gills of *Polynemus tetradactylus*. Bombay.

(16) LERNANTHROPUS KROEYERI. ♀ ♂.

Lernanthropus kröyeri V. Ben. Ann. Sc. Nat. 3 ser. vol. xvi. 1851, p. 102, pl. iii.

" " Claus, Beitrag Parasit. Crust. 1858, p. 18, pl. ii. fig. 16.

" " Nordm. Bull. Soc. Imp. Moscou, 1864, pl. ~~xxviii~~ vii, fig. 5a–g

Lernanthropus kröyeri Hesse, Ext. de la Rev. de Sc. Nat. 1878, vol. vii.
„ „ B.-S. Journ. M. B. Assn. Plymouth, 1896, p. 159.
In Coll. Brit. Mus.
Host: gills of *Labrax lupus*. European seas.

(17) LERNANTHROPUS BREVOORTIÆ. ♀.

Lernanthropus brevoortiæ Rath. Proc. U.S. N. H. Soc. 1887, x. p. 563.
Host: gills of *Brevoorta* [Clupea] *tyrannus*. Atlantic.

(18) LERNANTHROPUS POMATOMI. ♀ ♂.

Lernanthropus pomatomi Rath. Proc. U.S. N. H. Soc. 1887, x. p. 567.
Host: *Pomatomus saltator*? Atlantic.

(19) LERNANTHROPUS NOBILIS. ♀.

Lernanthropus nobilis Heller, Reise d. Novara, 1865, p. 225, pl. xxii. fig. 2.
Host: gills of *Temnodon saltator*. Brazil.

(20) LERNANTHROPUS GISLERI. ♂ ♀. 1852

Lernanthropus gisleri V. Ben. Bull. Acad. Roy. Belg. vol. xix. no. 9. ~~1861~~, pl. xxxviii.
„ „ Hesse, Revue des Sc. Nat. vi. 1877, pl. iv.
Host: *Sciæna aquila*. European seas.

(21) LERNANTHROPUS GIGANTEUS. ♀ ♂.

Lernanthropus giganteus Kr. Bidrag til Kundskab, 1863, p. 206, pl. viii. fig. 1.
„ „ B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 360.
Host: gills of *Caranx* spp. Indian Ocean.

(22) LERNANTHROPUS NUDUS. ♀ ♂.

Lernanthropus nudus B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 368, pl. xii. fig. 2.
In Coll. Brit. Mus.
Host: gills of *Mugil* sp. Aden.

(23) LERNANTHROPUS PETERSI. ♀ ♂ (*Stalagmus*).

Lernanthropus petersi Nordm. Bull. Soc. Imp. N. Moscou, 1864, pl. viii. fig. 1.
Host: gills of *Serranus goliath*. Mozambique.

See also *Lernanthropus holmbergi* Nordm. Bull. Soc. Imp. N. Moscou, 1864, fromHonolulu. Male only described.

G. 6. Dichelestium Herm.

Head obtuse. Body elongated, consisting of four distinctly articulated segments, without dorsal plates. Genital segment oval, long. Abdomen oblong, with two minute caudal plates. Anterior antennæ slender, with 8 joints. Posterior antennæ large, cheliform at the end. The first two pairs of thoracic limbs small, two-branched, the third lamellar, the fourth suppressed.

(1) Dichelestium sturionis. ♀ ♂.

Dichelestium sturionis Herm. Mém. Aptérologique, 1804, p. 125, pl. v. fig. 5.
" " Nordm. Mikrogr. Beiträge, 1832, p. 41.
" " M.-E. Hist. Nat. Crust. iii. 1840, p. 483, pl. xxxix. fig. 4.
" " H. Rathke, Mém. Acad. Sci. St. Pétersb. iii. 1837, p. 401.
" " V. Ben. Ann. Sc. Nat. vol. xxi. 1854, p. 96.

In Coll. Brit. Mus. Kröyer, Tidsskrift. i, 295. pl. II, fig. 2. 2a.
Host: gills of *Acipenser sturio*.

G. 7. Lonchidium Gerst. (*Kröyeria* V. Ben.)

Head broad, with two long movable styliform processes projecting backwards. Three distinct free thoracic segments without lobes or dorsal plates. Genital segment very long, oval shape. Abdomen elongated, simple, terminating in two lanceolate setose caudal plates. Anterior antennæ 8-jointed. Posterior antennæ short, cheliform; the second maxillipeds are large and uncinate. All four pairs of thoracic limbs are biramose, each branch having three joints furnished with plumose setæ.

1) ~~Lonchidium~~ Kröyeria lineatum. ♀.

Kröyeria lineata V. Ben. Bull. Acad. Roy. Belg. 1853, t. xx. pt. i. p. ~~21~~ 23-30. pl. x.
" " V. Ben. Rech. sur les Crust. Belg. 1861, p. 14~~9~~8 pl. xxii.
" " C. Claus, Beitrag Parasit. Crust. 1858, p. 24, pl. ii.

Host: gills of *Galeus canis*.

(2) ~~Lonchidium~~ Kröyeria aculeatum. ♀.

Lonchidium aculeatum Gerst. Archiv. f. Natur. 1854, p. 189.
Host: "Shark." Atlantic.

G. 8. ~~Clavella Oken.~~ Hatschekia. Poche.

Head small, rounded; thorax biarticulate, without dorsal plates or lateral processes. Genital segment very long (5 or 6 times as long as cephalothorax). Abdomen short. Caudal plates minute. Anterior antennæ 6-jointed. Posterior antennæ uncinate. Second

maxillipeds very slender. Only two pairs of thoracic limbs, both biramose and biarticulate.

(1) CLAVELLA HIPPOGLOSSI. ♀.

Clavella hippoglossi Kr. Tidsskrift, i. 1837, p. 196, pl. ii. fig. 3.
„ „ Guérin, Icon. du Règne Anim. 1829–43, pl. x. fig. 7.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 494.
„ „ V. Ben. Ann. Sc. Nat. 3 ser. vol. xvi. 1851, p. 100, pl. iii. figs. 5, 6.

In Coll. Brit. Mus.
Host: *Hippoglossus vulgaris.*

(2) CLAVELLA MULLI. ♀.

Clavella mulli V. Ben. Ann. Sc. Nat. 3 ser. vol. xvi. 1851, p. 101, pl. iii. fig. 4.
„ „ B.-S. Journ. M. B. Assn. Plymouth, 1896, p. 159.
Host: gills of *Mullus* sp.

(3) CLAVELLA TENUIS. ♀.

Clavella tenuis Heller, Reise d. Novara, 1865, p. 215, pl. xxiii. fig. 1.
Host: gills of *Monocentris* sp. Philippines.

G. 9. CYBICOLA B.-S. (*Helleria* B.-S.)

Head rounded. Thorax with three distinct segments bearing lateral lobes but no dorsal plates. Genital segment very long. Abdomen small, with two lanciform appendages. Anterior antennæ 6-jointed. Posterior antennæ 3-jointed, strongly hooked at the end. Second maxilliped very large, basal joint robust. Three pairs of thoracic limbs, all rudimentary, the first biramose, the second uniramose, the third stump-like.

"Male" smaller. Posterior antennæ strongly prehensile; no thoracic lateral lobes.

(1) CYBICOLA ARMATA. ♂ ♀.

Helleria armata B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 10, pl. v. figs. 1, 2.
Cybicola „ B.-S. op. cit. ii. 1898, p. 371.
In Coll. Brit. Mus.
Host: *Cybium* spp. Indian seas.

G. 10. PSEUDOCLAVELLA B.-S.

Head small, rounded. A single free thoracic segment without lobes or dorsal plates. Genital segment oval, 4 times as long as cephalothorax. Abdomen very short. Caudal plates minute, setiferous. Anterior antennæ indistinctly 3-jointed. Posterior antennæ short, uncinate. Second maxillipeds slender. Four pairs of rudimentary limbs present, the first two biramose, third and fourth from the genital segment stump-like.

(1) PSEUDOCLAVELLA OVALIS. ♀.

Pseudoclavella ovalis B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 95, pl. vi. fig. 1.

In Coll. Brit. Mus.

Host: gills of *Serranus* sp. Muscat.

G. 11. PSEUDOCYCNUS Heller.

Head oval. Thorax with three segments, bearing small lateral lobes. Genital segment long (3 times that of cephalothorax). Abdomen short, broad. Caudal appendages very small, simple. Anterior antennæ 3-jointed. Posterior antennæ small, uncinate. Second maxillipeds as moderately strong biarticulate hooks. Five pairs of rudimentary limbs; the first and third uniramose, the second biramose; fourth and fifth minute, stump-like; the last rising from the posterior extremity of the genital segment.

(1) PSEUDOCYCNUS APPENDICULATUS. ♀.

Pseudocycnus appendiculatus Heller, Reise d. Novara, 1865, p. 218, pl. xxii. fig. 7.

„ „ B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 368.

Hosts: gills of *Coryphæna* and *Thynnus macropterus*. Aden.

G. 12. CYCNUS M.-E. (*Congericola* V. Ben.)

Head rounded. Two distinct free thoracic segments without lobes or caudal plates. Genital segment oval. Abdomen short. Caudal plates small, setiferous. Anterior antennæ 6 jointed. Posterior antennæ 2-jointed, uncinate; second maxilliped slender. Four pairs of rudimentary thoracic limbs, all biramose.

(1) CYCNUS GRACILIS. ♀.

Cycnus gracilis M.-E. Hist. Nat. Crust. iii. 1840, p. 496, pl. xli. fig. 1.

„ „ Heller, Reise d. Novara, 1865, p. 216, pl. xxii. fig. 6.

Host: *Gadus*? Adriatic.

(2) CYCNUS PALLIDUS. ♀ ♂.

Congericola pallida V. Ben. Bull. Acad. Roy. Belg. t. xxi. pt. 2, 1854, p. 583.

„ „ V. Ben. Mém. Acad. Roy. Belg. xxxiii. 1861, p. 148, ~~pl. xxiii.~~

Cycnus pallida B.-S. Journ. M. B. Assn. 1896, p. 159.

In Coll. Brit. Mus.

Host: gills of *Conger vulgaris*. European seas.

(3) CYCNUS BUDEGASSÆ. ♀.

Cycnus budegassæ Kr. Bidrag til Kundskab, 1863, p. 270, pl. xii. fig. 3.

Host: gills of *Lophius budegassa*. Mediterranean.

G. 13. NEMESIS ~~Roux~~. (*Ergasitina*?, *Pagodina*, V. Ben.)

Head oval, distinct. Thorax divided into four well-marked articulate segments. Genital portion short. Abdomen articulate, with two small caudal plates. Anterior antennæ multiarticulate. Posterior uncinate. Second maxillipeds large, with single end-claw. First pair of thoracic limbs ~~uniramose~~, second, third, and fourth biramose.

(1) NEMESIS ~~MEDITERRANEA~~. ♀.

Nemesis lamnæ Roux, Crust. de la Méd. pl. xx. figs. 1–9.
„ *Carchariarum* Roux, op. cit. pl. xx. figs. 10–11.
„ *mediterranea* Heller, Reise d. Novara, 1865, p. 220, pl. xxi. fig. 2.

Hosts: "Sharks." Mediterranean.

(2) NEMESIS ROBUSTA. ♀ ♂.

Ergasilina robusta V. Bened. Ann. de Sc. Nat. 3 ser. 1851, vol. xvi. p. 97, pl. iii. fig. 1.
„ „ V. Bened. Mém. Acad. Roy. Belg. 1861, p. 149, ~~pl. xxvii.~~
Pagodina „ V. Bened. op. cit. 1853, vol. xx. pt. i. p. 482.

Hosts: *Trygon pastinaca*, *Galeus canis*, *Carcharias glaucus*.

G. 14. EUDACTYLINA Van Beneden.

Head obtuse, broader behind than in front. Four distinct thoracic segments without dorsal plates or lateral processes. Genital portion short. Abdomen biarticulate; caudal plates setose. Anterior antennæ with hooked basal joints. Posterior antennæ with three terminal claws. Second maxillipeds large, cheliform. First four pairs of thoracic limbs biramose; fifth uniramose.

(1) EUDACTYLINA ACUTA. ♀.

Eudactylina acuta V. Bened. Bull. Acad. Roy. Belg. vol. xx. pt. 1, 1853, p. 235.
„ „ V. Bened. Mém. Acad. Roy. Belg. 1861, p. 150, ~~pl. xxv.~~

Hosts: gills of *Squatina angelus* [Rhina squatina] and *Spinax acanthias* [Acanthias vulgaris].

(2) EUDACTYLINA ASPERA. ♀.

Eudactylina aspera Heller, Reise d. Novara, 1865, p. 213, pl. xxi. fig. 1.

Host: mouth of *Carcharias pleurotænia*. Java.

G. 15. Lamproglena Nordm.

Head distinct, quadrilateral. Thorax elongated, composed of four rings indistinctly articulated. Genital segment short. Abdomen very long; caudal plates small, lobe-like. Anterior antennæ with 10 joints. Posterior antennæ not uncinate, but provided with setæ. First maxillipeds very strongly uncinate, second terminating in 3 claws. Thoracic limbs rudimentary, the first four biramose, fifth minute, stump-like.

(1) Lamproglena pulchella. ♀.

Lamproglena pulchella Nordm. Mikrogr. Beiträge, 1832, Heft 2, p. 1, pl. i. fig. 1.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 487, pl. xxxix. fig. 6.
„ „ Claus, Beiträge, 1875, p. 26, pl. xxiv. fig. 33.

Host: gills of *Cyprinus jeses* [Leuciscus sp.].

(2) Lamproglena lichiæ. ♀.

Lamproglena lichiæ Nordm. Mikrogr. Beiträge, 1832, Heft 2, p. 134.

Host: gills of *Lichia aculeata*.

(3) Lamproglena hemprichi. ♀.

Lamproglena hemprichii Nordm. Mikrogr. Beiträge, 1832, Heft 2, p. 134.

Host: *Myletes dentex*.

Family IV. PHILICHTHYIDÆ. (*Lernéopodiens* Hesse.)

Females elongated, more or less segmented, without articulated locomotive organs, but often with soft lobe-like lateral appendages. Antennæ and mouth-processes more or less rudimentary.

Males distinctly articulate, with two pairs of antennæ, two pairs of maxillipeds, the first pair of the latter being transformed into powerful hooks, and two pairs of biramose thoracic limbs, sometimes also one pair on the first abdominal segment. Small cutaneous dorsal appendages to the second thoracic segment. Abdomen generally with 8 articulations.

