

II. *On some Entomostraca collected by DR. SUTHERLAND, in the Atlantic Ocean.* By JOHN LUBBOCK, Esq. F.G.S.

[Read January 7th, 1856.]

DR. SUTHERLAND, already so well known for his labours in the Arctic regions (having been appointed Government Surveyor at Port Natal), employed some of his time during the voyage there in collecting *Crustacea*. The *Entomostraca* thus obtained have been submitted to me by Dr. Gray, and I beg leave to lay before the Entomological Society the result of my examination.

The collection contains thirty-five species, of which twenty-three are new, viz. :—

- Calanus inconspicuus.
- " penicillatus.
- " latus.
- " brevicornis.
- " mirabilis.
- Euchæta Atlantica.
- " Sutherlandii.
- Undina Danæ.
- " longipes.
- " plumosa.
- " Helenæ.
- " pulchra.
- Diaptomus dubius.
- " abdominalis.
- Pontella setosa.
- Clytemnestra Atlantica.
- Corycæus Sutherlandii.
- " styliferus.
- Copilia Atlantica.
- Sapphirina Danæ.
- " opaca.
- " stylifera.
- Halocypris Atlantica.

The proportion of new species, though large, is not more than might be expected if it is considered how little attention has hitherto been given to marine *Entomostraca*. At the same time it

must be confessed that future researches may perhaps prove that the two sexes of one species have been separately described, for the generic descriptions are founded on characters which differ in the two sexes; and it is impossible to distinguish in all cases a female *Undina* from a *Calanus*, or a female *Pontella* from an *Acartia*.

To avoid if possible this source of error, I have been very careful in describing those parts which are generally considered to be alike in both sexes, as, for instance, the organs of the mouth, the natatory legs and the shape of the cephalothorax, and I do not think any difficulty will be found in joining the two sexes when both are known; at the same time, it is not *certain* that the above-mentioned organs are alike in the two sexes of the same species.

The characters upon which species are founded need perhaps some remark, for the hairs are in most cases so variable that it is rather startling to find them relied on in the *Entomostraca* as affording excellent specific characters. However, the examination of thousands of specimens has convinced Professor Dana that such is the case, and the form and position of the hairs, and especially of those on the terminal portion of the anterior antennæ, are as useful in the study of *Entomostraca* as are the teeth in that of *Mammalia*.

The normal number of hairs on each segment of the antennæ of— for instance—a *Calanus* is four, one on the middle of the anterior margin, and at the apex, two anterior and one posterior. The apical segment appears to offer an exception to this rule, but in such cases the apical segment itself is either very minute or perhaps has disappeared, so that the hairs belonging to two segments are apparently collected on one. In confirmation of this, compare the antennæ of *Diaptomus abdominalis* or *Calanus inconspicuus* with that of *C. brevicornis*. *C. penicillatus* is remarkable for having a pencil of hairs at the end of the anterior antenna. The antennæ are unequal, the longer one having eighteen, the shorter only thirteen segments, and I consider the terminal tuft to be the hairs which remain, although the segments to which they normally belong have disappeared. I found it impossible to determine the exact number of hairs, but convinced myself that there were more at the apex of the shorter antenna than at that of the longer, which in accordance with this theory ought to be the case.

It is much to be wished that we had some definite system of nomenclature for the appendages and parts of appendages of

*Crustacea*. Professor Milne-Edwards has indeed proposed one in the *Annales des Sciences Naturelles* for 1851, but unfortunately it is only applicable to the decapods. The *Calanidæ* possess ten or eleven pairs of appendages; viz., first two pairs of antennæ, then a pair of mandibles, then three pairs which are generally applied to the mouth, and then four or five pairs of natatory legs. Three pairs are therefore wanting; we may consider them to be those of the first or ocular segment, and of the two posterior segments. I subjoin a table showing the homologies of the genus *Pontella*, and the names used by different observers. It must be observed that Milne-Edwards appears to consider that the maxillæ are wanting, for in his *Nat. des C.* vol. iii. p. 418, he says, "Les machoires paraissent manquer complètement, ou se trouver réduites à l'état de simples vestiges;" if this is the case, his "Pates machoires de la première paire" belong to the seventh segment instead of to the fifth; and the missing appendages are those of the first, fifth and sixth segments.

