# RECENT ADDITIONS

TO THE

# COPEPODA

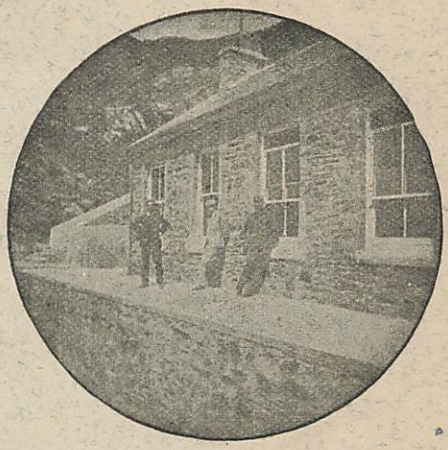
—OF—

# LIVERPOOL BAY.

—BY—

ISAAC C. THOMPSON, F.L.S., F.R.M.S.

*PLATES VI and VII.*



PORT ERIN BIOLOGICAL STATION.

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# RECENT ADDITIONS to the COPEPODA of LIVERPOOL BAY.

By Isaac C. Thompson, F.L.S., F.R.M.S.

With Plates VI and VII.

[Read November 9th, 1894.]

Since the Revised Report on the Copepoda of Liverpool Bay was published last year, twenty-four species new to the district have been recorded, one of these, *Pseudocyclopia stephoides*, being new to science.

Surface tow-nets have been continuously employed during the several marine expeditions undertaken by the Committee, also tow-nets attached to the rope a few fathoms above the dredge. The latter device has proved a success, collecting some good species of Copepoda, as well as Cumacea and Amphipoda, which are seldom or never obtained on the surface. Amongst the Copepoda thus obtained were several specimens of *Pseudocalanus armatus*, found along with a shoal of *Pseudocalanus elongatus*. A widely extending shoal of *Anomalocera patersonii* was observed off the Isle of Man in May, the only occasion on which we have taken this species during the year. On several occasions, notably in the early part of June, the surface organisms have been singularly scarce.

Special care has been taken to wash and sieve through fine silk as much as possible of the material brought up by the dredge during marine expeditions, and it is by this means that several of the above-mentioned Copepoda, new to the district, have been obtained, as well as the new species *Pseudocyclopia stephoides*.

Mr. Andrew Scott, "Fisheries" Assistant at University College, has worked through a large amount of material collected at low water and on various marine expeditions, with excellent results, the majority of those here mentioned having been found by him. To his kindness and skill in delineation I am also indebted for the drawings from which the plates accompanying this paper are engraved.

## Description of Species.

## COPEPODA.

### Family Pseudocyclopiidæ.

*Pseudocyclopia stephoides*, n. sp. (Pls. VI and VII, figs. 1 to 14).

Length, exclusive of caudal setæ, 1·2 mm. Cephalothorax robust, four-jointed, the first segment being two-thirds the combined length of the other three. Abdomen five-jointed in the male (fig. 14), four-jointed in the female (fig. 13); the lower portion of the first joint in the male abdomen (fig. 14) is covered with fine very short hairs or spines; the first joint in the female abdomen is about equal in length to that of the combined succeeding three-joints. Rostrum short.

Anterior antennæ (fig. 2) of moderate length, twenty jointed. Basal joint large, almost equal in length to the succeeding six joints, and bearing three plumose setæ and one shorter seta; the seventh, ninth, thirteenth, and twentieth joints have long sensory filaments; the nineteenth joint has one plumose seta; each joint bears one or more ordinary setæ. The proportional lengths of the joints are about as follows:—

| 24 | 5 | 3 | 3 | 4 | 5 | 6 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

Primary branch of posterior antennæ (fig. 3) two-jointed, in this respect and no other differing from the generic

character of *Pseudocyclopia*, Scott, in which the primary branch is described as being three-jointed. The basal joint has two marginal setæ, the terminal joint having a number of apical setæ. Secondary branch large, five-jointed, the first, second, and apical joints being about twice as long as broad, the third and fourth about half as long as broad.

Mandibles (fig. 4) large, consisting of a broad biting part furnished with two plumose spines, and a two-branched palp, one of the branches being two, the other four-jointed.