These parasites are all found free in the mucous canals and sinuses of various fishes.

G. 1. Philichthys Stp.

Female. The whole body distinctly multisegmented, and elongated; without dorsal plates or articulate limbs; carrying on the small rounded head as well as on the sides of the body a number of soft non-articulate appendages of very peculiar shapes and sizes.

The egg-sacs are broad and long, placed by the side of the body, and embraced by some of these processes, but not projecting. A single median eye.

Male. Much smaller, with distinctly segmented body attenuated posteriorly. Cephalothorax as a buckler, with two free thoracic rings, the second bearing two strong spines. The tail has 8 free rings, the last provided with two caudal appendages. Anterior antennæ 6-jointed. Posterior with two, the last carrying two curved setæ. First maxillipeds large.

PHILICHTHYS XIPHIÆ. ♀ ♂. (Plate XXVI. fig. 2.)

Philichthys xiphiæ Stp. Oversigt Danske Videnskab. 1861, p. 295, pl. ii.
„ „ Bergsoe, Monograph Fremstellet, 1864, pl. i.
„ „ C. Vogt, Arch. Zool. Exp. vol. vi. 1877, p. 407.

Host: mucous canals in head of *Xiphias gladius*. Europe.

G. 2. RICHIARDIA, gen. nov.

Female. Head small, obtuse. Body elongated, segmented, the second thoracic ring being very much enlarged, oval or rounded, followed by five attenuated joints, the second of which has the genital opening. Three pairs of lateral non-articulate acute processes on each side, with a pair of caudal appendages, and a pair also of frontal ones directed forwards. Anterior antennæ triarticulate. Egg-sacs long, thick, placed by the side of the body as in the preceding genus.

(1) RICHIARDIA LICHIÆ. ♀.

Philichthys lichiæ Richiardi, Atti Soc. Toscana di Sc. Nat. 1876, iii. pl. vi. fig. 1.

Host: frontal sinus of *Lichia amia*. Mediterranean.

(2) RICHIARDIA PAGRI. ♀.

Philichthys pagri Richiardi, op. cit. 1876, pl. vi. fig. 3.

Host: frontal sinus of *Pagrus vulgaris*. Mediterranean.

(3) RICHIARDIA PAGELLI. ♀.

Philichthys pagelli Richiardi, op. cit. 1876, pl. vi. fig. 4.

Host: frontal sinus of *Pagellus mormyrus*. Mediterranean.

(4) RICHIARDIA EDWARDSI. ♀.

Philichthys edwardsi Richiardi, op. cit. vol. ii. 1875, pl. vi. fig. 4.

Host: frontal sinus of *Serranus cabrilla*. Mediterranean.

(5) RICHIARDIA STEENSTRUPI. ♀.

Philichthys steenstrupii Richiardi op. cit. 1875, pl. vi. fig. 5.

Host: frontal sinus of *Mullus barbatus*, *M. surmuletus*.

(6) RICHIARDIA SCIÆNÆ. ♀ ♂.

Philichthys sciæna Richiardi, op. cit. 1875.
„ „ C. Vogt, Arch. Zool. Exp. vol. vi. 1877, p. 412.
Host: lateral line of *Sciæna umbra*. Mediterranean.

(7) RICHIARDIA DENTICIS. ♀. (Plate XXVI. fig. 3.)

Philichthys denticis Richiardi, op. cit. 1876, pl. vi. fig. 2.
Host: frontal sinus of *Dentex vulgaris*. Mediterranean.

(8) RICHIARDIA BARALDI.

Philichthys baraldii Richiardi, op. cit. vol. iii. 1876, pl. vi. fig. 5.
Host: frontal sinus of *Chrysophrys aurata*. Mediterranean.

G. 3. SPHÆRIFER Richiardi. (*Sphærosoma* Leydig.)

Female. Head small, obtuse. Body elongated, segmented; first thoracic segment slender, the second large and spherical, followed by five diminishing joints, in the second of which are seen the genital pores; there is a single pair of acute processes projecting from the enlarged segment, and a pair of elongated appendages from the last. The anterior antennæ are triarticulate. Egg-sacs globular. Male not known.

(1) SPHÆRIFER CORVINÆ.

Sphærosoma corvinæ Leydig, Arch. f. Natur. v. Trosch. xvii. 1851, p. 259.
Sphærifer cornutus Richiardi, Soc. Toscana de Sc. Nat. ii. 1876.
„ „ C. Vogt, Arch. Zool. Exp. vol. vi. 1877, p. 413.
Host: mucous canals of *Corvina nigra* and *Sciæna aquila*.

(2) SPHÆRIFER LEYDIGI. (Plate XXVI. fig. 4.)

Sphærifer leydigi Richiardi, op. cit. 1876, pl. vi. fig. 6.
Host: mucous sinus of *Umbrina cirrhosa*. Mediterranean.

G. 4. COLOBOMATUS Hesse.

Female. Head round or conical. Body elongated, segmented; three narrow free thoracic joints followed by an enlarged oval genital portion, and two or three slender abdominal joints; there are three pairs of lateral obtuse appendages, one pair of caudal, and one pair of spathulate processes from the head directed forwards. Anterior antennæ with four or five articulations. Posterior antennæ small, uncinate. Proboscis and maxillipeds present; also a small single eye. External ovarian tubes not observed. Male not known.

(1) COLOBOMATUS LAMNÆ. ♀.

Colobomatus lamnæ Hesse, Ann. Sci. Nat. ser. 5, xvii. 1873, p. 3, pl. xxiv. fig. 1.
„ „ C. Vogt, Arch. Zool. Exp. vol. vi. 1877, p. 387.
Host: nasal fossa of *Lamna cornubica*.

(2) COLOBOMATUS BERGYLTÆ. ♀. (Plate XXVI. figs. 5, 5*a*.)

Colobomatus bergyltæ Hesse, op. cit. 1873, pl. xxiv. fig. 8.
„ „ C. Vogt, op. cit. 1877, p. 411.
Host: head of *Labrus bergyltæ* [L. maculatus]. Brest.

G. 5. LEPOSPHILUS Hesse.

Female. Head small, rounded. Body elongated, segmented thorax of two indistinct joints followed by a large dilated genital segment. Abdomen of six distinct articulations; no lateral appendages, but minute caudal setose plates. A single median eye proboscis and small maxillipeds present.
Male very similar to that of *Philichthys*.

LEPOSPHILUS LABRI. ♀ ♂. (Plate XXVI. fig. 6.)

Lepsophilus labrii Hesse, Ann. Sci. Nat. ser. 5, vol. v. 1866 p. 265, pl. ix.
„ „ Hesse, op. cit. vol. xvii. art. 14, 1873.
„ „ C. Vogt, op. cit. 1877, p. 387.
Host: lateral sinus of *Labrus donovani*. Brest.

Family V. LERNÆIDÆ.

The body in the young, sexually mature form very similar to those of the preceding families. The anterior antennæ are short, slender, and carrying small bristles; the posterior pair are uncinate, generally projecting beyond the front border of the cephalothorax. The maxillipeds are very small and weak. There are four pairs of thoracic limbs well developed, the first two or more biramose. Genital segment of female much elongated. Abdomen rudimentary. Eye median. The larvæ vary from a cyclops-like form to those with a twisted frontal filament. In the older and fixed parasitic condition, the females are long, worm-like, generally without limbs, some with irregular excrescences from the anterior portion, others with elongated appendages from the genital segment or abdomen. Egg-sacs double.

G. 1. LERNÆOCERA Blainville.

Head not distinctly divided off, but bearing horn-like processes. Mouth terminal. Genital segment much elongated, slightly curved; the limbs placed at nearly equal distances one from another, the first four pairs biramose, triarticulate, the fifth very minute.

(1) LERNÆOCERA ~~LUCINA~~ cyprinacea. ♀. p. 509,

Lernæa cyprinacea Linn. Fauna Suecica, ii. 1761, pl. xi. fig. 2.
„ „ Blainv. Journ. de Physique, xcv. 1822, p. 337.
Lernæocera cyprinacea Burm. Nov. Act. Nat. Cur. xvii. p. 309, pl. xiv. fig. 1 (1835).
„ „ Nordm. Mikrogr. Beiträge, ii. 1832, p. 123, pl. vi. fig. 1.

Lernæocera esocina M.-E. Hist. Nat. Crust. iii. 1840, p. 527, pl. xl. figs. 13, 15.
„ *cyprinacea* M.-E. op. cit. 1840, p. 527, pl. xl. fig. 16.
Lernaea esocina Herm. Naturforscher, xix. 1783, p. 44, pl. ii. fig. 6.
Lernæocera „ C. Claus, Zeitschr. gesammt. Naturwiss. xxxi. 1868, p. 530.
„ „ Richiardi, Atti Soc. Toscana di Sc. Nat. iii. 1876.
Hosts: Carp, Perch, Roach, &c.

(2) LERNÆOCERA CRUCIATA. ♀.

Lernæocera cruciata Lesueur, Journ. Ac. Philad. 1824, iii. p. 286, pl. xi. fig. 4.
„ „ M.-E. Hist. Nat. Crust. 1840, iii. p. 527.
„ „ Richiardi, Atti Soc. Toscana di Sc. Nat. iii. 1876.
Host: *Cichla ænea*, Les. Lake Erie.

(3) LERNÆOCERA PHOXINACEA. ♀.

Lernæocera phoxinacea Kllr. An. Mus. Wien.
„ „ Kr. Bidrag til Kundskab, 1863, p. 325, pl. xviii. fig. 3.
Host: *Phoxinus marsilii* [Leuciscus phoxinus].

(4) LERNÆOCERA LAGENULA. ♀.

Lernæocera lagenula Heller, Reise d. Novara, 1865, p. 246, pl. xxiv. fig. 9.
Host:—? Brazil.

(5) LERNÆOCERA POMOTIDIS. ♀.

Lernæocera pomotidis Kr. Bidrag til Kundskab, 1863, p. 323, pl. xv. fig. 5.
Host: gills of *Pomotis* sp. New Orleans.

(6) LERNÆOCERA GASTEROSTEI. ♀.

Lernæocera gasterostei, Brühl, Inst. d Univ. Pest. 200, 1860.
„ „ Heller, Reise d. Novara, 1865, p. 246.
Host: *Gasterosteus aculeatus*.

(7) LERNÆOCERA CATOSTOMI. ♀.

Lernæocera catostomi Kr. Bidrag til Kundskab, 1863, p. 321, pl. xviii. fig. 4.
Host: *Catostomus macrolepidotus*, Les. Mississippi.

G. 2. THERODAMAS Kröyer.

Head rounded, without horn-like appendages; mouth opening at the base of the long slender neck. Thorax much elongated, indis-

tinctly segmented. Genital ring short. Abdomen small, with two minute caudal plates. Posterior antennæ strongly uncinate. All four pairs of thoracic limbs present, biramose and triarticulate.

(1) THERODAMAS SERRANI. ♀.

Therodamas serrani Kr. Bidrag til Kundskab, 1863, p. 316, pl. xv. fig. 4.

Host: gills of *Serranus* sp. West Indies.

G. 3. PENICULUS Nordm.

Head oval, without horn-like processes. Thorax distinctly segmented, giving rise to four pairs of limbs, the first two pairs being placed close behind the head, the third and fourth some distance removed from them and from each other. Genital segment very long. Abdomen small, with minute caudal plates.

Male smaller than female, with a short genital segment.

(1) PENICULUS FISTULA. ♀ ♂.

Peniculus fistula Nordm. Mikrog. Beiträge, 1832, p. 107, pl. vi. fig. 8.
" " M.-E. Hist. Nat. Crust. iii. 1840, p. 497.
" " Heller, Reise d. Novara, 1865, p. 248, pl. xxv. fig. 3.
" " Claus, Rech. über *Lernæocera* &c., 1868, p. 12, pls. ii., iii

Host: *Zeus faber*.

(2) PENICULUS FURCATUS. ♀.

Peniculus furcatus Kr. Bidrag til Kundskab, 1863, p. 268, pl. xii. fig. 4.
" " Claus, op. cit. 1868, p. 12.

Host: gills of *Holacanthus* [Tetrodon] sp. East Indies.

(3) PENICULUS CLAVATUS. ♀.

Peniculus clavatus Kr. Bidrag til Kundskab, 1863, p. 266, pl. xiv. fig. 8.

Lernæa clavata Müll.

Host: fins of *Sebastes norvegicus*. Greenland.

G. 4. PENELLA Oken. (*Lernæopenna* Blainv.)

Head large, globose, tuberculate, with arm-like projections directed backwards; the neck is long and straight, not distinctly segmented, united with the elongated genital segment in the same line. Abdomen penniform. Four pairs of limbs are present, placed close behind the head and together; the first two are biramose, the third and fourth uniramose, each branch with two joints.

Male minute, not elongated.

Young form of female as "*Hessella cylindrica*" Brady, Chall. Rep. vol. xxiii. p. 190, pl. xxix. figs. 40–42, and *Baculus elongatus*,

Lubbock, Trans. Linn. Soc. Lond. 1860, vide Bidrag Anat. der Lernæiden, Al. Mrázek, 1895.

(1) PENELLA SAGITTA. ♀.

Pennatula sagitta Linn. Amœn. Acad. iv. 1754, p. 257, pl. iii. fig. 13.
Lernæopenna sagitta Gmel. Syst. Nat. 1788, p. 3865.
„ „ Blainv. Journ. de Physique, xcv. p. 479.
Penella sagitta Nordm. Mikrogr. Beiträge, 1832, p. 121, pl. x. fig. 6.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 522.
„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 409, pl. xiv. fig. 31.
In Coll. Brit. Mus.
Hosts: *Lophius* [Antennarius] *tumidus*; *L. marmoratus*; *Chironectes*.

(2) PENELLA FILOSA. ♀.

Pennatula filosa Linn., Syst. Nat. et Amœn. Acad. iv. 1754.
„ „ Guérin, Icon. Zooph. pl. ix. fig. 3.
Penella „ M.-E. Hist. Nat. Crust. iii. 1840, p. 523.
Host: *Orthagoriscus mola*. Atlantic.

(3) PENELLA EXOCŒTI. ♀ ♂.

