SOME ADDITIONS to the FAUNA of LIVERPOOL BAY,

COLLECTED MAY 1ST, 1900, TO APRIL 30TH, 1901.

By ANDREW SCOTT.

[Read May 10th, 1901.]

SINCE the publication of the paper by I. C. Thompson, F.L.S., and myself in the Transactions of the Society for last year,* further additions to the published lists have turned up. The new records, chiefly Crustacea, were found while carrying on various investigations connected with fisheries work in the Piel Laboratory, partly during the past year and earlier portion of the present one.

This report represents an addition of thirty species not previously recorded for the district. All of these have come under my own observation. The additions include, one sporozoan fish parasite, six worm parasites of fishes, and twenty-two crustaceans, represented by one Macrurid, two Sympoda, one Branchiurid, four Ostracoda, and fourteen Copepoda. Of the Copepoda, only two are non-parasitic; the other twelve are parasites on various fishes. The latter include one new species and another for which a new genus is now established. A number of the additions are here recorded for the first time from the sea round the English coasts.

* Some Recent Additions to the Fauna of Liverpool Bay. Trans. L'pool Biol. Soc., vol. xiv., 1900, p. 139.

PROTOZOA.

1.—*Glugea lophii*, Doflein.†

Glugea lophii, Mrázek, Sporozoenstudien II. Sitz. d. Konigl. Böhmischen Gesellschaft d. Wissenschaften. Mathematisch-naturwissenschaftliche classe (1899).

The cysts of this protozoan were found imbedded in the posterior region of the brain of the Angler fish (*Lophius piscatorius*) forming a conspicuous mass, easily visible to the naked eye when the brain had been dissected out. Very much larger masses of cysts were found surrounding the main trunks of the seventh nerve just outside the skull. The fish measured about two feet in length, and was caught on the offshore station between Lancashire and the Isle-of-Man, April 19th, 1901. Mrázek obtained his specimens from *Lophius* caught at Triest and Naples.

VERMES (*Trematoda*).

2.—**Dactylocotyle pollachii*, Van Beneden and Hesse.

Dactylocotyle pollachii, Van Beneden and Hesse, Recherches sur les Trématodes, p. 110, pl. xi., figs. 23-30 (1863).

Attached to the gills of Pollack (*Gadus pollachius*) caught on the offshore stations between Lancashire and Isle-of-Man, March 13th and April 19th, 1901.

3.—*Octobothrium merlangi* (Kuhn).

Octostoma merlangi, Kuhn, Mém. Mus. d'hist. nat., vol. xviii. (1830.)

Attached to the gills of Whiting (*Gadus merlangus*) from the offshore stations between Lancashire and Isle-of-Man, March 13th, 1901. This species has been recorded from the Firth of Forth, by Mr. T. Scott, F.L.S., in Thirteenth Annual Report, Fishery Board of Scotland (Part III.).

† J. Doflein, Studien zur Naturgeschichte des Protozoen: III. Ueber die Myxosporidien Zool. Jahrb. Bd. xi. (1898.)

4.—**Octobothrium scombri* (Kuhn).

Octostoma scombri, Kuhn, Mém. Mus. d'hist. nat., vol. xviii. (1830).

Attached to the gills of Mackerel caught off the Manx coast, August, 1900. This is a very slender species and unless the gills are carefully examined will be easily overlooked.

5:—**Onchocotyle appendiculata* (Kuhn).

Polystoma appendiculatum, Kuhn, Mém. Mus. d'hist. nat. vol. xviii., p. 362 (1830).

Attached to the gills of Grey Skate (*Raia batis*), caught on the offshore stations between Lancashire and Isle-of-Man, February, 1900. It is easily identified by having, in addition to the six suckers at the posterior end, a slender median appendage arising from between the suckers and passing in an anterior direction.

6.—**Phyllonella soleæ*, Van Beneden and Hesse.

Phyllonella soleæ, Van Beneden and Hesse, Recherches sur les Trématodes, p. 70, pl. v., figs. 1-8 (1863).

Attached to the scales on the "white side" of the Common Sole (*Solea vulgaris*), caught on the offshore stations between Lancashire and Isle-of-Man, April 19th 1901.