Anterior foot-jaw (fig. 5) four-jointed, with several marginal processes, bearing long setæ, some finely plumose, the third joint having two powerful serrated claw-like spines; the fourth joint very small, and terminated with two long setæ. The posterior foot-jaw (fig. 6) is seven-jointed, the basal joint large, about twice as long as broad, bearing several marginal spines, the upper distal angle protruding upwards, and terminated by three long setæ, the lower one plumose. The second joint is about equal in length to the first, and little more than half its width; the inner margin clothed with short setæ, and having three long plumose setæ; the five terminal joints are small, their combined length being rather less than the first or second joints, and all thickly clothed with long setæ.

The swimming feet are very similar to those of *P. crassicornis*, Scott. The outer branch of the first pair (fig. 7) is three-jointed, each joint being provided with a stout dagger-like spine at the outer distal angle; the inner branch is one-jointed, and rather longer than the first joint of the outer branch. The outer branch of the second pair (fig. 8) is also three-jointed; each of the first and second joints bear one, and the last joint four, stout serrated spines of variable length, the terminal one being

serrated only on the inner side; the inner branch is two-jointed, about half the length of the outer branch, its inner joint being about half as long as the outer one. The densely plumose setæ in the second, third, and fourth swimming feet are all jointed at about one-third of their length. The third (fig. 9) and fourth pairs (fig. 10) have both branches three-jointed. The outer branch in both pairs is very similar to that of the second pair. The inner branch of the fourth pair (fig. 10) has a strong hairy spine at the distal angle of the first and second joints in place of jointed seta in the fourth pair. Each of the fifth pair in the female (fig. 12) is one-branched, two-jointed, the first joint short, about as long as broad, with a spinous prolongation in the centre on the inner side. A similar projection, as well as a smaller one occur on each inner side of the segment from which the fifth feet spring. The second joint of the fifth pair is produced into three plumose spines (without articulation), the inner terminal one being longer than the two outer lateral ones. Each of the fifth pair of feet in the male (fig. 11) is one-branched and four-jointed, and together form a powerful clasping organ. The right foot is long and slender, the terminal joint being about the combined length of the other three; its centre portion almost forms a semi-circle, the continuation being a long sharp spine. The left foot is shorter; there are several setæ and a short blunt spine on the third joint; the fourth, which is small, terminating in a curved claw-like prolongation, with a sharp spine near the apex.

The caudal stylets (fig. 13) in the female are about as long as broad, those of the male (fig. 14) being rather longer; each bears three long and one short plumose setæ.

Three specimens only, two males and one female, were found in washings from dredged material taken outside Port Erin, in 15 fathoms, in March, 1894.

It was by no means easy to decide into which genus to place this well-marked species, as it has strong points of resemblance in common with the three genera, Pseudocalanus, Stephos, and Pseudocyclopia. With Pseudocyclopia it agrees in all points excepting in the number of joints in the anterior antennæ, and the primary branch of the posterior antennæ, and, as in general appearance and in the first four pairs of swimming feet, it strongly resembles Pseudocyclopia, I have decided provisionally to place it in that genus. Its fifth pair of feet, however, are more like those of Stephos.

In the Twelfth Annual Report of the Fishery Board for Scotland, Mr. Thomas Scott has added a new species belonging to this genus, recently found by him in the Forth area.

As the genus Pseudocyclopia forms a sort of missing link between the families Calanidæ and Misophriidæ, Scott has wisely constituted a new family, the Pseudocyclopiidæ, for its reception. The species of Pseudocyclopia, described by Scott having respectively sixteen and seventeen joints in the anterior antennæ, he has made that number a family character. The species here described has, however, twenty joints in the anterior antennæ, and as it otherwise agrees in all respects with the family characters of Pseudocyclopiidæ, I would suggest that the words "sixteen to seventeen jointed" be altered to "sixteen to twenty jointed" as a character of this new family.

### Family Cyclopidæ.

*Cyclops magnoctavus*, Cragin.

One or two specimens of this brackish species were found along with quantities of *Temorella affinis* and *Tachidius brevicornis* in tow-net gatherings sent to me

by Mr. Ascroft, taken by him in low water marine pools at Lytham. It is evident that a considerable amount of fresh-water finds its way into the Lytham pools.