Lernæa exocœti Holten, Naturhist. Skrifter, 136, 1802, pl. iii. fig. 3.
Lernæopenna holteni Blainv. Journ. de Physique, 1822.
„ *blainvillii*, Lesueur, Journ. Ac. Nat. Sc. Philad. iii. 1823, p. 291, pl xi. fig. 2
Penella exocœti Stp. & Lütk. Bidrag til Kundskab, 1861, p. 415, pl. xiv. fig. 33.
In Coll. Mus. Brit.
Host: *Exocœtus volitans* [E. evolans]. Indian Ocean.

(4) PENELLA VARIANS. ♀ ♂.

Penella varians Stp. & Lütk. Bidrag til Kundskab, 1861, p. 413, pl. xiv. fig. 32.
„ *pustulosa*? Baird, Ann. Nat. Hist. xix. p. 280.
Host: fin of *Coryphæna* sp. Atlantic.

(5) PENELLA DIODONTIS. ♀.

Penella diodontis Oken, Chamisso & Esenhart, Nov. Act. Acad. Cæs. Leop. Bonn, x. 1821.
„ *brachiata* Blainv. Journ. de Physique, 1822.
„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 412.
Host: *Diodon sexmaculatus*. Manila.

(6) PENELLA HISTIOPHORI. ♀.

Penella histiophori Thomson, Trans. N. Z. Inst. vol. xxii. 1889, p. 368, pl. xxviii. fig. 2.
Host: *Histiophorus herscheli*. New Zealand.

G. 5. LERNÆENICUS Les. (*Lernæonema* M.-E.)

Head rounded or obliquely pointed, with short, simple, horn-like excrescences projecting backwards; neck non-segmented, long, passing gradually into the genital segment, which is in the same straight line. Abdomen without penniform processes. Thoracic limbs placed close together just behind the head, the two first biramose, the third and fourth uniramose, all with two joints.

(1) LERNÆENICUS SPRATTÆ. ♀.

Lernæa spratta Sowerby, Brit. Miscell. ii. 1806, p. 17, pl. lxviii.
„ *cyclophora* Blainv. Journ. de Physique, xcv. 1822, p. 436.
Lernæocera surrirensis Blainv. Dict. Hist. Nat. xxvi. 1823, p. 117.
Lernæa ocularis Cuv. Règne Animal, ii. vol. iii. 1830, p. 256.
Foroculum spratti Thompson, Cat. Mus. Coll. Surg.
Lernæonema monilaris M.-E. Hist. Nat. Crust. iii. 1840, p. 525, pl. xli fig. 5.
„ *spratta* Baird, Brit. Entom. 1850, p. 341, pl. xxxv. fig. 10.
„ *bairdi* Salter, Ann. & Mag. N. H. (2) vi. 1850, p. 86, pl. vii. fig. 1.
„ *monilaris* Heller, Reise d. Novara, 1865, p. 248, pl. xxv. fig. 4.
Lernæenicus spratta Olsson, Prod. Faun. Copep. 1869, p. 46.
„ „ Richiardi, Descr. di Lernæen., Atti Soc. Toscana Sci. Nat. vol. iii. 1877.

In Coll. Brit. Mus.

Host: *Clupea spratta*. Europe.

(2) LERNÆENICUS ENCRASICOLI. ♀.

Lernæa encrasicoli Turton, Brit. Fauna, i. 1807, n. 108.
Lernæonema encrasicoli Baird, Brit. Entom. 1850, p. 341, pl. xxxv. fig. 11.
Lernæenicus encrasicoli Olsson, Prod. Faun. Copep. 1869, p. 46.
„ „ Richiardi, Atti della Soc. Toscana di Sci. Nat. vol. iii.

In Coll. Brit. Mus.

Hosts: *Engraulis encrasicolus* and *Clupea spratta*.

(3) LERNÆENICUS ABDOMINALIS. ♀.

Lernæonema abdominalis M.-E. Hist. Nat. Crust. 1840, p. 525.
„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 398.
Lernæenicus abdominalis Richiardi, Atti della Soc. Toscana, vol. iii.

Host:—? Valparaiso.

(4) LERNÆENICUS RADIATUS. ♀.

Lernæocera radiata Lesueur, Journ. Ac. Nat. Sc. Philad. iii. 1824, p. 288, pl xi. fig. 1. proposed v name Lernaee
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 528.

Lernæenicus radiatus Stp. & Lütk. Bidrag til Kundskab, 1861, p. 400.
„ „ Richiardi, Atti della Soc. Toscana Sci. Nat. vol. iii. p. 8.
Hosts: *Clupea tyrannus* and *C. mattowacca*.

(5) Lernæenicus nodicornis. ♀.

Lernæenicus nodicornis Stp. & Lütk. Bidrag til Kundskab, 1861, p. 401, pl. xiii. fig. 26.
„ „ Richiardi, op. cit. p. 8.
Host: *Coryphæna* sp.

(6) Lernæenicus inflexus. ♀.

Lernæenicus inflexus Stp. & Lütk. op. cit. 1861, p. 401, pl. xiii. fig. 27.
„ „ Richiardi, op. cit. vol. iii. p. 8.
Host: gills of "Barracotta." Atlantic.

(7) Lernæenicus gracilis. ♀.

Lernæonema gracilis Heller, Reise der Novara, 1865, p. 249, pl. xxv. fig. 5.
Lernæenicus gracilis Richiardi, op. cit. vol. iii. p. 8.
Host: body of *Lichia amia*.

(8) Lernæenicus polynemi. ♀.

Lernæenema polynemi B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 12, pl. vii. fig. 1.
In Coll. Brit. Mus.
Host: body of *Polynemus tetradactylus*. Bombay.

(9) Lernæenicus vorax. ♀.

Lernæenicus vorax Richiardi, op. cit. p. 9, pl. vii. figs. 1–21.
Hosts: *Sciæna aquila*, *Corvina nigra*, *Labrax lupus*, &c.

(10) Lernæenicus neglectus. ♀.

Lernæenicus neglectus Richiardi, op. cit. p. 13, pl. vii. figs. 22-43.
Hosts: *Mugil cephalus*, *M. capito*, *M. chelo*, *M. auratus*.

(11) Lernæenicus musteli. ♀ ♂.

Lernæonema musteli V. Ben. Bull. de l'Acad. Belg. 1861, p. 154, pl. xxix.
„ „ V. Ben. Ann. Sc. Nat. xvi. 1851, p. 125.
In Coll. Brit. Mus.
Host: gills of *Mustelus vulgaris*.

G. 6. Echetus Kr.

Head obtuse, separated by a long thin neck from the short

squarish genital segment. Abdomen as a long pedunculated sac, terminating in two minute caudal appendages. Egg-tubes filiform; ovules uniseriate. The minute articulate appendages have not been described.

(1) Echetus typicus. ♀.

Echetus typicus Kr. Bidrag til Kundskab, 1863, p. 315, pl. xv. fig. 6.

Host: *Corvina unimaculata*. New Orleans.

Labellula, Poche.

G. 7. Lophura Köllikero preëmpted—

Head oval, in the same straight line as the neck and genital segment, having two wing-like processes at its base; neck slender. Genital segment squarish, giving off posteriorly two bundles of filiform appendages.

(1) Lophura edwardsi. ♀. p. 34,

Lophura edwardsi C. Claus, Nat. Zeitschrift, 1860, pl. x. fig. 11.

Host:—? Mediterranean.

——, Kölliker, 1853, Zeit. f. wiss. Zool. IV. p. 359.

G. 8. Lernæolophus Heller.

Head globular, carrying three strong branching horns; neck long, chitinous, curved. Genital segment S-shaped, bearing over the posterior or abdominal portion extremely numerous, long, tassel-like appendages. Four pairs of limbs placed close behind the head and near together. Egg-sacs long; ovules uniseriate.

(1) Lernæolophus sultanus. ♀.

Lernæolophus sultanus Heller, Reise d. Novara, 1865, p. 251, pl. xxv. fig. 7.

Penella sultana M.-E. Hist. Nat. Crust. iii. 1840, p. 523.

In Coll. Brit. Mus.

Hosts: *Serranus scriba*, *S. cabrilla*, Mediterranean; also *Caranx* sp.

(2) Lernæolophus hemirhamphi. ♀.

Lernæa hemirhamphi Kr. Bidrag til Kundskab, 1863, p. 318, pl. xv. fig. 7.

Host: *Hemirhamphus* sp. West Indies.

G. 9. Lernæa Linn.

Head globular, with strong branching horns; neck cylindrical, chitinous. Genital segment strongly bent in S-shape, simple. Egg-tubes long, convoluted. Four pairs of thoracic limbs placed close behind the head, the first two biramose, third and fourth uniramose; all with plumose setæ.

(1) LERNÆA BRANCHIALIS. ♀ ♂.

Lernæa branchialis Linn. Syst. Nat. 12 ed. 1767, p. 1092; Lamarck, Cuvier, Burmeister, Guérin, Kröyer, Oken, M.-E., Thompson, Baird, Stp. & Lütk., V. Ben., B.-S., Hesse.

„ „ ♂ Claus, Beitrag zur Naturges. der Lern. 1868, p. 16, pl. iii., iv.

„ „ Al. Mrázek, Beitrag zur Anat. der Lern. 1895.

„ „ I. C. Thompson, Rep. Copep. of Liverp. Bay, 1893, pl. xxiv.

„ *gadina* Müll. Zool. Dan. iv. p. 65, pl. cxviii. fig. 4.

„ „ O. Fabr. Faun. Grœnl. 1780, p. 339.

Lernæocera branchialis Blainv. Journ. de Physique, xcv. 1823, p. 376, pl. xxvi. fig. 1.

„ „ Nordm. Mikrogr. Beiträge, ii. 1832, p. 130.

„ *sigmoidea* Stp. & Lütk. Bidrag til Kundskab, 1861, p. 404, pl. xiii. fig. 29.

In Coll. Brit. Mus.

Host: gills of *Gadidæ*. N. temperate region.

(2) LERNÆA RIGIDA. ♀.

Lernæa rigida Kr. Bidrag til Kundskab, 1863, p. 320, pl. xviii. fig. 2.

Host:— ? Valparaiso.

(3) LERNÆA LUSCI. ♀.

Lernæa lusci B.-S. Ann. & Mag. N. H. ser. 6, xviii. 1896, p. 13, pl. iv. fig. 6.

In Coll. Brit. Mus.

Host: gills of *Gadus luscus*. Plymouth.

(4) LERNÆA LOTELLÆ. ♀.

Lernæa lotellæ Thomson, Trans. N. Z. Inst. 1889, vol. xxii. p. 369, pl. xxviii. fig. 3.

In Coll. Brit. Mus.

Host: *Lotella bacchus*. N. Zealand.

G. 10. HÆMOBAPHES Stp. & Lütk.

Head rectangular, without horn-like processes. Two more or less distinct thoracic segments are visible crowded behind the head, each with a pair of bilobed, not articulated limbs; neck very elongated, acutely curved, near which flexure are two short blunt processes. Genital segment dilated, twisted on itself, with, on either side over the origin of the spirally coiled egg-tubes, a pair of tubercles; abdominal portion considerably narrower, with blunted extremity. Two pairs of biramose biarticulated limbs are present.

(1) Hæmobaphes cyclopterinus. ♀.

Lernæa cyclopterina Fabr. Fauna Grœnl. 1780, p. 337.
Lernæocera cyclopterina Blainv. Journ. de Physique, xcv. 1823, p. 376.
Lernæa cyclopterina Kr. Tidsskrift, i. 1837, p. 502, pl. v. fig. 4.
Lernæa cyclopterina M.-E. Hist. Nat. Crust. iii. 1840, p. 529.
Hæmobaphes cyclopterina Stp. & Lütk. Bidrag til Kundskab, 1861, p. 405, pl. xiii. fig. 30.

Hosts: *Cyclopterus spinosus*, *Cottus* spp., *Gadus* sp., *Gunnellus* [Centronotus] *fasciatus*, *Sebastes norvegicus*. Faroe Is. &c.

G. 11. Peroderma Heller.

Head globular, covered with numbers of closely placed fine-branching processes, united to the long sac-like genital segment by a short, narrow, slender neck, at a right angle and one-third from the extremity. Anterior antennæ triarticulate, setiferous. First two pairs of true limbs biramose, others uniramose, each with two joints. Egg-sacs long; ovules in a single row.

(1) Peroderma cylindricum. ♀.

Peroderma cylindricum Heller, Reise d. Novara, 1865, p. 250 pl. xxv. fig. 6.
„ „ Richiardi, Atti della Soc. Toscana, 1876, (75) vol. ii. pl. iv. fig. 1.
„ *branchiata* B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 13, pl. vii. fig. 2.

Hosts: 'Sardine' in Mediterranean; *Coilia dussumieri*, Bombay.

Family VI. CHONDRACANTHIDÆ.

Female forms incompletely or indistinctly segmented, often of particularly bizarre appearance from the growth of irregular lobes and prolongations. The anterior antennæ are short, 2–3-jointed, the posterior generally in the form of simple hooks, often powerful. Maxillipeds small, unciform, close to the mouth-opening; limbs generally in the form of non-articulate lobes. Sex-organs paired, often very voluminous. External ovaries claviform; ovules multiseriate in most cases, sometimes convoluted or hidden.

The pigmy male is out of all proportion to the female, to which it is firmly adherent. It has a distinct cephalothorax, segmented abdomen, and is furnished with articulate limbs.

G. 1. Sphyrion Cuv. (*Lesteira* Kr.)

Head float-like, enlarged transversely, separated by a long cylindrical neck from the genital segment, which is cordiform or oval, flattened antero-posteriorly; this gives off on either side of the rudimentary abdomen a bunch of hard grape-like processes projecting backwards. Thoracic limbs suppressed. Egg-tubes long, robust. Antennæ as non-articulate lobes.

(1) SPHYRION LÆVIGATUM. ♀.

Sphyrion lævigatus Cuv. Règne Anim., Zooph. 1830, pl. xxxii. fig. 4.

Chondracanthus levis Quoy & Gai., Freycinet Reise Zool. 1824, p. 541, pl. lxxxvi. fig. 10.

" " Guerin, Iconogr. Zooph. pl. ix. fig. 4.

Sphyrion levis Stp. Overs. Vidensk. Selsk. Kjöbenh. 1869, p. 187.

Lesteira kröyeri Thomson, Trans. N.Z. Inst. vol. xxii. 1889, p. 370, pl. xxviii. fig. 4.