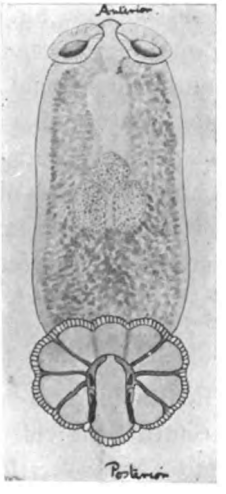
7.—? *Placunella pini*, Van Beneden and Hesse.

Placunella pini, Van Beneden and Hesse, Recherches sur les Trématodes, p. 72, pl. v., figs. 9-18 (1863).

Attached to the gills of Yellow Gurnard (*Trigla hirundo*), caught on the offshore stations between Lancashire and Isle-of-Man, April 19th, 1901.

This species differs in some respects from the figure of *Placunella pini* given by Van Beneden and Hesse, as will be seen from the appended drawing, and may turn out to be a different species. There are eight distinct and two

indistinct rays in the large posterior sucker. Van Beneden and Hesse (op. cit.) give a description with figures of *Trochopus tubiporus* (Diesing) from the Yellow Gurnard, but the above species does not appear to be that form.



? Placunella pini, Van Beneden and Hesse, from ventral surface. × 16.

There is no doubt that by careful examination of the various fishes taken in the local sea, other trematode parasites will in time be found. Practically every species of fish has its own peculiar parasites, but some are more easily overlooked than others on account of their small size and resemblance to the particular region they adhere to.

Crustacea (*Macrura*).

8.—*Upogebia deltäura* (Leach).

Gebia deltäura, Leach, Malac. Podolph. Brit., t. xxxi., fig. 9, 10.

An almost perfect specimen of this curious lobster-like crustacean, measuring two inches in length, was found in

the stomach of a haddock caught on the offshore station between Lancashire and Isle-of-Man, March 13th, 1901.

The *Upogebia* had evidently just been swallowed by the fish, as it was perfectly fresh, and the gastric juices had not had time to act upon the carapace. It belongs to the Callianassidæ, a family of Crustacea which burrow under the surface of the sea bottom, and as Rev. T. R. R. Stebbing remarks, "are more often obtained from the stomachs of fishes than by intentional methods of capture."

There is some doubt whether this species is really distinct from *Upogebia stellata* (Montagu), but the present form, which has the inner branches of the uropods deltoid in shape, agrees better with the species described by Leach than with Montagu's *U. stellata.*

Sympoda.

The Rev. T. R. R. Stebbing in his memoir on some crustacea from the South Seas collected by Dr. Willey (Willey's Zool. Results, part V., 1900), has shown that *Cuma*, so familiar as the name of a genus of Crustaceans, is preoccupied; and as the subordinal name *Cumacea* is derived from *Cuma* and must also lapse, he adopts the name *Sympoda* for this sub-order instead of *Cumacea.*

9.—*Eudorellopsis deformis* (Kröyer).

Leucon deformis, Kr., Nat. Tidsskr, vol. 2 (2nd series), p. 194, pl. 4 (1846).

This peculiar little form, though probably widely distributed, is apparently rare. Only one specimen has so far been found in the Irish Sea. It is easily recognised, when mixed with *Eudorella*, by the turned up rostrum.

In bottom material collected N.W. of Bahama Lightship, off the north end of the Isle-of-Man.

10.—*Pseudocuma similis*, G. O. Sars.

Pseudocuma similis, G. O. Sars., Crustacea of Norway, vol. iii. (Cumacea), p 76, pl. 53 (1900).

It is probable that this Cumacean has been passed over as a deep-water form of *Pseudocuma cercaria* (Van Beneden), which is occasionally met with in the sandy bays round the Lancashire coast. Professor G. O. Sars, in his work on the Crustacea of Norway, now separates it from that species, and shows its distinguishing characters. One of these is the presence of three small but quite distinct teeth at the anterio-lateral angles of the carapace.

In the same gathering as the last. Two specimens were found.

OSTRACODA.

11.—*Cythere pellucida*, Baird.

Cythere pellucida, Baird, British Entomostraca, p. 173, pl. xxi. fig. 7 (1849).

This form is very abundant, especially during the summer months on the muddy sand flats along the coast.

Common on the mud flats near Piel, practically throughout the year.

12.—*Cythere porcellanea*, Brady.

Cythere porcellanea, Brady, Ann. and Mag. Nat. Hist., ser. iv., vol iii., p. 47, pl. vii., figs. 1-4.