*Cyclops ewarti*, Brady.

This species, first taken in the Forth estuary, was suspected by Brady to have a fresh-water origin. Ours are evidently strictly marine, two specimens, both males, having been dredged at 20 fathoms off Port Erin.

Family HARPACTICIDÆ.

*Longipedia minor*, T. & A. Scott.

A few specimens of this species were collected by hand-net in the rock-pools at Hilbre Islands in March, by Mr. A. Scott. It is easily distinguished from *L. coronata*, Claus, by its much smaller size.

*Canuella perplexa*, T. & A. Scott.

Frequently found in dredged material taken about Port Erin. It has probably been overlooked from its general resemblance to *Longipedia coronata*, the points of difference being enumerated by Scott.

*Ectinosoma normani*, T. & A. Scott.

Several specimens were obtained by Mr. A. Scott in material from Barrow Channel, collected in May by Professor Herdman, and I have also dredged it off Port Erin. When fresh this species has a brilliant red spot on the lower angles of the cephalothorax, and in this respect it agrees with *E. erythrops*, Brady.

*Ectinosoma elongata*, A. & T. Scott.

One specimen was found in material from pools at Hilbre Island.

*Ectinosoma gracile*, T. & A. Scott.

One or two specimens of this species were obtained among dredged material collected at Port Erin by Professor Herdman.

*Ectinosoma pygmæum*, T. & A. Scott.

This species was obtained from the same material as the last, and is the smallest known *Ectinosoma*: it measures only $\frac{1}{100}$th of an inch (·33 mm.).

*Ectinosoma herdmani*, T. & A. Scott.

One specimen was found in dredged material taken off Port Erin.

*Bradya minor*, T. & A. Scott.*

A few species of this new *Bradya* were obtained in rock-pools at Hilbre Island, along with *Longipedia minor*.

*Ameira longicaudata*, Scott.

One specimen was found in material dredged at 15 fathoms between Port Erin and Peel.

*Dactylopus rostratus*, T. Scott.

A single specimen was obtained among some dredged material collected at Port Erin by Professor Herdman, at Easter, 1894.

*Diosaccus propinquus*, T. & A. Scott, *Ameira exigua*, T. Scott, *A. longiremis*, T. Scott, *Laophonte inopinata*, T. Scott, *Pseudowestwoodia pygmæa*, T. & A. S., and possibly a new *Laophonte*, and one or two other doubtful species were obtained from washings from sponges collected by Dr. Hanitsch at Port Erin in August, 1894.

## Family Hersiliidæ.

*Cancerilla tubulata*, Dalyell.

The first record of this rare Copepod occurs in Dalyell's "Powers of the Creator," 1851, and it has since been taken by Mr. Gamble at Plymouth, but not before in our district. I found it lately on examining the results of

* The above species of *Ectinosoma* and *Bradya* are figured and described in a revision of the British species of Copepoda belonging to the two genera *Ectinosoma* and *Bradya*, T. & A. Scott, which is to be published at an early date.

a recent expedition from Port Erin. Large quantities of ophiuroids, chiefly *Ophiocoma nigra* and *Ophiothrix fragilis*, were amongst the dredged material, and it is probably from one or other of these that the two specimens of *Cancerilla tubulata*, Dalyell, male and female, were taken, as the species is parasitic on ophiuroids. It has recently been fully described and figured in "Les Copépodes du Boulonnais," by Dr. Eugène Canu.

Family SAPPHIRINIDÆ.

*Pseudanthessius sauvagei*, Canu.

A few specimens were obtained by washing a number of *Spatangus purpureus*, which were trawled in the central area, 21 miles W.N.W. from Morecambe Bay Lightship, on April 3rd. This rare species was only added to the British fauna last year, when it was found in the Firth of Forth, and the present is the second time it has been observed in the British area.

*Lichomolgus* (*Doridicola*) *agilis*, Leydig, was found in the bottom tow-net, Morecambe Bay, May, 1894.

Family ARTOTROGIDÆ.

*Acontiophorus elongatus*, Scott.