In Coll. Brit. Mus.

Hosts: *Gadus* sp., Cape of Good Hope (Q. & G.); *Genypterus blacodes*, N.Z. (Thoms.).

(2) SPHYRION LUMPI. ♀.

Lestes lumpi Kr. Danmk. Fiske, ii. 1845, p. 217.

Lesteira lumpi Kr. Bidrag til Kundskab, 1863, p. 325, pl. xviii. fig. 5.

" " Stp. Overs. Vidensk. Selsk. Kjöbenh. 1869, p. 182, pl. ii. fig. 5.

In Coll. Brit. Mus.

Host: *Cyclopterus lumpus*. Denmark; ? Dungeness.

G. 2. MEDESICASTE Kröyer.

Head minute, rounded, with both pairs of antennæ, and two pairs of minute uncinate maxillipeds and mouth in front. Thoracic portion very elongated, divided into two parts, the anterior being the broader, having at its base two wing-like processes, the posterior portion cylindrical. Genital segment as broad as long, robust, deeply emarginate in front and behind. Abdomen small, biarticulate. Egg-sacs long, club-shaped. One pair (?) of bilobed thoracic limbs placed close behind the head.

Male pigmy, like those of *Chondracanthus*.

1. MEDESICASTE TRIGLARUM. ♀. ♂.

Medesicaste triglarum Kr. Bidrag til Kundskab, 1863, p. 312, pl. xviii. fig. 1.

Host: *Trigla hirundo*. Kattegat.

2. MEDESICASTE PENETRANS. ♀. ♂.

Medesicaste penetrans Heller, Reise d. Novara, 1865, p. 235, pl. xxv. fig. 1.

Host: *Trigla capensis*. Cape of Good Hope.

G. 3. ORALIEN, gen. nov.

Head rounded in front, carrying there the two pairs of antennæ, and lateral lobe-like projections; produced posteriorly as a cylindrical neck more or less long, at the juncture of which with

the thoracic segment are distinctly seen the mouth, maxillæ, and two pairs of maxillipeds. Body large, convex above, concave beneath, robust, with margins deeply incised; it is divided into two portions, the thoracic bearing on the ventral side two pairs of blunt lobed processes, and the genital rounded and larger. Abdomen biarticulate. Egg-sacs elongated, claviform.

Male pigmy as in *Chondracanthus*.

Oralien asellinus. ♂ ♀. (Plate XXVI. figs. 1, & 1*a*–1*c*.)

Lernæa asellina Linn. Fauna Suec. 1761, p. 510.
Lernæntoma triglæ Blainv. Jour. de Physique, xcv. 1822, p. 441, xxvi, pl. ~~lxii~~. fig. 12.
„ „ Blainv. Dict. des Sc. Nat. xxiv. 1823, p. 125.
Chondracanthus triglæ Nordm. Mikrogr. Beiträge, ii. 1832, p. 116, pl. ix. fig. 1.
„ „ Guérin, Iconograph. pl. ix. fig. 8.
„ „ Kröyer, Tidsskrift, ii. 1838, p. 135, pl. iii. fig. 33.
„ „ V. Ben. Ann. Sc. Nat. 3 ser. xvi. 1851, p. 109.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 502.
„ „ Stp. Bull. Soc. Roy. Dan. 1869, pl. ii. fig. 1.
„ „ B.-S. Ann. & Mag. N. H. ser. vi. 1896, p. 13, pl. iv. fig. 4.
Lernentoma asellina Baird, Brit. Entom. 1850, p. 329, pl. xxxv. fig. 4.
Chondracanthus gurnardi Kr.
„ „ Stp. Bull. Soc. Roy. Dan. 1869, pl. ii. fig. 3.

In Coll. Brit. Mus.

Hosts: gills of *Gadus* sp. and *Trigla* spp. Europe.

G. 4. Strabax Nordm.

Head oblong, with six knob-like swellings. Body elongated, widening posteriorly, where it gives off on either side four filiform processes. Abdomen pyriform, $\frac{1}{3}$ as long as processes; limbs suppressed.

Male pigmy, distinctly segmented, and provided with limbs.

(1) Strabax monstrosus. ♂ ♀.

Strabax monstrosus Nordm. Bull. Soc. Imp. N. H. Moscou, 1864, t. xxxvii., pl. v. fig. 10.

Host: *Scorpæna porcus*. Mediterranean.

G. 5. Trichthacerus Kröyer.

Head short, dilated, separated from the oval non-segmented body by a constriction. Abdomen small, articulate. Anterior

antennæ slender, with three joints. Posterior large, trifurcate. There are four pairs of rudimentary limbs, the first biramose. Ovarian sacs long; ovules multiserial.

Male pigmy, like those of *Chondracanthus*.

(1) TRICHTHACERUS PERISTEDII. ♀ ♂.

Trichthacerus peristedii Kr. Bidrag til Kundskab, 1863, p. 264. pl. xiv. fig. 7.

Host: gills of *Peristethus* sp. Rio Janeiro.

(2) TRICHTHACERUS MOLESTUS. ♀.♂

Trichthacerus molestus Heller, Reise d. Novara, 1865, p. 233, pl. xxiii. fig. 5.

Host: gills of *Prionotus punctatus*. Brazil.

G. 6. BLIAS Kröyer.

Head rounded, separated by a constriction from the smooth, thick, oval body, which is unsegmented and without processes. Abdomen biarticulate, small, with two short terminal setæ. Anterior antennæ short, thick. Posterior are two-jointed, uncinate. Mouth at the posterior part of the head. Two pairs of single branched articulate limbs are present.

Male pigmy, like those of *Chondracanthus*.

BLIAS PRIONOTI. ♀ ♂.

Aethon prionoti Kllr. Ann. Wien. Mus.

Blias prionoti Kr. Bidrag til Kundskab, 1863, p. 262, pl. xii. fig. 5.

Host: gills of *Prionotus punctatus*. Brazil.

G. 7. CHONDRACANTHUS. De la Roche. (*Lernentoma* Blainv.)

Head distinct, separated from the body by a more or less constricted neck. Thorax indistinctly biarticulate, bearing two pairs of lobe-like limbs. Genital segment compressed with concave borders, or provided with irregular globose or elongated processess. Abdomen distinctly articulated, placed between the two posterior horns. Anterior antennæ 2- or 3-jointed. Posterior uncinate, strong. Mouth and appendages placed a little behind these. External ovaries large; ovules multiseriate.

Male pigmy; the cephalothorax carries the strong hook-like posterior antennæ (or hooks of attachment) on the dorsal surface; abdomen segmented; thoracic limbs articulate.

(1) CHONDRACANTHUS CORNUTUS. ♂ ♀.

Lernæa cornuta Müll. Zool. Dan. i. 1776, pl. xxxiii. fig. 6.

Entomoda cornuta Lamarck, Hist. Anim. sans Vert. viii. 1818.

Anops cornuta Oken, Lehrbuch Naturg. iii. 1815.

Lernentoma cornuta Blainv. Dict. Sc. Nat. xxvi. 1823, p. 126.

Chondracanthus cornutus Cuv. Règne Anim. iv. 1830, p. 258.
" " Nordm. Mikrogr. Beiträge, ii. 1832, p. 111, pl. ix. fig. 10.
" " M.-E. Hist. Nat. Crust. iii. 1840, p. 500, pl. xl. fig. 18.
Lernentoma cornuta Baird, Brit. Entom. 1850, p. 328, pl. xxxv. fig. 2.
Chondracanthus cornutus Kr. Bidrag til Kundskab, 1863, p. 249, pl. xiii. fig. 7.
" " V. Ben. Ann. des Sc. Nat. 3 ser. xvi. 1851, p. 108, pl. iv. fig. 1.
&c.
" *furcæ* Kr., Var., Bidrag til Kundskab, 1863, p. 249, pl. xiii. fig. 6.
" *soleæ* Kr., Var., Tidsskrift, i. 1837, p. 139, pl. iii.
" " M.-E. Hist. Nat. Crust. iii. 1840, p. 501.
" " V. Ben. Ann. Sc. Nat. xvi. 1851, p. 109.

In Coll. Brit. Mus.
Host: gills of various *Pleuronectidæ*.

(2) CHONDRACANTHUS OPHIDII. ♀.

Chondracanthus ophidii Kr. Bidrag til Kundskab, 1863, p. 244, pl. xii. fig. 6.
Host: gills of *Ophidium* (*blacodes*?). Valparaiso.

(3) CHONDRACANTHUS MACRURUS. ♀.

Chondracanthus macrurus Brady, Challenger Rep. viii. 1883, p. 137, pl. lv. fig. 4.
Host: *Macrurus* sp. Kermadec Is.

(4) CHONDRACANTHUS CLAVATUS. ♀ ♂.

Chondracanthus clavatus B.-S. Ann. & Mag. N. H. ser. 6, xviii. 1896, p. 13, pl. v. fig. 6.
In Coll. Brit. Mus.
Host: gills of *Pleuronectes microcephalus*. Plymouth.

(5) CHONDRACANTHUS SICYASIS. ♀ ♂.

Chondracanthus sicyasis Kr. Bidrag til Kundskab, 1863, p. 244, pl. xiii. fig. 4.
Host: gills of *Sicyases* sp. Valparaiso.

(6) CHONDRACANTHUS LIMANDÆ. ♀ ♂.

Chondracanthus limandæ Kr. Bidrag til Kundskab, 1863, p. 248, pl. xiv. fig. 2.
Host: gills of *Platessa* [Pleuronectes] *limanda* Linn.

(7) CHONDRACANTHUS PSETTI. ♀.

Chondracanthus psetti Kr. Bidrag til Kundskab, 1863, p. 243, pl. xiii. fig. 5.
Host: *Pleuronectes* sp. Valparaiso.

(8) CHONDRACANTHUS LOTELLÆ. ♀.

Chondracanthus lotellæ Thomson, Trans. N.Z. Inst. vol. xxii. 1889, p. 372, pl. xxviii. fig. 7.
In Coll. Brit. Mus.
Host: gills of *Lotella bacchus*. New Zealand.

(9) CHONDRACANTHUS CRASSICORNIS. ♀.

Chondracanthus crassicornis Kr. Tidsskrift, i. 1837, p. 203, pl. ii. fig. 10.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 501.
Host: *Labrus*.

(10) CHONDRACANTHUS BREVICOLLIS. ♀.

Chondracanthus brevicollis Kllr. Ann. Wien. Mus.
„ „ Kr. Bidrag til Kundskab, 1863, p. 246, pl. xiii. fig. 3.
Host: —? Indian Ocean.

(11) CHONDRACANTHUS ANGUSTATUS. ♀.

Chondracanthus angustatus Heller, Reise d. Novara, 1865, p. 230, pl. xxiii. fig. 2 (not 3).
„ „ Schaub, Arbeit. Akad. Wien, 1876, pls. i.–iii.
Host: *Uranoscopus scaber*. Mediterranean.

(12) CHONDRACANTHUS ALATUS. ♀ ♂.

Chondracanthus alatus Heller, Reise d. Novara, 1865, p. 231, pl. xxiii. fig. 3 (not 2).
„ „ B.-S. Ann. & Mag. N. H. ser. 7, i. 1898, p. 14.
Hosts: *Hippoglossus walako*, Singapore; *Psettodes erumei*, Bombay.

(13) CHONDRACANTHUS ELONGATUS. ♀ ♂.

Chondracanthus elongatus B.-S. Ann. & Mag. N. H. ser. 7, vol. i. 1898, p. 14, pl. vi. fig. 4.
In Coll. Brit. Mus.
Host: *Solea* sp. Bombay.

(14) CHONDRACANTHUS HORRIDUS. ♀.

Chondracanthus horridus Heller, Reise d. Novara, 1865, p. 232, pl. xxiii. fig. 4.
Host: *Gobius jozo*. Mediterranean.

(15) CHONDRACANTHUS CHYLOMYCTERI. ♀.

Chondracanthus chylomycteri Thoms. Trans. N.Z. Inst. xxii. 1889, p. 371, pl. xxviii. fig. 5.
Host: mouth of *Chylomycterus jaculiferus*. New Zealand.

(16) CHONDRACANTHUS GENYPTERI. ♀.

Chondracanthus genypteri Thoms. Trans. N.Z. Inst. xxii. 1889, p. 372, pl. xxviii. fig. 6.

Host: *Genypterus blacodes*. New Zealand.

(17) CHONDRACANTHUS RADIATUS. ♀.

Chondracanthus radiatus Müll. Zool. Danica, i. 1776, pl. xxxviii. fig. 3.

Lernentoma radiata Blainv. Dict. Sci. Nat. xxvi. 1823, p. 124.

Entomoda radiata Lamarck, Hist. des Anim. s. Vert. iii. p. 223.

Chondracanthus radiatus Kr. Bidrag til Kundskab, 1863, p. 251, pl. xiv. fig. 1.

Hosts: *Coryphæna* (*Macrurus*) *rupestris*. Greenland.

(18) CHONDRACANTHUS MERLUCCII. ♀ ♂.

Lernæa ~~*Chondracanthus*~~ *merluccii* Holt, Mem. Soc. Hist. Nat. Copenhag. vol. v. pl. iii. fig. 2.

Chondracanthus „ Kr. Tidsskrift, i. 1837, p. 278, pl. iii. fig. 9.

„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 503.

„ „ B.-S. Journ. M. B. Assn. Plymouth, 1896, p. 161.

„ *xyphiæ*? Cuv. Iconogr. Zool. pl. ix. fig. 20.

In Coll. Brit. Mus.

Host: gills of *Merluccius vulgaris*.

(19) CHONDRACANTHUS NODOSUS. ♀.

Lernæa nodosa Müll. Zool. Danica, 1776, p. 40, pl. xxxiii. fig. 5.

„ „ Lamarck, Hist. des Anim. s. Vert. iii. 1818, p. 231.

Lernentoma nodosa Blainv. Dict. Sci. Nat. xxvi. 1823, p. 125.

Chondracanthus nodosus Kr. Tidsskrift, ii. 1838, p. 133, pl. iii. fig. 2.

„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 503.

Host: *Pleuronectes* sp.

(20) CHONDRACANTHUS LOPHII. ♀ ♂.

Chondracanthus lophii Johnst. Loud. Mag. N. H. 1836, p. 481, fig. 16.