Usually associated with *C. pellucida*. Some care has to be taken in identifying the two forms owing to the amount of variation that occurs amongst the two species.

In the same locality as the last. August, 1900.

13.—*Cythere gibbosa*, Brady and Robertson.

Cythere gibbosa, B. and R., Ann. and Mag. Nat. Hist., ser. iv. vol. iii., p. 368, pl. xxi., figs. 1-3.

This ostracod is frequently found in gatherings from the mud flats left dry by the receding tide associated with *C. pellucida* and *C. porcellanea*, but is easily distinguished from either of these species.

In tidal pools near Piel. August, 1900.

14.—*Cytheropteron humile*, Brady and Norman.

Cytheropteron humile, B. and N., Monog. of the Marine and F. W. Ostracoda. Trans. Roy. Dublin Soc., vol. iv., ser. ii., p. 219, pl. xx., figs. 4-7 (1889).

Many specimens of this remarkable little ostracod were found by washing waterlogged and decayed wood in weak spirit, and examining the sediment. This appears to be the true habitat of the species. My father, who first found the species in material dredged in the Clyde, tells me that he always finds it when examining the sediment washed from old wood brought up in the trawl net, and remarks that it seems to be partial to that kind of habitat.

In waterlogged wood burrowed by wood-boring crustacea, collected between tide marks in Barrow Channel, near Piel, April 18th, 1901.

Branchiura.

15.—*Argulus foliaceus* (Linn).

Monoculus foliaceus, Linn. Syst. Nat., edit. 10th, 1,643, No. 2 (1758).

On Trout from the Ribble, which were sent to University College, Liverpool, for examination. June, 1900.

Copepoda (Free).

16.—*Stephus gyrans* (Giesbrecht).

Mobianus gyrans, Giesb. Pelagischen Copepoden des Golfes von Neapel (1893).

Amongst material collected in *Laminaria* bed, near Piel, at a very low ebb. August, 1900.

17.—*Idya minor*, T. and A. Scott.

Idya minor, T. and A. Scott, Annals of Scottish Natural History Oct., 1896.

In the same material as the last species.

Copepoda (Parasitic).

18.—*Bomolochus soleæ*, Claus.

Bomolochus soleæ, Claus, Zeitschrift fur Wissenschaft Zool. vol. xiv., p. 374.

A number of specimens of this Copepod can usually be found by pressing the nostrils of Cod, so that mucus, &c., may be ejected. The mucus is then placed in a drop of water, and the copepods, if present, are easily seen. The females have two large white egg sacs.

From small cod caught in Barrow Channel, August, 1900; and also in the nostrils of large cod caught on the offshore fishing grounds between Lancashire and Isle-of-Man, March, 1901.

19.—*Caligus minimus*, Otto. Pl. 1, figs. 1-8.

Caligus minimus, Otto, Beschreibung neuer Crustacean, p. 354, pl. xxii. 1828.

This is a well marked species, and may easily be distinguished from other Caligi by the long slender antennules and large caudal stylets. The second foot-jaws in the male are powerful grasping appendages.

Frequent in the mouth of the Bass (*Labrax lupus*), caught in Barrow Channel, August, 1900.

Length of female, 4·9 mm.; male, 6·9 mm. It is rather unusual to find the males of copepod fish parasites larger than the females.

20.—*Caligus brevicaudatus*, n.sp. Pl. II., figs. 7-10.

Length of female, 5·3 mm. The characters which distinguish this species from the other members of the genus are, 1° the extremely short abdomen and caudal stylets; 2° the fourth pair of feet, the expodite of which is very slender.

Inside the mouth of the Common Gurnard (*Trigla gurnardus*) caught in the vicinity of Piel, August, 1901.

Pseudocaligus, nov. gen.

Animal similar to *Caligus*. The general structure of the various appendages, with the exception of the fourth pair of feet, is the same as in that genus. Fourth pair of feet very rudimentary, almost obsolete, consisting of a basal portion only; no exopodite, as in *Caligus*.

21.—*Pseudocaligus brevipedes* (Basset Smith). Pl. II., figs. 1-6.

Caligus brevipedes, B. Smith, Ann. and Mag. Nat. Hist. (6), vol. xviii., p. 11, pl. iii., fig. 1 (1896).