One specimen was found among the strained washings of *Pecten maximus*, dredged at 15 fathoms, off Port Erin.

Family CALIGIDÆ.

*Lepeoptheirus pectoralis.*

Several specimens, male and female, were found on the flounder, taken off Morecambe, and also from *Arnoglossus megastoma*, at Professor Herdman's Fisheries Laboratory.

Family LERNÆIDÆ.

*Anchorella appendiculata.*

Several specimens were found attached to the gills of the hake at Professor Herdman's Fisheries Laboratory.

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EXPLANATION OF PLATE VI.

*Pseudocyclopia stephoides*, n.sp.

Fig. 1. Adult male.
Fig. 2. Anterior antenna.
Fig. 3. Posterior antenna.
Fig. 4. Mandible and palp.
Fig. 5. Anterior foot-jaw.
Fig. 6. Posterior foot-jaw.
Fig. 7. Foot of first pair.

EXPLANATION OF PLATE VII.

*Pseudocyclopia stephoides*, n.sp.

Fig. 8. Foot of second pair.
Fig. 9. Foot of third pair.
Fig. 10. Foot of fourth pair.
Fig. 11. Fifth pair of feet, male.
Fig. 12. Fifth pair of feet, female.
Fig. 13. Abdomen and caudal stylets, female.
Fig. 14. Abdomen and caudal stylets, male.

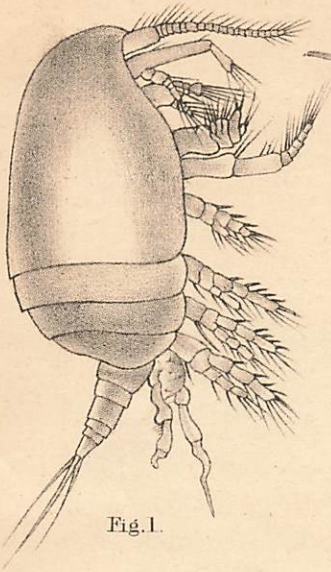

Fig. 1.

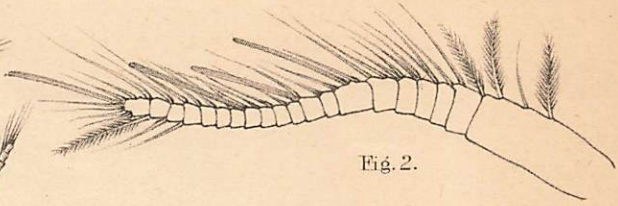

Fig. 2.

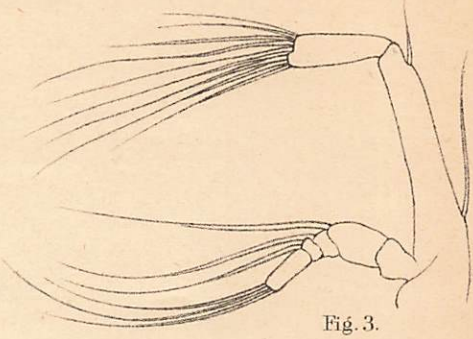

Fig. 3.

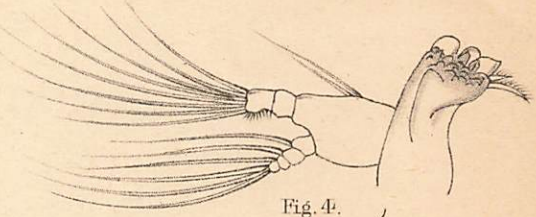

Fig. 4.

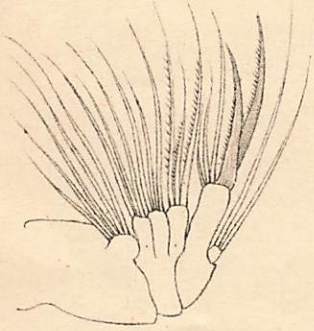

Fig. 5.