## NAMES USED BY

Segments of the body.	MILNE-EDWARDS, His. Nat. des Crustacea. 1840.	BAIRD, British Entomostraca. 1849.	DANA, Crustacea, United S. Exploring Expedition, 1852.	LILJEBORG, Cladocera, Ostracoda och Copepoda 1 Skane. 1853.	LUBBOCK.
1	Ant. de la 1er Pr.	Antennæ	1st Pr. Antennæ	1st Pr. Antennæ	1st Pr. Antennæ
2	Antennes de la 2me Pr.	Antennules	2nd Pr. Antennæ	2nd Pr. Antennæ	2nd Pr. Antennæ
3	Mandibules	Mandibles	Mandibles	Mandibles	Mandibles
4	Pates machoires de la 1er Pr.	1st Pr. Footjaws	Maxillæ	1st Pr. Maxillæ	1st Pr. Maxillæ
5	" " 2me Pr.	2nd "	Maxillipeds	2nd "	2nd Pr. Maxillæ
6	" " 3me Pr.	3rd "	1st Pr. Legs	3rd "	Maxillipeds
7	Pates de la 1er Pr.	1st Pr. Legs	2nd "	1st Pr. Legs	1st Pr. Legs
8	" " 2me Pr.	2nd "	3rd "	2nd "	2nd "
9	" " 3me Pr.	3rd "	4th "	3rd "	3rd "
10	" " 4me Pr.	4th "	5th "	4th "	4th "
11	" " 5me Pr.	5th "	6th "	5th "	5th "
12					
13					
14					

The species which I have named *Diaptomus dubius* is one of those intermediate forms whose place is very difficult to determine. It makes one link of a series which connects *Pontella* with *Calanus*. There appear to be two such series, one of which contains *Hemicalanus calaninus*, Da., *H. tenuicornis*, Da., and the other the species which Dana has formed into the group *Calanopia*, which he considers to be a subgenus of *Pontella*. *Diaptomus dubius* belongs to the latter group, but is, if I may use the expression, on the *Calanoid* side of it. The absence of inferior eyes, and the structure of the maxillipeds, are sufficient to prove that it cannot be considered a *Pontella*, while the structure of the inferior antennæ exclude it from *Hemicalanus*. I have been obliged, therefore, to place it in Westwood's genus *Diaptomus*, although it resembles more nearly the species in Dana's subgenus *Calanopia*. I am very averse to multiplying genera, but "*Calanopia*" appears to me to have far more claims to that rank than "*Rhincalanus*." Many facts seem to favour the opinion that there is no such thing as a well marked genus in Nature, but that every intermediate form either does exist or may have existed in Nature; and that to say that any group is well marked, is equivalent to saying that there are many forms with which we are unacquainted. We may expect therefore that such species as *D. dubius* will become more and more frequent as our knowledge increases.

I have requested Dr. Baird to give me his opinion of the proper place of this species. He considers that it belongs to his genus *Temora*. It may be necessary to remind Naturalists that the genus *Calanus* was founded by Leach on the *Cyclops Finmarchicus*, which was both imperfectly known and incorrectly described. Dr. Baird rectified the descriptions and, considering that the falsity of Leach's characters vitiated the genus, described it as *Temora Finmarchica*. Even he, however, was only acquainted with one sex, so that we had thus two genera founded on one species, and that one very imperfectly known. The characters given by Dr. Baird as those of *Temora (Calanus) Finmarchicus*, are those of a large number of *Entomostraca*, and Dana considered that by the rules of the British Association Leach's name ought to be used. Although I regret to be obliged to differ from my much respected friend Dr. Baird, I feel myself obliged to come to the same conclusion as Professor Dana. Now, however, Dr. Baird considers that we have become acquainted in this species (*Diaptomus dubius*) with both sexes of *Temora*, and that the characters must accordingly be altered. Liljeborg in his excellent work "On

the *Entomostraca* of Sweden,"\* has expressed a similar opinion, and gives the characters of *Temora*, as follows:—"Caput a thorace quinque annulato disjunctum, unum annulum præbens. Abdomen thorace angustius, quatuor-sex articulis compositum. Antennæ secundi paris biramosæ, ramo exteriori articulis septem composito. Palpus mandibularum biramosus, vel appendice branchiali membranacea et setifera præditus. Maxillæ vel pedes maxillares primi paris laminosæ, lobulos plures setiferos, secundi paris breves et crassæ, processus plures setiferos, setis longis plumosis, antice vergentibus, gerentes; tertii paris elongatæ pediformes, simplices articulis sex compositæ, setiferæ, antice vergentes. Ramus interior pedum primi paris inarticulatus, et secundi-quarti paris biarticulatus. Pedes quinti paris antecedentibus dissimiles, dexter maris subcheliformis. Oculus unicus. Sacculus oviferus unicus."