A number of specimens of this species were found inside the operculum of a three-bearded Rockling (*Onus tricirratus*), caught in Barrow Channel, August, 1900. Also on another one sent me by Mr. Chadwick, Port Erin, March, 1901.

Length of female, 3·6 mm.; male, 2·8 mm.

22.—*Lepeophtheirus pollachii*, Basset Smith.

Lepeoptheirus pollachii, B. Smith, Ann. and Mag. Nat. Hist. (6), vol. xviii., p. 12, pl. iv., fig. 1 (1896).

Attached to the inside of the mouth of Pollack (*Gadus pollachius*), caught on the offshore stations between Lancashire and Isle-of-Man, March, 1900, March and April, 1901.

23.—*Cycnus pallidus* (Van Beneden).

Congericola pallidus, Van Ben., Bull. Acad. Roy. Belg., vol. xxi. pl. 11 (1854).

On the gills of the Conger (*Conger vulgaris*), caught in the Barrow Channel, March, 1900; also on Congers from the offshore stations, caught at various times during the past two years. A number of specimens were found on each fish examined. It is a small, slender species, and easily overlooked.

24.—*Oralien asellinus* (Linn).

Lernæa asellina, Linn. Fauna Suec., 2101 (1761).

On the gills of a Yellow Gurnard (*Trigla hirundo*) from the offshore station between Lancashire and Isle-of-Man, April 19th, 1901. This appears to be a very variable species, and the figures given by various writers on fish parasites all show differences, more or less marked. The species, therefore, requires further study, as it is possible that there is more than one *Oralien*.

25.—*Chondracanthus cornutus* (Muller).

Lernæa cornuta, Muller, Zool. Dan., vol. i. (1776).

On the gills of Plaice (*Pleuronectes platessa*) from the offshore station between Lancashire and Isle-of-Man, March, 1900. What appears to be a variety of this species occurs on the gills of the Flounder (*P. flesus*) from the Barrow Channel and other parts of the Lancashire coast.

26.—*Chondracanthus clavatus*, Basset Smith.

Chondracanthus clavatus, B. Smith, Ann. and Mag. Nat. Hist. (6), vol. xviii., p. 13 (1896).

On the gills of Lemon Soles (*Pleuronectes microcephalus*) from the offshore station between Lancashire and Isle-of-Man, February, 1900, and also from Barrow Channel.

27.—*Chondracanthus soleæ*, Kröyer.

Chondracanthus solæa, Kr., Naturh. Tidsskr. I., p. 139 (1838).

On the gills of the Common Sole (*Solea vulgaris*) from the offshore station between Lancashire and Isle-of-Man, April 19th, 1901.

28.—*Charopinus dalmannii* (Retzius).

Lernæa dalmannii, Retz. Froriep's Notizen, vol. xxix. (1831).

In the spiracles of the Grey Skate (*Raia batis*) from the offshore station between Lancashire and Isle-of-Man, February, 1900.

30.—**Brachiella insidiosa*, Heller.

Brachiella insidiosa, Heller, Reise der Novara, p. 239 (1865).

On the gills of the Hake (*Merluccius vulgaris*) from the vicinity of Calf of Man, 1900.

30.—**Brachiella ovalis*, Kröyer.

Anchorella ovalis, Kröyer, Naturh. Tidsskr., 1, p. 289 (1837).

Attached to the gill-rakers of the Common Gurnard (*Trigla gurnardus*) from the offshore stations, April, 1901. Also from the gill-rakers of the Yellow Gurnard, caught off Conway.

NOTE.—The species recorded as *Chondracanthus radiatus*, Kr., in the paper by Mr. Thompson and myself, published in the Transactions last year, turns out to be *Chondracanthus merluccii*, Holten.

The species marked with an asterisk are described and figured by my father, Mr. T. Scott, in the XIX. Ann. Rept. Fishery Board for Scotland, part iii. For other fish parasites see XVIII. Ann. Rept. F.B.S.

PIEL LABORATORY,

May 1, 1901.