„ „ Rathke, Nov. Act. Nat. Cur. 1843, xx. p. 116, pl. v. fig 2.

„ *gibbosus* Thomps. Ann. Mag. N. H.

„ „ Kr. Tidsskrift, 1840, p. 738, pl. ii. fig. 4.

„ „ V. Ben. Ann. d. Sc. Nat. xvi. 1851, pl. iii. fig. 10.

Lernentoma lophii Baird, Brit. Entom. 1850, p. 330, pl. xxxv. fig. 3.

Chondracanthus lophii B.-S. Journ. M. B. Assn. Plymouth, 1896. p. 162.

In Coll. Brit. Mus.

Host: gills of *Lophius piscatorius*.

(21) CHONDRACANTHUS ZEUS. ♀ ♂.

Chondracanthus zei De la Roche, Nouv. Bull. de Soc. Philom. ii. 1811, p. 270, pl. ii. fig. 2.

„ *delarochiana* Blainv. Journ. Physique, xcv. 1822, pl. xxvi. fig. 13.

„ *zei* Burmeister, Nov. Act. Nat. Cur. xvii. 1831, p. 325.

„ „ Guérin, Iconogr. Zool. pl. ix. fig. 9.

„ *tuberculatus* Nordm. Mikrogr. Beiträge, 1832, p. 118.

„ *zei* M.-E. Hist. Nat. Crust. 1840, p. 504.

~~*Lernentoma*~~ „ *zei* Baird, Brit. Entom. 1850, p. 327, pl. xxxv. fig. 1.

Chondracanthus zei V. Bened. Ann. Sc. Nat. xvi. 1851, p. 110, pl. iv. fig. 5.

„ „ B.-S. Journ. M. B. Assn. Plymouth, 1896, p. 162.

In Coll. Brit. Mus.

Host: gills of *Zeus faber*.

G. 8. DIOCUS Kröyer.

Head small, with long pointed processes on either side directed outwards. Body short, compressed, squarish, deformed, with obtuse nodular arm-like projections. Egg-sacs convoluted. Anterior antennæ 3- or 4-jointed. Posterior small, uncinate.

(1) DIOCUS GOBINUS. ♀.

Lernæa gobina Fabr. Zool. Dan. 2747.

„ „ Müll. Fauna Grœnlandica, 389.

Chondracanthus gobinus Kr. Tidsskrift, 1837, p. 289.

Diocus gobinus Kr. Bidrag til Kundskab, 1863, p. 259.

„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 423, pl. xv. fig. 39.

Host: *Cottus gobio*. North Sea.

Ismaïlia, Bergh.

G. 9. TANYPLEURUS Stp. & Lütk. (~~*Ismalia* Berg.~~)

Head small, rounded, covered with a number of papilliform processes. Body in the form of two wide incurving lobes, much shorter than deep, with irregularly cut borders. Abdomen short. Limbs not apparent. Egg-sacs twisted, partially hidden.

Male not known.

(1) TANYPLEURUS ALCICORNIS. ♀.

Tanypleurus alcicornis Stp. & Lütk. Bidrag til Kundskab, 1861, p. 425, pl. xv. fig. 3Ø.♂

Hosts: *Cyclopterus spinosus*, *Scymnus microcephalus* [Læmargus borealis]. Greenland.

Family VII. LERNÆOPODIDÆ.

Adult female with the body robust, incompletely or not at all segmented. The anterior antennæ are small, springing from the inside of the posterior ones, which are generally two-branched. Mouth conical, with a ciliated margin in which is seen the dentate slender mandible. Maxillæ curved, toothed, and free. First maxillipeds large, as strong hook-like limbs. Second maxillipeds converted into organs of attachment, sometimes long and slender, others united throughout, or short and dilated, terminating in a fixing apparatus. Thoracic limbs often totally suppressed. External ovaries as dilated sacs. Generally a fixed parasite.

Male pigmy, found on some portion of the female (head, arms, or body). It is strikingly different and proportionately very small. Articulate limbs more or less represented, but varying considerably in different genera, and useful as a means of classification.

G. 1. THYSANOTE Kröyer.

Cephalothorax not markedly attenuated, joining imperceptibly with the body, which is dilated and flattened; the second maxillipeds, like the hinder part of the body, giving rise to fimbriform appendages. Abdomen minute. Anterior antennæ slender, articulate; posterior unciform. Second maxillipeds united at the end.

Male with distinct cephalothorax, and elongated segmented abdomen.

(1) THYSANOTE POMACANTHI. ♀.

Thysanote pomacanthi Kr. Bidrag til Kundskab, 1863, p. 288, pl. xv. fig. 1.

Host: gills of *Pomacanthus paru*. West Indies.

(2) THYSANOTE FIMBRIATA. ♀.

Brachiella fimbriata Heller, Reise d. Novara, 1865, p. 240, pl. xxiv. fig. 2.

Host: gills of *Serranus sexfasciatus*. Batavia.

(3) THYSANOTE LOBIVENTRIS. ♀.

Brachiella lobiventris Heller, Reise d. Novara, 1865, p. 241. pl. xxxiv. fig. 3.

Host: gills of *Rhypticus saponaceus*. Brazil.

(4) Thysanote appendiculata. ♀ ♂.

Brachiella appendiculata Stp. & Lütk. Bidrag til Kundskab, 1861, p. 419, pl. xv. fig. 35.
„ „ Carl Vogt, Arch. Zool. Exp. xvi. 1877.
„ *appendiculosa* B.-S. Ann. & Mag. N. H. ser. 7, i. 1898, p. 14, pl. vi. fig. 1.

In Coll. Brit. Mus.

Hosts: gills of *Stromateus paru* [S. niger], *Polynemus tetradactylus*. Indian Ocean.

(5) Thysanote impudica. ♀ ♂.

Brachiella impudica Nordm. Mikrogr. Beiträge, ii. 1832, p. 92, pl. viii. fig. 1.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 513.
„ „ C. Vogt, Arch. Zool. Exp. xvi. 1877, p. 436.
„ „ B.-S. Jour. M. B. Assn. Plymouth, 1896, p. 162.

In Coll. Brit. Mus.

Hosts: gills of *Gadus æglefinus* and *Trigla* sp. Europe.

G. 2. Basanistes Nordm.

Cephalothorax distinctly separated from the body, and not attenuated. Genital segment quadrilateral or egg-shaped, with three rounded tubercles on either side. Second pair of maxillipeds short, united at the extremity, the first pair being placed at their base.

Young as an elegant free-swimming *Nauplius*.

(1) Basanistes huchonis. ♀.

Lernæa huchonis Schrank, Voyage in Bohême, p. 99, pl. i. fig. *a*.
„ „ Lamarck, Hist. des Anim. sans Vert. 1818, iii. p. 230.
Basanistes huchonis Nordm. Mikrogr. Beiträge, ii. 1832, p. 87.
„ „ Kollar, Ann. Wien. Mus. 1841, p. 86, pl. x.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 509.
Lernæopoda clavigera? Olsson, Oversigt Kgl. Ak. Forh. 1872, pl. v.

In Coll. Brit. Mus.

Host: gills of *Salmo hucho* and *Thymallus vulgaris*.

G. 3. Vanbenedenia Malm.

Head short, broader than long, not markedly attenuated, but plainly separated from the body. Body elongated, indistinctly segmented; no caudal appendages. External ovaries long, filiform. Second maxillipeds short and thick.

(1) Vanbenedenia kroeyeri. ♀.

Vanbenedenia kröyeri Malm, Förhand. Skand. Naturf. 1860, p. 620.

Host: gills of *Chimæra monstrosa*. Kattegat.

G. 4. CHAROPINUS Kröyer.

Cephalothorax short, distinctly two-jointed. Second maxillipeds very long and slender, arm-like, with organ of attachment as hand-like clasping processes. Genital segment elongated, indistinctly segmented, terminating in two simple filiform processes. Abdomen rudimentary. External ovaries saccular.

Male minute; cephalothorax distinct; 2nd maxillipeds very large and cheliform; abdomen with 5 or 6 articulations.

(1) CHAROPINUS RAMOSUS. ♀ ♂.

Charopinus ramosus Kr. Bidrag til Kundskab, 1863, p. 284, pl. xiv. fig. 5.

Host: gills of *Raja clavata*. Europe.

(2) CHAROPINUS DALMANNI. ♀ ♂.

Lernæa dalmannii Retzius, Froriep's Notizen, xxix. 1831, p. 617, pl. vi. fig. 5.
Lernæopoda dalmannii Kr. Tidsskrift, i. 1837, p. 264, pl. ii. fig. 3.
" " M.-E. Hist. Nat. Crust. iii. 1840, p. 516.
Charopinus dalmannii Kr. Bidrag til Kundskab, 1863, p. 280, pl. xiv. fig. 6.

Host: gills of *Raja batis*. Europe. hippocephalus.

(3) CHAROPINUS ~~HIPPOCEPHALUS.~~ ♀.

Stylophorus ~~hippocephalus~~ Hesse, Ann. Sci. Nat. sér. 6, viii. 1878, art. 15, p. 1. ♀

G. 5. ACTHERES Nordm.

Cephalothorax distinctly separated from the body, short, oval, one-jointed. Second maxillipeds long, slender, arm-like, united at the end, bearing a small disc of attachment. Body oval, distinctly segmented. External ovaries bag-like; ovules large.

(1) ACTHERES PERCARUM. ♀.

Actheres percarum Nordm. Mikrog. Beiträge, 1832, p. 63, pl. i.
" " Kr. Tidsskrift, ii. 1838, p. 143, pl. iii. fig. 6.
" " M.-E. Hist. Nat. Crust. iii. 1840, p. 511, pl. xl. fig. 8.

Host: *Perca fluviatilis*.

(2) ACTHERES PIMELODI. ♀.

Actheres pimelodi Kr. Bidrag til Kundskab, 1863, p. 272, pl. xvii. fig. 5.

Host: gills of *Pimelodes maculatus*. North America.

(3) ACTHERES LACÆ. ♀.

Actheres lacæ Kllr.
" " Kr. Bidrag til Kundskab, 1863, p. 274, pl. xvii. fig. 6.

Host: *Perca laca*. North America.

[62]

Actheres amblopliti - D.S. Kellicott -
" micropteri - Wright -

(4) ACTHERES SELACHIORUM. ♀.

Actheres selachiorum Kurz, Zeitschrift wissens. Zool. xxix. 1877, p. 385, pl. xxv. ~~fig. 1~~ XXVII

Host: *Mustelus lævis*, *Myliobatis aquila*.

G. 6. LERNÆOPODA ~~Kröyer~~. Blainville, 1822.

Cephalothorax short, single-jointed, stout, distinctly separated from the body. First maxillipeds placed not far behind the mouth. Second maxillipeds long, thin, arm-like, united at the end, bearing a disc of attachment. Genital segment elongated, bag-like, not segmented.

Male minute; cephalothorax distinct; abdomen elongated, segmented; articulate limbs present.

(1) LERNÆOPODA ELONGATA. ♀ ♂.

Lernæa elongata Grant, Edinb. Journ. of Science, vii. 1827, p. 147, pl. ii. fig. 5.

Lernæopoda elongata M.-E. Hist. Nat. Crust. iii. 1840, p. 515.

„ „ Baird, Brit. Entom. 1850, p. 333, pl. xxxv. fig. 5.

„ „ Stp. & Lütk. Bidrag til Kundskab, 1861, p. 422, pl. xv. fig. 37.

„ „ V. Ben. Rech. sur la Faune lit. Belg. 1861, p. 154.

In Coll. Brit. Mus.

Host: eye of Shark. Greenland.

(2) LERNÆOPODA STELLATA. ♀.

Lernæopoda stellata Mayor, Bull. de la Soc. Phil. 1824, p. 24, pl. i. fig. 2.

„ „ Rathke, Nova. Act. Acad. Cæs. Leop. 1839, p. 154.

„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 515, pl. xl. fig. 12.

Host:—? Norway.

(3) LERNÆOPODA GALEI. ♀ ♂.

Lernæopoda galei Kr. Tidsskrift, vol. i. 1837, p. 272, pl. iii. fig. 5.

„ „ M.-E. Hist. Nat. Crust. iii 1840, p. 516.

„ „ Baird, Brit. Entom. 1850, p. 334, pl. xxxv. fig. 7.

„ „ V. Bened. Ann. des Sci. Nat. 3 ser. xvi. 1851, p. 120, pl. iv.

„ „ B.-S. Jour. M. B. Assn. Plymouth, 1896, p. 163.

„ *musteli* Thomson, Trans. N. Z. Inst. xxii. 1889, p. 373, pl. xxviii. fig. 9.

In Coll. Brit. Mus.

Hosts: fins of *Mustelus vulgaris*, *M. antarcticus*, *Squalus acanthus*, *Scyllium canicula*.

(4) LERNÆOPODA SEBASTES. ♀.

Lernœopoda sebastes Kr. Bidrag til Kundskab, 1863, p. 279, pl. xvii. fig. 7.

Host: gills of *Sebastes norvegicus*. Greenland.

(5) LERNÆOPODA OBESA. ♀.

Lernœopoda obesa Kr. Tidsskrift. vol. i. 1837, p. 270, pl. iii. fig. 13.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 516.

Host: *Squalus acanthias*.

(6) LERNÆOPODA SALMONEA. ♀.

Lernœa salmonea Linn. Fauna Suec. Ed. 2, 1761, p. 509, no. 2102.
„ „ Cordiner, Antiq. & Sc. of N. Scot. 7. 8, pl. vi. fig. 2.
„ „ O. Fabr. Faun. Grœnl. 337.
„ „ Müll. Zool. Dan. Prod. 2744.

Pediculus salmonis Gisler, Kongl. Svensk. Vetensk. Ak. Handling. 1751, p. 171, pl. viii. fig. 1.

Entomoda salmonea Lamarck, Hist. Anim. s. Vert. Ed. 2, 1818, p. 686.

Lernœopoda cyprinacea Hermann, Naturforsch. no. 19, 1783, pl. ii. fig. 7.
„ *salmonea* Blainv. Dict. Nat. xxvi. 1823, p. 127.
„ „ Mayor, Bull. des Sc. Soc. Phil. 1824, vol. xxiv. p. 24.
„ *carpionis* Kr. Tidsskrift, i. 1837, p. 268, pl. ii. fig. 6.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 515.
„ *salmonea* Baird, Brit. Entom. 1850, p. 335, pl. xxxv. fig. 6.
„ „ Kr. Bidrag til Kund. 1863, p. 275, pl. xv. fig. 3.