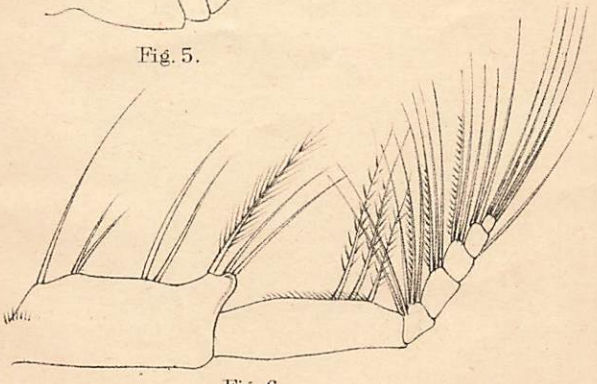

Fig. 6.

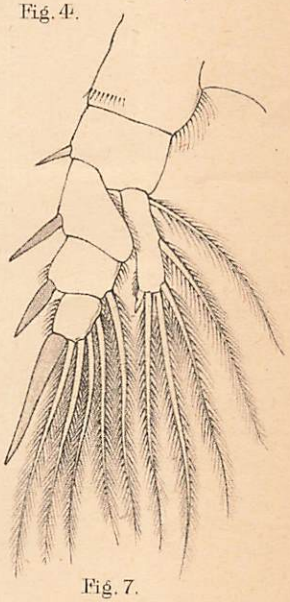

Fig. 7.

*A. Scott, del ad nat.*

W. & A.K. Johnston, Edinburgh & London

PSEUDOCYCLOPIA STEPHOIDES, n. sp.

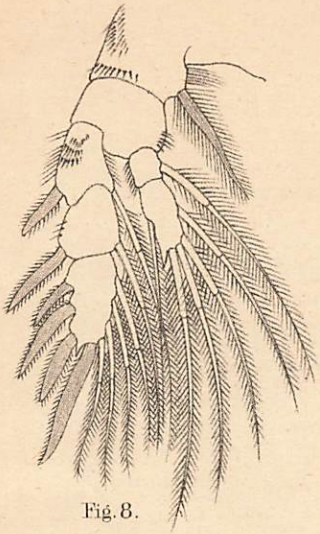

Fig. 8.

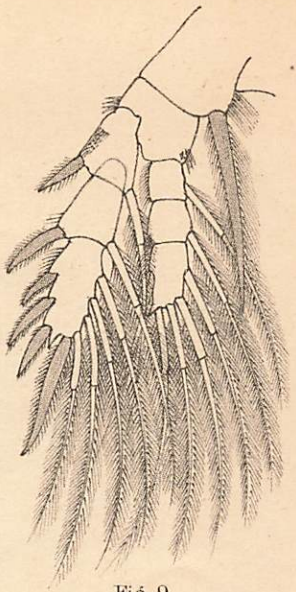

Fig. 9.

Fig. 10.

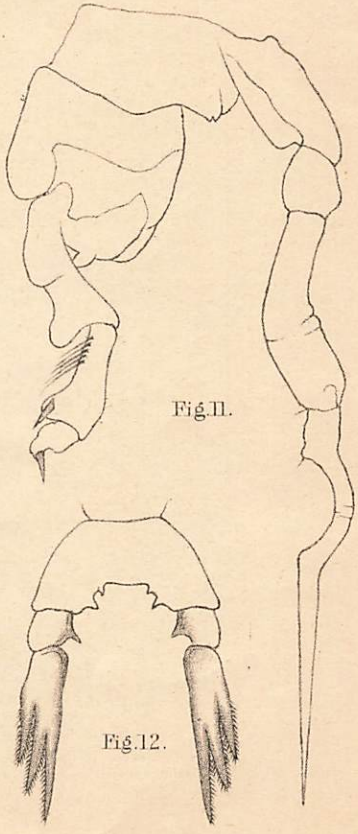

Fig. 11.



Fig. 12.

Fig. 13.

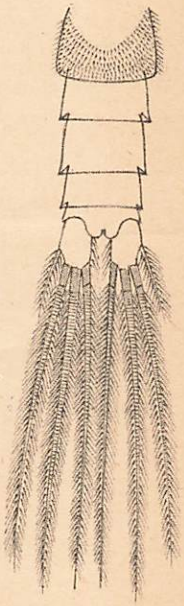

Fig. 14.

*A. Scott, del ad nat.*

PSEUDOCYCLOPIA STEPHOIDES, n. sp.