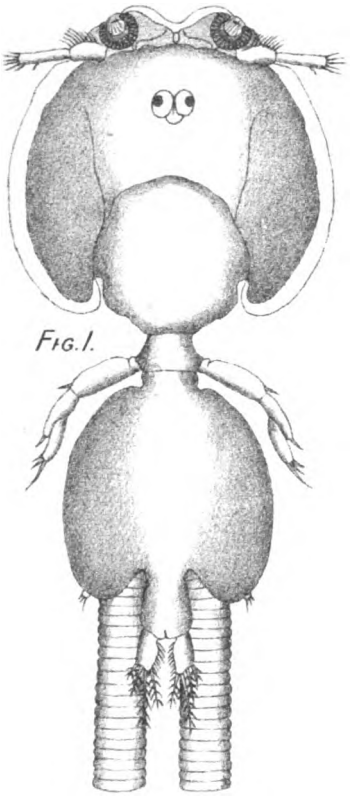


FIG. 1.

FIG. 5.

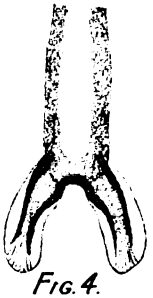


FIG. 4.

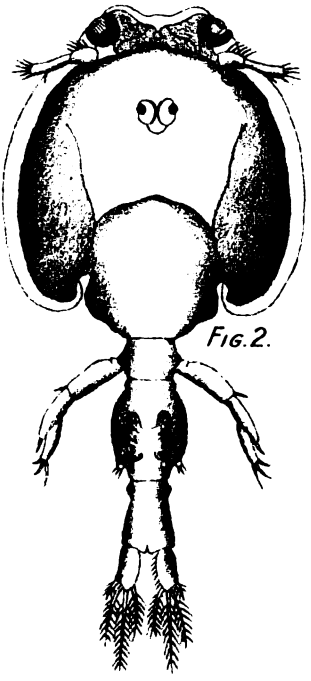


FIG. 2.

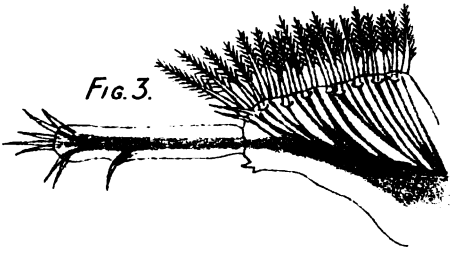


FIG. 3.

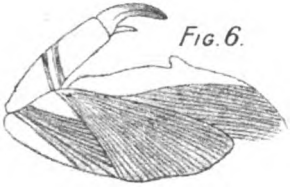


FIG. 6.

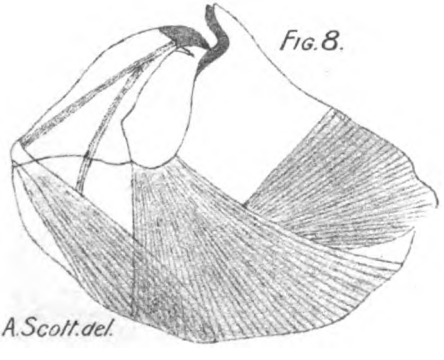


FIG. 8.