Basanistes salmonea M.-E. Hist. Nat. Crust. iii. 1840, p. 509, pl. xli. fig. 3.

In Coll. Brit. Mus.

Host: *Salmo* spp., *Cyprinus leuciscus* [Leuciscus vulgaris].

G. 7. TRACHELIASTES Nordm.

Cephalothorax subcylindrical or cordate; mouth inferior; orbicular ciliated. Second maxillipeds long, arm-like, united at the ends, and provided with an organ of attachment. First maxilliped small, uncinate, at the base of the arms. Genital segment elongated, bag-like, not segmented, and without lobes or tubercles. Abdomen small. External ovaries saccular; ovules large.

(1) TRACHELIASTES POLYCOLOPHUS. ♀.

Tracheliastes polycolophus Nordm. Mikrog. Beiträge. ii. 1832, p. 95, pl. vii. figs. 1–8.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 507, pl. xl. figs. 1–7.

In Coll. Brit. Mus.

Host: gills of *Cyprinus jeses*.

(2) Tracheliastes maculatus. ♀.

Tracheliastes maculatus Kollar, Ann. Wien. Mus. i. 1841, p. 85.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 507.

Host: *Cyprinus brama* [Abramis brama].

(3) Tracheliastes stellifer. ♀.

Tracheliastes stellifer Kollar, op. cit. p. 82, pl. ix. fig. 8.
„ „ M.-E. op. cit. p. 508.

Host: *Silurus glanis*.

G. 8. Brachiella Cuv.

Cephalothorax markedly thin and elongated, vermiform. First maxilliped placed close behind mouth; second mostly long, arm-like, generally divided up to the ends, where is found the organ of attachment. Genital segment oval or quadrilateral. Abdomen simple.

Male. Pigmy, attached to body, neck, or maxillipeds of female. Cephalothorax distinctly divided from the long segmented abdomen by a marked constriction; both pairs of maxillipeds large, uncinate.

(1) Brachiella bispinosa. ♀ ♂.

Brachiella bispinosa Nordm. Mikrogr. Beiträge, 1832, p. 94, pl. viii. fig. 4.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 513.
„ „ C. Vogt, Arch. Zool. Exp. 1877, p. 426.
„ *bicaudata*? Kr. Tidsskrift, i. 1837, p. 275, pl. iii. fig. 2.
„ „ M.-E. op. cit. p. 517.
„ „ B.-S. Journ. M. B. Assn. Plymouth, 1896, p. 163.

In Coll. Brit. Mus.

Host: gills of *Trigla* spp. Europe.

(2) Brachiella lophii. ♀.

Brachiella lophii M.-E Hist. Nat. Crust. iii. 1840, p. 514, pl. xli. fig. 4.
„ „ C. Vogt, Arch. Zool. Exp. 1877, p. 426.

Host: *Lophius* sp. Naples.

(3) Brachiella rostrata. ♀.

Brachiella rostrata Kr. Tidsskrift, i. 1837, p. 207, pl. ii. fig. 1.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 514.
„ „ C. Vogt, Arch. Zool. Exp. 1877, p. 426.

In Coll. Brit. Mus.

Hosts: gills of *Pleuronectes pinguis*, *P.* [Rhombus] *maximus*, *Hippoglossus vulgaris*. North Sea, Greenland.

(4) Brachiella pastinacea. ♀.

Brachiella pastinacea V. Bened. Ann. Sci. Nat. 3 ser. xvi. 1851, p. 118, pl. iv. fig. 8.
„ „ C. Vogt. Arch. Zool. Exp. 1877, p. 426.
„ „ Kurz, Zeitschrift wiss. Zool. 1877, p. 389, pl. xxv. figs. 2, 3.

Host: nasal fossa of *Trygon pastinaca*.

(5) Brachiella parkeri. ♀.

Brachiella parkeri Thomson, Trans. N. Z. Inst. xxii. 1889, p. 374, pl. xxviii. fig. 8.

In Coll. Brit. Mus.

Hosts: *Raja nasuta* and *Trygon* sp. New Zealand.

(6) Brachiella malleus. ♀ ♂.

Brachiella malleus Nordm. Mikrogr. Beiträge, ii. 1832, p. 95.
„ „ C. Vogt, Arch. Zool. Exp. vi. 1877, p. 417.

Host: *Torpedo marmorata*.

(7) Brachiella insidiosa. ♀ ♂.

Brachiella insidiosa Heller, Reise der Novara, 1865, p. 239, pl. xxiv. fig. 1.
„ „ B.-S. Ann. & Mag. N. H. ser. 6, xviii. 1896, p. 14, pl. vi. fig. 2.

In Coll. Brit. Mus.

Hosts: *Gadus* sp. and *Gadus merluccius* [Merluccius vulgaris]. Mediterranean and Plymouth.

(8) Brachiella thynni. ♀ ♂.

Brachiella thynni Cuv. Règne Anim. iii. p. 287, pl. xv. fig. 5.
„ „ Guérin, Iconograph. Zool. pl. ix. fig. 2.
„ „ Nordm. Mikrogr. Beiträge, 1832, p. 90.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 512.
„ „ V. Bened. Ann. Sci. Nat. 3 ser. xvi. 1851, p. 128.
„ „ C. Vogt, Arch. Zool. Exp. vi. 1877, p. 426.
„ „ B.-S. Jour. M. B. Assn. Plymouth, 1896, p. 162.

In Coll. Brit. Mus.

Host: gills of *Thynnus thynnus*, *Sciæna aquila*. Plymouth, &c.

(9) Brachiella chaviesii. ♀ ♂.

Brachiella chaviesii V. Bened. Bull. Acad. Roy. de Belg. xxii. 1891, p. 23, pl. i.

Host: *Ceratopterus* sp. Azores.

(10) Brachiella chevreuxii. ♀ ♂.

Brachiella chevreuxii V. Bened. op. cit. p. 29, pl. ii.

Host:—? Senegal.

(11) Brachiella multifimbriata. ♀ ♂.

Brachiella multifimbriata B.-S. Ann. & Mag. N. H. ser. 7, vol. ii. 1898, p. 96, pl. vi. fig. 2.

In Coll. Brit. Mus.

Host: gills of a *Serranus*. Muscat.

Second maxilliped united throughout, short.

(12) Brachiella merluccii. ♀ ♂.

Brachiella merluccii B.-S. Ann. & Mag. N. H. ser. 6, xviii. 1896, p. 14, pl. vi. fig. 1.

In Coll. Brit. Mus.

Host: *Gadus merluccius* [Merluccius vulgaris]. Plymouth.

(13) Brachiella triglæ. ♀ ♂.

Brachiella triglæ Claus, Zur Morph. der Copep. 1860, pl. i. fig. 6.

Anchorella triglæ Kurz, Zeitsch. f. wiss. Zool. 1877, p. 404, pl. xxv. figs. 13–15.

Brachiella triglæ B.-S. Journ. M. B. Assn. Plymouth, 1896, p. 163.

Host: gills of *Trigla* spp.

G. 9. ~~Anchorella Cuv.~~ (*Lernæomyzon* Blville.)

Cephalothorax markedly thin and elongated, worm-like. First maxillipeds placed close behind the mouth, unciform; the second short, generally united together throughout, furnished at the extremity with the organ of attachment, often in the form of a drill. External ovaries saccular, ovules large.

Male. Pigmy; a globular cephalothorax with antennæ ciliated, mouth and large unciform maxillipeds, but apparently entirely destitute of abdominal segments.

(1) Anchorella emarginata. ♀ ♂.

Anchorella emarginata Kr. Tidsskrift, i. 1837, p. 287, pl. iii. fig. 7.

" " V. Bened. Ann. Sci. Nat. 1851, p. 113, pl. vi. fig. 4.

" " Kr. Bidrag til Kundskab, 1861, p. 309.

" " C. Vogt, Arch. Zool. Exp. xvi. 1877, p. 432.

" " Kurz, Zeitsch. f. wiss. Zool. xxix. 1877, p. 398, pl. xxv. fig. 8.

" " B.-S. Journ. M. B. Assn. Plymouth, 1896, p. 163.

" *rugosa* Kr. Tidsskrift, i. 1837, p. ~~298,~~ 284 pl. iii. fig. ~~vi.~~ 14 + Pl. II. fig.

" " M.-E. op. cit. p. 519.

" " V. Bened. op. cit. p. 114, pl. vi. fig. 7.

In Coll. Brit. Mus.

Hosts: gills of *Alosa finta* [Clupea finta] and *Anarrhichas lupus*. Europe.

(2) Anchorella ovalis. ♀.

Anchorella ovalis Kr. Tidsskrift, i. 1837, p. 289, pl. iii. fig. 6.
„ „ M.-E. Hist. Nat. Crust. iii. 1840, p. 519.
„ „ C. Vogt, Arch. Zool. Exp. xvi. 1877, p. 432.
Host: gills of *Trigla* sp.

(3) Anchorella scombri. ♀.

Anchorella scombri Kurz, Zeitschrift f. wiss. Zool. xxix. 1877, p. 403, pl. xxv. fig. 12.
Host: gills of *Scomber scomber*.

(4) Anchorella fallax. ♀.

Anchorella fallax Heller, Reise der Fregatte Novara, 1865, p. 241, pl. xxiv. fig. 4.
~~*emarginata* M.-E. Hist. Nat. Crust. iii. 1840, p. 518.~~

This belongs under A. emarginata" =

(5) Anchorella stellata. ♀.

Anchorella stellata Kr. Bidrag til Kundskab, 1863, p. 309.
„ „ C. Vogt, Arch. Zool. Exp. xvi. 1877, p. 432.
Host: gills of *Gadus merluccii* [Merluccius vulgaris].

(6) Anchorella angulata. ♀.

Anchorella angulata Kr. op. cit. 1863, p. 293, pl. xv. fig. 3.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: *Mugil* sp. Central America.

(7) Anchorella pagelli. ♀.

Anchorella pagelli Kr. op. cit. 1863, p. 295, pl. xvi. fig. 3.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: *Pagellus* sp. Mediterranean.

(8) Anchorella sargi. ♀ ♂.

Anchorella sargi Kurz, Zeitschrift f. wiss. Zool. xxix. 1877, p. 393, pl. xxv. fig. 5.
Host: gills of *Sargus annularis*. Trieste.

(9) Anchorella denticis. ♀.

Anchorella denticis Kr. op. cit. 1863, p. 296, pl. xvi. fig. 4.
„ „ Heller, Reise der Fregatte Novara, 1865, p. 243.
„ „ C. Vogt, Arch. Zool. Exp. 1877, p. 432.
Host: gills of *Dentex argyrozona*.

(10) Anchorella quadrata. ♀.

Anchorella quadratus B.-S. Ann. & Mag. N. H. 1896, p. 15, pl. iv. fig. 5.
Host: gills of *Callionymus lyra*. Plymouth.

(11) Anchorella brevicollis. ♀.

Anchorella brevicollis M.-E. Hist. Nat. Crust. iii. 1840, p. 518.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: gills of *Gadus cellarius*.

(12) Anchorella bergyltæ. ♀.

Anchorella bergyltæ Kr. op. cit. 1863, p. 297, pl. xvi. fig. 5.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: gills of *Labrus bergylta* [L. maculatus].

(13) Anchorella stichæi. ♀.

Anchorella stichæi Kr. op. cit. 1863, p. 298, pl. xvi. fig. 1.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: gills of *Stichæus punctatus*. Greenland.

(14) Anchorella agilis. ♀.

Anchorella agilis Kr. op. cit. 1863, p. 300, pl. xvi. fig. 2.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: gills of *Gadus agilis* [G. fabricii]. Greenland.

(15) Anchorella pagri. ♀.

Anchorella pagri Kr. op. cit. 1863, p. 301, pl. xvi. fig. 9.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: gills of *Pagrus vulgaris*. Mediterranean.

(16) Anchorella canthari. ♀.

Anchorella canthari Heller, Reise der Fregatte Novara, 1865, p. 242, pl. xxiv. fig. 6.
Host: gills of *Cantharus bleekeri*. Cape of Good Hope.

(17) Anchorella uncinata. ♀ ♂.

Lernæa uncinata Müll. Zool. Dan. i. 1776, pl. xxxiii. fig. 2.
Schisturus uncinatus Oken, Lehrbuch der Natur. iii. 1815, p. 183.
Clavella uncinata Oken, op. cit.
Lernæomyzon uncinata Blville. Dict. Sc. Nat. xxvi. 1823, p. 122.
Anchorella uncinata Nordm. Mikrogr. Beitr. ii. 1832, p. 102, pl. viii. fig. 8.
„ „ Kr. Tidsskrift, i. 1837, p. 290, pl. iii. fig. 8.
„ „ M.-E. Hist. Nat. Crust. 1840, p. 519.
„ „ Baird, Brit. Entom. 1850, p. 377, pl. xxxv. fig. 19.
„ „ V. Bened. Ann. Sci. Nat. 1851, p. 116, pl. vi. fig. 2.
„ „ C. Vogt, Arch. Zool. Exp. 1877, p. 428.
„ „ B.-S. Journ. M. B. Assn. Plymouth, 1896, p. 163.
„ „ Thompson, Trans. Liverp. Biol. Assn. 1893, p. 39, pl. xxvii. fig. 2.
In Coll. Brit. Mus.
Host: gills and mouth of *Gadidæ*. North Sea.

(18) ANCHORELLA DILATATA. ♀.

Anchorella dilatata Kr. op. cit. 1863, p. 302, pl. xv. fig. 2.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: gills of *Chilodactylus* sp. Cape of Good Hope.

(19) ANCHORELLA PARADOXA. ♀ ♂.

Anchorella paradoxa V. Ben. Ann. Sci. Nat. 1851, p. 117, pl. vi. fig. 1.
„ „ C. Vogt, op. cit. 1877, p. 432.
„ „ B.-S. Ann. & Mag. Nat. Hist. ser. 6, xviii. 1896, p. 15, pl. v. fig. 2.
In Coll. Brit. Mus.
Host: gills of *Scomber scomber*. Plymouth.

(20) ANCHORELLA HOSTILIS. ♀.

Anchorella hostilis Heller, Reise der Fregatte Novara, 1865, p. 243, pl. xxiv. fig. 7.
„ „ Kurz, Zeitschrift f. wiss. Zool. xxix. 1877, p. 391, pl. xxv. fig. 4.
Host: gills of *Umbrina cirrhosa*. Mediterranean.