I may observe, however, firstly, that Professor Dana's labours have shown that the number of segments of the cephalothorax, abdomen, and of the branches of the natatory legs, though useful as specific characters, vary in species of the same genus; and, secondly, that though we may think it probable that the right male antenna of *C. Finmarchicus* may be prehensile, we do not know that it is so. Liljeborg's *Temora velox* appears to me to belong to Westwood's genus *Diaptomus*. If, when we are acquainted with the male of *Calanus Finmarchicus*, we find that it agrees generally with that of the species which I have named *Diaptomus dubius*, it will become a question whether the genus "*Diaptomus*" will not have to be abandoned, as synonymous with "*Calanus*." A new genus must, in that case, be formed for the species described as *Calani* by Kroyer, Dana and myself.

I have observed spermatoc tubes on *Euchaeta Atlantica*, and *Undina longipes* in one or two instances was furnished with two or three small tubes about a quarter as long as the abdomen, and with long thin necks. There are, perhaps, also spermatoc tubes, although I observed them on males. In the genus *Corycæus* there are generally one or two bags attached to the upper side of the abdomen, which may be of the same nature.

#### CALANUS.

- I. Setæ antennarum anticarum apicales subapicalibus longiores.
  - A. Styli caudales curti.

\* Om de inom Skane forekommande Crustaceer af ordningarne Cladocera, Ostracoda och Copepoda.

*C. inconspicuus*, n. sp.

Frons rotundata. Cephalothorax 5-articulatus, crassus, postice obtusus, supernè visus angulis acutis, segmento postico brevi. Antennæ anticæ corporis longitudine, setis brevibus, apicalibus articulum æquantibus unâ longiore; subapicalibus minutis. Maxillæ et maxillipedes ut in *Calano*. Pedes natatorii primi paris ramis 3 et 1-articulatis, quarti paris ramis ambobus 3-articulatis. Abdomen 5-articulatum breve. Setæ caudales quatuor, subæquæ.

If all my specimens are females, which the form of the abdomen seems to render probable, this species may, perhaps, be an *Undina*.

The anterior antennæ are  $\cdot 065$  in length. At the apex there is one rather long hair, and two others rather longer than the apical segment; the penultimate and ante-penultimate hairs are very minute, and all the rest are small.

The second pair of antennæ are  $\cdot 015$  in length. The accessory branch is about one-fourth longer than the organ itself, and the intermediate segments are indistinct; the basal segment of the shorter branch has the margins very straight, and is of equal thickness all the way up; there are six hairs at the apex in one tuft, and seven in the other.

The maxillipeds are of the usual form, and are  $\cdot 02$  in length.

The first pair of natatory legs are  $\cdot 015$  in length, the outer branch has three segments, the inner only one. The inner branch, and the apical segment of the outer branch, have two hairs at the side and two at the apex. The spines on the outer margin are inconspicuous.

The fourth pair are  $\cdot 025$  in length. The branches are both three-jointed, the two basal segments of each branch have a hair at the apex, the terminal segment of the lesser branch has two hairs on the margin and two at the apex; that of the larger branch has three at the margin and two at the apex. The fifth pair of legs appears to be wanting.

The abdomen is 5-jointed; the first and second segments are swollen. The stylets are short, and the four terminal hairs subequal in length.

Collected in  $12^{\circ} 20' N. L.$ ;  $25^{\circ} W. L.$  Pl. II. figs. 8, 11.

*C. penicillatus*, n. sp.

Frons obtusa. Cephalothorax 5-articulatus, postice subacutus. Antennæ anticæ inequales, dextrâ cephalothoracis, sinistrâ

corporis longitudine, setis brevibus, apicalibus tamen sublongis, numero minimum viginti et conspicui. Abdomen 3-articulatum. Styli caudales breves.

The inequality in length of the anterior antennæ, and the thick pencil at the end of the same organs, make it very easy to distinguish this species from any other. I only possessed one specimen, which I was obliged to dissect in order to examine the different appendages. The two branches of the second pair of antennæ are nearly equal in size. The basal part of the lateral branch is indistinctly divided into several segments, and has about six long hairs. Length  $\cdot 03$ .

The first pair of maxillæ are  $\cdot 018$ , the second pair  $\cdot 015$ , and the maxillipeds  $\cdot 032$  in length. All these organs are formed as usual in *Calanus*.

The first pair of legs are  $\cdot 032$  in length; both the branches are three-jointed, and have a hair at the apex of each of the four basal segments; the apical segment of the outer branch has three hairs on the margin and two at the apex, besides a curved spine. That of the inner branch has also three at the margin and two at the apex.

The fourth and fifth pairs were, unluckily, imperfect.

The abdomen is short, and the caudal stylets are rather longer than the posterior abdominal segment. The terminal setæ have been broken off.

Length of cephalothorax . . .  $\cdot 100$ .

„ abdomen . . . . .  $\cdot 026$ .

Pl. IV., figs. 1, 3.

*C. latus*, n. sp.