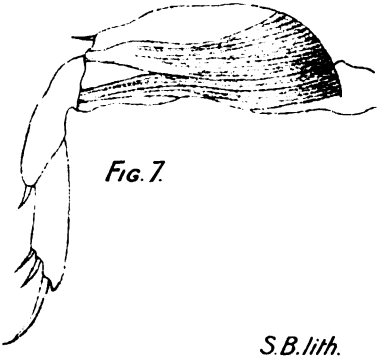
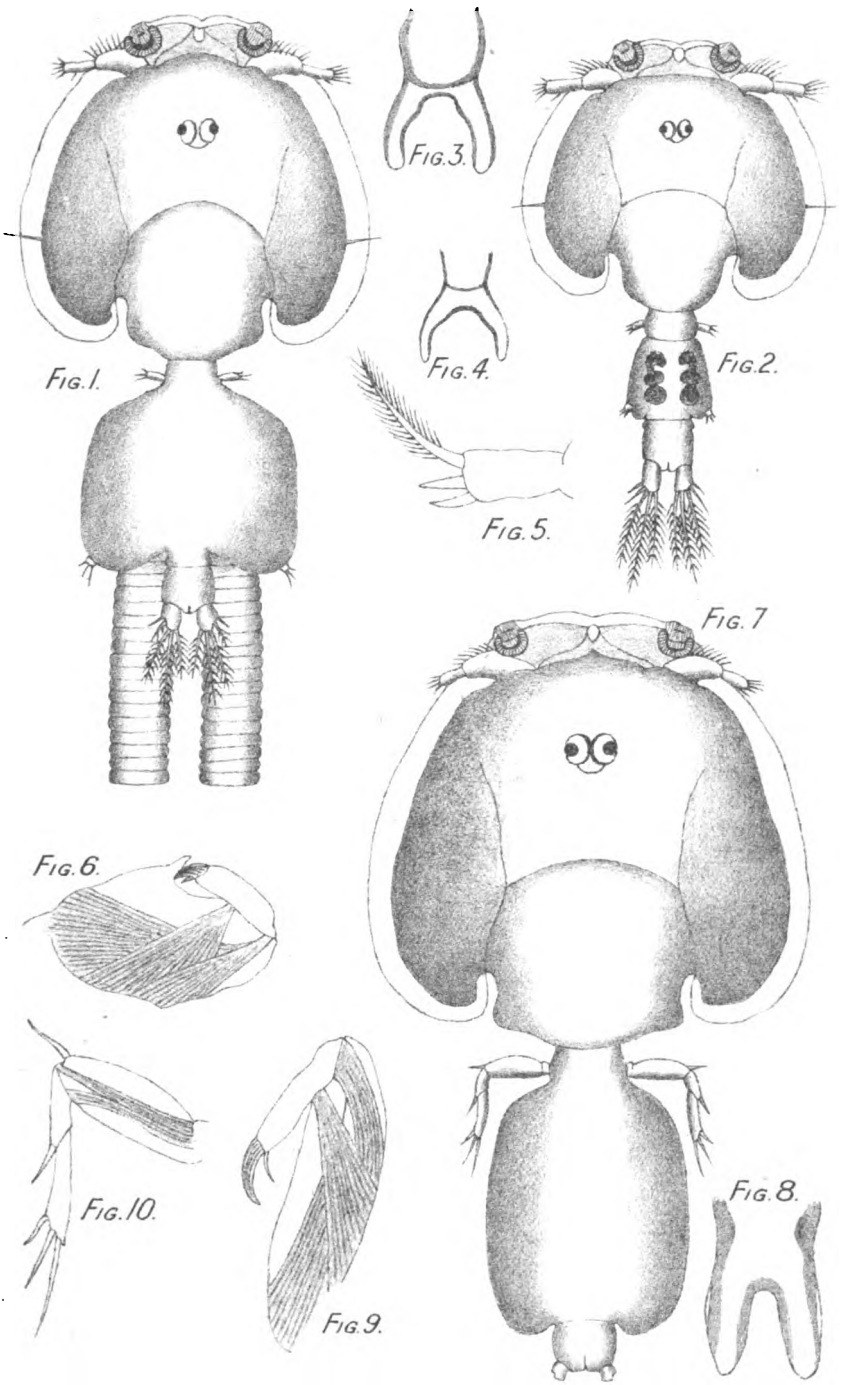


FIG. 7.

A. Scott. del.

S.B. lith.

CALIGUS MINIMUS, OTTO.



FIGS. 1-6. PSEUDOCALIGUS BREVIPEDES (B. SMITH).

,, 7-10. CALIGUS BREVICAUDATUS, n. sp.

Explanation of Plates.

Plate I.

Caligus minimus, Otto.

Fig.	1.	Mature female, dorsal view	× 19·25
Fig.	2.	Mature male, dorsal view	× 12·8
Fig.	3.	Antennule	× 100
Fig.	4.	Sternal fork, female	× 100
Fig.	5.	Sternal fork, male	× 100
Fig.	6.	Second maxilliped, female	× 77
Fig.	7.	Fourth foot	× 71
Fig.	8.	Second maxilliped, male	× 51

Plate II.

Pseudocaligus brevipedes (Basset Smith).

Fig.	1.	Mature female, dorsal view	× 22
Fig.	2.	Mature male, dorsal view	× 22
Fig.	3.	Sternal fork, female	× 77
Fig.	4.	Sternal fork, male	× 77
Fig.	5.	Fourth foot	× 145
Fig.	6.	Second maxilliped, male	× 77

Caligus brevicaudatus, n.sp.

Fig.	7.	Mature female, dorsal view	× 19·25
Fig.	8.	Sternal fork, female	× 77
Fig.	9.	Second maxilliped, female	× 75
Fig.	10.	Fourth foot	× 51