(21) ANCHORELLA SCIÆNOPHILA. ♀.

Anchorella sciænophila Heller, op. cit. 1865, p. 243, pl. xxiv. fig. 8.
Host: gills of *Sciæna* sp. Indian Ocean.

(22) ANCHORELLA APPENDICULATA. ♀.

Anchorella appendiculata Kr. Bidrag til Kundskab, 1863, p. 305, pl. xvi. fig. 7.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host:—? Valparaiso.

(23) ANCHORELLA LACINIATA. ♀.

Anchorella laciniata Kr. op. cit. 1863, p. 308, pl. xvi. fig. 8.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: gills of *Acanthurus chirurgus*. W. Indies.
Second maxillipeds not united throughout.

(24) ANCHORELLA (?) UROLOPHI. ♀.

Anchorella urolophi Kr. op. cit. 1863, p. 304, pl. xvi. fig. 10.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: gills of *Urolophus oerstedii*. Mexico.

(25) ANCHORELLA (?) APPENDICULOSA. ♀.

Anchorella? appendiculosa Kr. op. cit. 1863, p. 306, pl. xvi. fig. 6.
„ „ C. Vogt, op. cit. 1877, p. 432.
Host: *Corvina* sp., *Pagellus* sp. New Orleans.

G. 10. ~~Cestopoda Kurz.~~ *Naobranchia* Hesse

Female with elongated cylindrical cephalothorax, enlarged squarish genital segments, and minute abdomen. The ovaries are lateral, enclosed in muscular bands which are united together down the centre by a membrane. Second pair of maxillipeds short, double, muscular, serving as an organ by which the animal fixes itself to its host.

(1) Cestopoda amplectens. ♀.

Cestopoda amplectens Kurz, Zeitschrift f. wiss. Zool. xxix. 1877, p. 407, pl. xxiv.

Host: gills of *Sargus annularis*. Adriatic.

(2) Cestopoda lizæ. ♀.

Anchorella lizæ Kr. Bidrag til Kundskab, 1863, p. 295, pl. xvi. fig. 2.

Cestopoda lizæ Kurz, op. cit. 1877, p. 415.

Anchorella lizæ Carl Vogt, Arch. Zool. Exp. vi. 1877, p. 432.

Host: gills of *Mugil liza*. New Orleans.

(3) Cestopoda cygniformis. ♀.

Naobranchia cygniforme Hesse, Ann. Sci. Nat. 4 ser. xx. p. 122, 1863.

„ „ Heller, Reise der Fregatte Novara, 1865, p. 244.

Host: *Pagellus erythrinus*. North Sea.

Summary of the Genera and Species.

Family.	Page.	Genera.	Species.
i. Ergasilidæ	441	2	22
ii. Caligidæ	444	25	124
iii. Dichelestidæ	468	15	46
iv. Philichthyidæ	477	5	14
v. Lernæidæ	480	11	38
vi. Chondracanthidæ ..	488	9	32
vii. Lernæopodidæ	496	10	62
	Total..	77	338

EXPLANATION OF PLATE XXVI.

Fig. 1. *Oralien asellinus*, ♀, p. 490. Dorsal surface. 1 *a*. Ventral surface. 1 *b*. Anterior part of head with antennæ. 1 *c*. Posterior portion. with mouth.

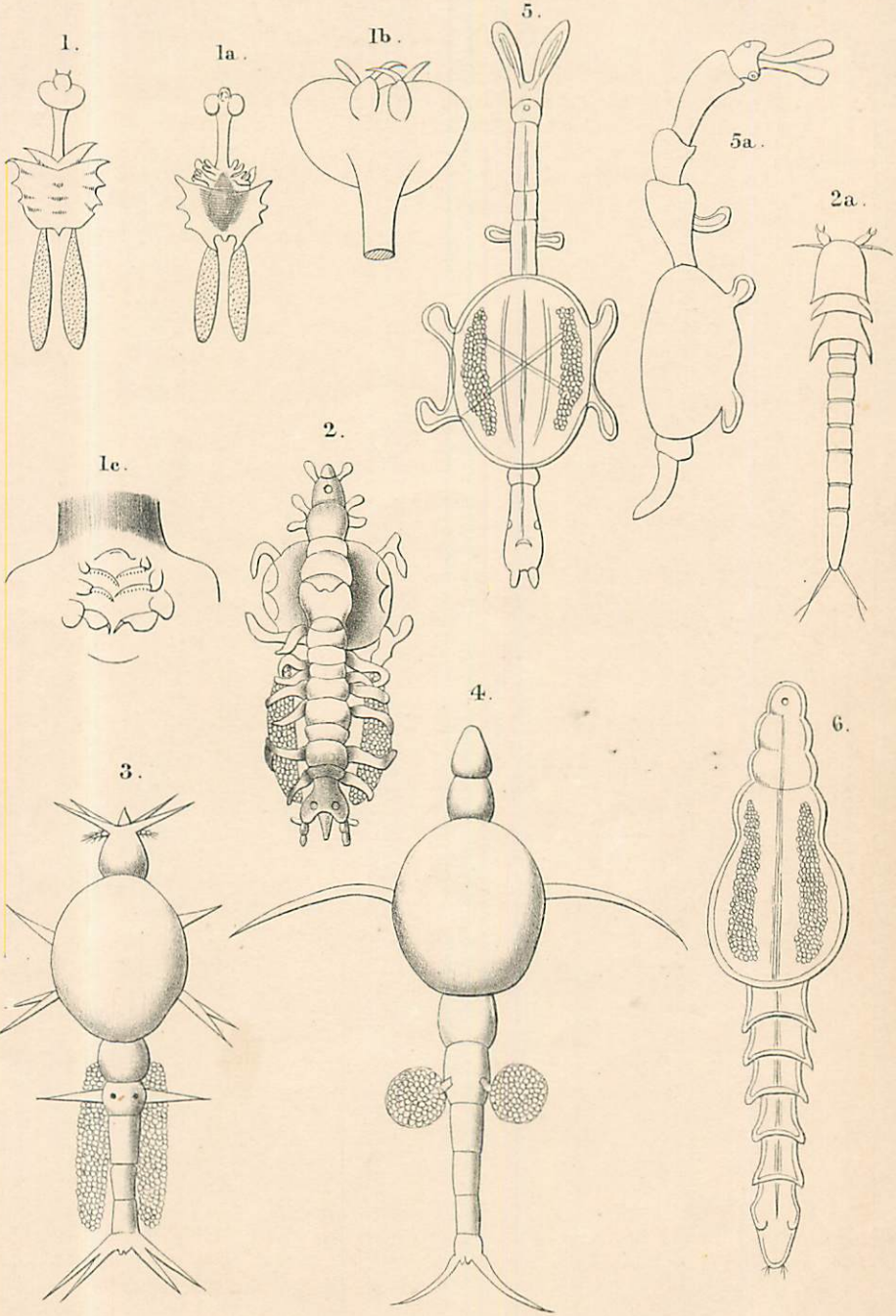
2. *Philichthys xiphiæ*, ♀, p. 478. 2 *a*. ♂ of same.

3. *Richiardia denticis*, ♀, p. 479. $\frac{15}{1}$.

4. *Sphærifer leydigi*, ♀, p. 479. $\frac{10}{1}$.

5. *Colobomatus bergyltæ*, ♀, p. 480. $\frac{16}{1}$. 5 *a*. The same seen from the side.

6. *Leposphilus labri*, ♀, p. 480. $\frac{15}{1}$.



P.W.B.S. del. R.E. Mintern lith.

Mintern Bros. imp.

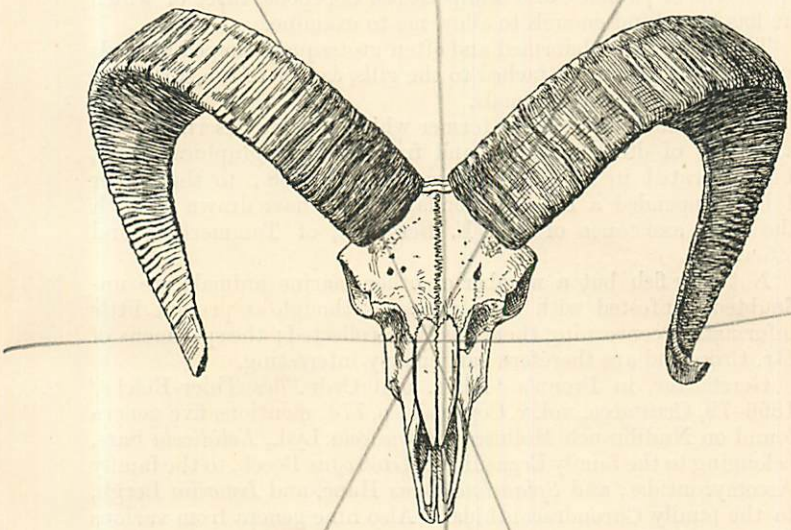
PARASITIC COPEPODA.

INDEX.

wrinkles very low and indistinct. The length of the horn is 33 inches along the inner front angle, with a basal circumference of 11 inches, a basal width of 3 inches, and a basal depth of 4 inches.

The last two dimensions are considerably greater than in a skull of the Kelat Urial measured by Mr. Hume, in which the length along the curve is $35\frac{3}{4}$ inches.

Text-fig. 10.



Front view of skull and horns of adult ram of the Kopet-Dagh Urial. $\frac{1}{4}$ nat. size.

The Kopet Dagh Urial decidedly appears to be a distinct form, connected with the typical *Ovis vignei* by means of the Punjab race of that species. On these grounds I regard it as a local race rather than a species; its name will accordingly be *O. vignei arkal* (or perhaps *arcal*). The suggestion of M. Dauvergne [1], that this sheep is identical with the Kelat Urial, is not borne out by a comparison of the present specimen with a skull of that form in the British Museum, in which the angles of the horns are much rounded off. This leads me to think that the Kelat Urial (*O. vignei blanfordi*) is, after all, distinct from the Punjab animal.

[1] See p. 131 of my book on 'Game of Europe, N.W. Asia, and America.'

4. On new Parasitic Copepoda from Zanzibar and East Africa, collected by Mr. Cyril Crossland, B.A., B.Sc. By Staff-Surgeon P. W. Bassett-Smith, R.N., F.Z.S.

[Received December 4, 1902.]

(Text-figures 11 & 12.)

Mr. Cyril Crossland, in his recent examination of the marine fauna of Zanzibar and British East Africa, obtained several specimens of parasitic and semiparasitic Copepods, three of which he has been kind enough to allow me to examine.

These curiously deformed and often grotesquely-shaped animals are frequently found attached to the gills, &c., or to the surface of fish and other marine animals.

A large number from the former which are now described from a variety of different hosts, and from wide geographical areas, I enumerated in Proc. Zool. Soc. 1899, p. 438; to this paper I have appended a list of addenda, which I have drawn up with the kind assistance of Mr. E. Bergrotti, of Tammerfers, and others.

Not only fish but a number of other marine animals are undoubtedly infested with these parasites, though at present little information concerning them has been collected; the specimens of Mr. Crossland are therefore particularly interesting.

Gerstäcker, in Bronn's 'Klass. und Ordn. des Thier-Reichs,' 1866–79, Crustacea, vol. v. Copepoda, p. 774, mentions five genera found on Nudibranch Mollusca: *Doridicola* Lyd., *Eolidicola* Sars, belonging to the family Ergasilidæ; *Artotrogus* Boeck, to the family Ascomyzontidæ; and *Splanchnotropus* Hanc. and *Ismailia* Bergh, to the family Chrondracanthidæ. Also nine genera from various Vermes, p. 773.

Of the three specimens of Mr. Crossland, two were taken from the kidneys of species of Pleurobranchids (not determined) and one from the skin of a Sipunculid (*Aspidosiphon*).

As they were only single specimens it was impossible to dissect them, and therefore the descriptions are necessarily incomplete. The first two evidently belong to the family Chondracanthidæ, but do not fall in with the descriptions of any known genus; they appear to be most nearly related to the genus *Splanchnotropus* of Hancock (Trans. Linn. Soc. vol. xxiv. pp. 51, 55), two species of which he describes, *S. gracilis* and *S. brevipes*, taken from Nudibranchs; the present specimens differ from them, however, in the complete absence of antennæ and articulate limbs, and in having the external ovaries elongated and the eggs arranged in single series.

I have therefore provisionally placed them in a new genus, *Chondrocarpus*, following closely after *Splanchnotropus* Hanc. and *Diocus* Fabr.

Chondrocarpus, gen. nov.

♀. Cephalothorax coriaceous, elongated, with four lateral short

Proc. Zool. Soc. London, 1903, vol. 1, pt. 1,

lobe-like processes on either side; abdomen one-fourth length of whole, biarticulate, tapering; no distinct antennæ or thoracic limbs; mouth placed on under surface, with minute maxillæ; external ovaries as elongated filiform sacs containing ova in a single series.

♂. Pigmy.

CHONDROCARPUS RETICULOSUS, sp. n. (Text-fig. 11, A–G.)

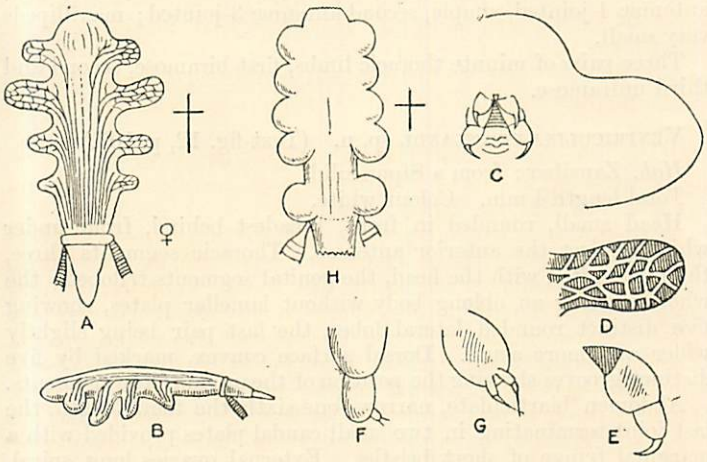
Hab. Zanzibar: from large Pleurobranchid.

Length 12 mm., breadth 4 mm.

♀. Cephalothorax indistinctly segmented, elongated, tapering, dorsally convex, laterally produced into 4 rounded truncated processes; the 4th pair being most widely separated and the smallest; the whole having a peculiar reticulate appearance from the network of ramifying tubules; anterior extremity rounded; no visible antennæ; mouth as a papilla placed between the 1st pair of processes; upper lip triangular; only one pair of maxillæ and mandibles (?) could be made out, each terminating in minute claws. No thoracic limbs; there is a short genital segment, or ring, from which spring the long filiform ovaries. Abdomen indistinctly biarticulate, tapering, without caudal plates or setæ.

♂. Pigmy. One was seen attached to the last abdominal segment but was partially hidden, the bifid articulate caudal extremity only being visible.

Text-fig. 11.



Chondrocarpus reticulosus ♀, gen. & sp. n. A. Dorsal surface. B. Lateral view. C. First segment and mouth-organs. D. One of the lobes showing reticulate appearance. E. Second maxilliped. F. Abdomen showing fixed ♂. G. Posterior extremity of ♂. H. *Chondrocarpus* sp. ♀: dorsal surface (specimen incomplete).

CHONDROCARPUS sp. (Text-fig. 11, H.)

A specimen of a second species of this genus was taken from a

Pleurobranchid; it was much broken both at the anterior and posterior extremities. It differs from *C. reticulosus* in not having the peculiar reticulate appearance and in having a pair of lateral lobes on either side of the genital segment.

The third specimen also appears to be new, and belongs to the family Dichelesthiidæ, the animal resembling most nearly the genus *Enterocola* of Van Beneden (Bull. Acad. Roy. de Belg. tom. ix. 2nd ser. p. 151), found by him in the respiratory cavity of "*Aphidium ficus*," than any other form I have been able to find recorded.

Mr. Crossland's specimen appears to be much more degenerate from its parasitic habits; the articulate limbs are excessively small, difficult to make out, and the ova are carried in long spiral thread-like processes in a single series as in the Caligidæ, and not in dilated sacs. Unfortunately there was only this single female specimen for examination. I would provisionally create for it a new genus "*Ventriculina*," giving the specific name of "*crosslandi*" in recognition of the collector.

VENTRICULINA, gen. nov.

Head small, rounded; neck indistinct; 3 thoracic segments, the first amalgamated with the head; genital segments lobed, equal in breadth with the thoracic; no dorsal plates; abdomen short, biarticulate; external ovaries spiral, ova uniserial; first antennæ 4-jointed, simple, second antennæ 3-jointed; maxillipeds very small.

Three pairs of minute thoracic limbs, first biramose, second and third uniramose.

VENTRICULINA CROSSLANDI, sp. n. (Text-fig. 12, p. 107.)

Hab. Zanzibar: from a Sipunculid.

Total length 4 mm. Colour white.

Head small, rounded in front, broadest behind, from under which project the anterior antennæ. Thoracic segments three, the first united with the head, the genital segments trilobed; the whole forming an oblong body without lamellar plates, showing five distinct rounded lateral lobes, the last pair being slightly wider and more acute. Dorsal surface convex, marked by five distinct grooves showing the position of the union of the segments.

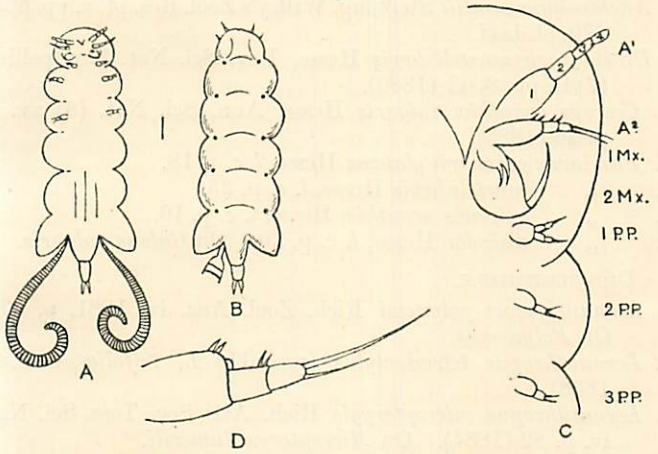
Abdomen biarticulate, narrow, one-sixth the total length, the last joint terminating in two small caudal plates provided with a marginal fringe of short bristles. External ovaries long, spiral, springing from papillæ at the angle of the genital segments and abdomen. Ova large, arranged uniserially as in the Caligidæ.

Anterior antennæ 4-jointed, non-setose, the first joint being the longest and broadest, rising from the underside of the head just in front of the mouth; second, third, and fourth joints progressively decreasing in size.

Posterior antennæ 3-jointed, rising just in front of the upper lip; at the distal end and anterior border of the first and second joints are two short setæ, the third terminating in two bristles, the anterior being very long.

Mouth and appendages placed rather far back; the labrum is triangular, projecting backwards; labium simple, rounded. I was able to make out only 2 pairs of maxillipeds; the first very small, biarticulate, terminating in two short hairs: the second uncinate, with large globose basal joint, to which was articulated a sharp curved claw.

Text-fig. 12.



Ventriculina crosslandi ♀, gen. & sp. n. A. Ventral surface, × 10. B. Dorsal surface. C. Ventral surface much enlarged, showing articulate appendages. D. Posterior antennæ.

Only three pairs of thoracic limbs present: the first rising from the posterior under surface of the cephalic segment, minute, biramose, each ramus terminating in a single bristle; second and third pairs uniramose, made up of two articulations, the distal terminating in two small bristles.

♂ not known.

ADDENDA *to Systematic Enumeration of Species of Parasitic Copepoda found on Fish* (Proc. Zool. Soc. 1899, p. 438).

ERGASILIDÆ.

1. *Eucanthus marchesettii* Valle, Atti Mus. Civ. Trieste, vii. p. 245 (1885). On *Motella tricirrata*.
2. *Ergasilus centrarchidarum* Wright, Proc. Canad. Inst. (2) i. p. 243 (1883).
3. *Ergasilus biuncinatus* Gadd. Meddelanden af Societas pro Fauna et Flora Fennica, xxvii. pp. 181–182 (1901). On *Gastrosteus aculeatus*.

4. *Bomolochus onosi* T. Scott, 20th Ann. Rep. Fish. Board of Scotland, p. 289, pl. xiii. figs. 19–22 (1902). On *Onos mustelus* and *Onos cimbrius*, Firth of Forth.
5. *Bomolochus zeugopteri* T. Scott, *loc. cit.* p. 290, pl. xiii. figs. 23–25. On *Zeugopterus punctatus*.

CALIGIDÆ.

6. *Caligus pacificus* Gissler, Amer. Nat. p. 886 (1883). On *Salmo*.
7. *Caligus labracis* T. Scott, *l. c.* p. 291, pl. xiii. figs. 26–29. On *Labrus mixtus* and *L. maculatus*.
8. *Anchicaligus nautili* Stebbing, Willey's Zool. Res. pt. v. pp. 667–670, pl. lxxi.
9. *Dinematura musteli lævis* Hesse, Rev. Sci. Nat. Montpellier, (2) ii. pp. 6, 11 (1880).
10. *Cecrops acanthiæ vulgaris* Hesse, Ann. Sci. Nat. (6) xv. 3, p. 26 (1883).
11. *Pandarus carcharii glaucus* Hesse, *l. c.* p. 18.
12. „ *musteli lævis* Hesse, *l. c.* p. 23.
13. „ *spinacis acanthiæ* Hesse, *l. c.* p. 10.
14. „ *unicolor* Hesse, *l. c.* p. 20. On *Galeus vulgaris*.

DICHELESTHIIDÆ.

15. *Lernanthropus polynemi* Rich. Zool. Anz. iv. 1881, p. 505. On *Polynemus*.
16. *Lernanthropus tetradactylus* (probably *L. trifoliatus* B.-S. 1898).
17. *Lernanthropus micropterygis* Rich. Atti Soc. Tosc. Sci. Nat. iv. p. 82 (1884). On *Micropteryx dumerili*.
18. *Lernanthropus tylosuri* Rich. *l. c.* p. 83. On *Tylosurus imperialis*.
19. *Kröyeria (Lonchidium) galii vulgaris* Hesse, Ann. Sci. Nat. (6) xvi. 3, p. 2 (1883).
20. *Clavella cluthæ* T. Scott, *l. c.* p. 292, pl. xii. figs. 26–31. On *Ctenolabrus rupestris*.
21. *Pagodina (Nemesis) charchariæ glauci* Hesse, *l. c.* p. 13.
22. *Eudactylina carchariæ glauci* Hesse, *l. c.* p. 11.
23. „ *musteli lævis* Hesse, *l. c.* p. 8.
24. „ *squatina angeli* Hesse, *l. c.* p. 5.
25. „ *similis* T. Scott, *l. c.* p. 295, pl. xii. figs. 1–19. On *Raia radiata*.
26. *Eudactylina acanthii* T. Scott, *l. c.* p. 296, pl. xiii. figs. 1–9. On *Squalus acanthias*.
27. *Bassettia congri* Stebbing, Willey's Zool. Res. pt. v. pp. 671, 672, pl. lxx.

PHILICHTHYIDÆ.

28. *Philichthys fialolæ* Rich. Zool. Anz. iii. p. 69 (1880). On *Stromateus fialola*.
29. *Philichthys doderleini* Rich. Zool. Anz. vi. p. 558 (1883). On *Labrus turdus*.

LERNÆIDÆ.

30. *Lernæa abyssicola* Brady, Chall. Rep. viii. p. 137. On *Ciralias uranoscopus*.
31. *Lernæa minuta* T. Scott, 18th Rep. Fish. Board of Scotland, p. 161, pl. vii. fig. 13 (1900). On *Gobius minutus*.
32. *Lernæa lumpi* T. Scott, 19th ditto, p. 128, pl. vii. fig. 12 (1901). On *Cyclopterus lumpus*.
33. *Hæmobaphes ambiguus* T. Scott, 18th ditto, p. 162, pl. vii. fig. 15. On *Callionymus maculatus*.
34. *Peraderma petersi* Rich. Zool. Anz. iv. 1881, p. 387. On *Gobius buccatus*.
35. *Peraderma bellottii* Rich. Zool. Anz. v. 1882, p. 475. On *Scopelus benotti*.

CHONDRACANTHIDÆ.

36. *Chondracanthus bleekeri* Rich. Zool. Anz. iv. p. 387 (1881). On *Chilium chlorurus*.
37. *Chondracanthus ninnii* Rich. Zool. Anz. v. p. 504 (1882). On *Gobius*.
38. *Chondracanthus ornatus* T. Scott, 20th Ann. Rep. Fish Board of Scotland, p. 298, pl. xiii. fig. 34. On *Callionymus maculatus*.

LERNÆOPODIDÆ.

39. *Achtheres sandræ* Gadd. Med. af Soc. pro Fauna et Flora Fennica, xxvii. (1901).
40. *Lernæopoda extumescens* Gadd. *l. c.* On *Coregonus*.
41. *Tracheliastes gigas* Rich. Zool. Anz. iv. 1881, p. 504.
42. *Charopinus dubius* T. Scott, 19th Ann. Rep. Fish Board of Scotland, p. 130, pl. vii. fig. 15. On *Raia circularis*.

5. On the Original Home of the Tiger.

By Col. C. E. STEWART, C.B., C.M.G., C.I.E.[1]

[Received December 6, 1902.]

The ordinary idea of English people that the Tiger was originally an Indian animal, is, I believe, quite a mistake. After careful enquiry, I have come to the conclusion that the Tiger is a comparatively late intruder into India.

Firstly, after enquiry, I can discover no Sanscrit word for the Tiger. If tigers had existed in India in the days when Sanscri was a spoken language, there would be a name in Sanscrit for it, while there is only a modern Hindustani name. There is a Sanscrit word for Lion, "Singha," which would point to the fact that lions were certainly more common than tigers in time long past. At present lions are not found in India, except a very few, which are strictly preserved in Googerat, one extreme

[1] Communicated by Col. HILL JAMES, F.Z.S.

corner of India, though I will allow that lions were probably commoner than they are now in the olden time, though probably never very numerous.

I remember, when I first went to India, nearly 50 years ago, a lion being killed not very far to the southward of Allahabad, but this was even then a rare occurrence. I have studied the question of the habitat of lions and tigers in Persia, where I resided for a good many years. Lions are found only in the very south of Persia, near the Persian Gulf, and Arabia; while tigers are only seen in the very north of Persia, near the Russian border, and especially near the Caspian Sea, on the north of Persia, and they are more numerous within British territory than within the Persian boundary, and tigers are more common in Southern Siberia than they are anywhere in Persia.

Tigers are more numerous in cold countries. They are plentiful in Corea, which has a severe winter climate, and still more plentiful in the Island of Saghalien, belonging to Russia, and further north than Corea, and which has almost an arctic climate in winter. The tiger is mentioned by Marco Polo in his travels, but nowhere as an Indian animal, and I very much doubt whether tigers were found in India at the time Marco Polo visited it.

In the Sanscrit works treating of the fighting between Rama and Rawun, the Demon King of Ceylon, though many animals are mentioned, such as bears, monkeys, and several others, I have been unable to find any mention of the tiger; and the tiger is not found in the Island of Ceylon, though the leopard is; nor is the tiger found in the larger island of Borneo, which would seem to point to its only inhabiting the islands of the Indian Archipelago, which it could reach by swimming. Thus it would seem that tigers did not exist in India before the time that Ceylon was separated from India. Tigers did not exist in the island of Singapore until about 1809, when apparently they swam over from the mainland. Tigers are such good swimmers that they can cross a considerable body of water. I do not think any allusion to tigers in India can be found in the Greek historians. I should feel much obliged if anyone could find me such a reference.

In the monuments of the Assyrian Kings, and of the Kings of Persia, there are constant references to lion-hunts by those kings, but never allusion to a tiger-hunt. Of course there is an existing Persian word for tiger, but there is nothing to show that it is at all ancient.

My own idea is that the tiger was originally a purely northern animal, which has gradually extended southward. I fancy that no allusion to a tiger in India can be traced to a period anterior to the early Mahommedan conquerors of India. I should be much obliged to anyone who will help me to clear up this question. We English have so completely assumed the idea that the tiger is an Indian animal, that we have called him the Royal Bengal Tiger, though I firmly believe he is as much an intruder from the north into Bengal as we are ourselves.