Rostrum breve. Frons rotundatus. Cephalothorax 5-articulatus, postice obtusus. Antennæ anticæ corpore vix breviores, setis quibusdam longis, unâ apicali prælongâ, posticâ penultimâ longâ; anticâ penultima ante-penultimisque brevibus. Antennæ postice brevissimæ, appendice laterali tamen longâ. Pedes natatorii primi paris, ramis 2 et 1-articulatis, quarti paris 3-articulatis. Abdomen 4-articulatum stylis brevibus, setis quatuor subæquis.

The hairs on the anterior antenna are short, but about every fourth segment there is one considerably longer than the others. The length of the organ is  $\cdot 135$ , which is very nearly that of the body.

The second pair of antennæ are remarkable. The lateral ap-



pendage is formed as usual, but is about six times as long as the two apical segments of the organ itself. Length .038.

Length of the second pair of maxillæ . . . . .02  
 " " maxillipeds . . . . .045

There is nothing peculiar in the forms of these two pairs of appendages, which resemble those of other *Calani*.

The first pair of natatory feet is .025 in length, and very closely resembles that of *Undina pulchra*. (Pl. IV. fig. 6.)

The fourth pair is .04 in length, and appears to me to be exactly similar to that of *Undina pulchra*. (Pl. IV. fig. 7.)

The exact similarity of the natatory legs in these two species, coupled with the fact that I only know the male of the one and the female of the other, force on us the consideration whether they are not the different sexes of the same species. It may be so certainly, but the difference in both pairs of antennæ and in the maxillipeds have induced me to describe them as separate.

Length of cephalothorax, .110; of abdomen, .05.

Collected in N. L. 31° 50'; W. L. 18° 30'.

Most of the specimens had spermatoc tubes attached to the abdomen. Pl. II. fig. 12 and Pl. XI. figs. 8, 11.

## II. *Setæ antennarum anticarum apicales subapicalibus non longiores.*

### *Calanus communis*, Da.

There are a number of specimens which agree in most points with Dana's description of this species. The apical segment of the anterior antenna in my specimens was, however, rather shorter than the preceding, and the second of the abdominal setæ is quite twice as long as the others.

Professor Dana gives no side view; Pl. X. figs. 9, 10, represents the outline of the posterior segment of the cephalothorax; the hooked spine exists in every position between the two in which I have figured it.

Collected in the Atlantic by Dr. Sutherland, from 12° 30' N. to 33° 50' S. L., and from 19° to 26° W. L.; by Dana from 8° N. to 5° S. L., and from 15° to 30° W. L. Pl. X. figs. 9, 10.

### *Calanus mirabilis*.

Frons subacuta, lateribus inflata. Cephalothorax 5-articulatus, gracilis, postice obtusus. Antennæ anticæ corpore longiores, setis brevibus apicalibus tamen, et setâ anticâ articuli ab apice quarti, longis, et posticâ penultimâ prælongâ. Antennarum

posticarum ramus lateralis multiarticulatus, pyramidatus, setis longis. Mandibulæ palpo magno ramis valde inæquis. Pedes natorii primi paris ramis 3 et 2?-articulatis. Pedes quarti paris ramis 3-articulatis. Abdomen curtum, 2?-articulatum. Styli caudales breves.

The anterior antennæ are considerably longer than the body; the hairs all along the middle part are small, but some near the apex are very large. The posterior penultimate is the longest, then two at the apex, and one attached to the fourth segment, counting from the apex. Length .17.

The posterior antennæ are remarkable for the form of the lateral branch, which is multiarticulate, tapering and clothed with long hairs. Length .033.

The palpus of the mandible is also of an unusual shape. Instead of consisting, as usual, of a large basal portion, bearing at the apex two equal short branches, in this species one branch is inserted at the side of the basal part, and is much smaller than the other. Length .033.

The second pair of maxillæ are .015 in length, and the maxillipeds .052.

The first pair of natatory legs are .026 in length; the outer branch is three-jointed; the inner, I believe, has two segments, which are well marked in the second pair of legs, but in the first are very indistinctly separated. The fourth pair is .03 in length, and both the branches have three segments. The fifth pair appeared to me to be altogether absent.

The abdomen is short, and in my specimen most of the caudal bristles appeared to have been broken off.

Collected in the Bay of Biscay.

Pl. V. figs. 1 to 6.

### *Calanus brevicornis*, n. sp.

Frons elongata, angusta, rotundata, stylis longis. Cephalothorax postice obtusus, 5-articulatus articulis posticis subæquis. Antennæ anticæ cephalothoracis longitudine, fere rectæ, fronte posteriores, setis brevibus, articuli tertii longiore, postica penultima et antepenultima longis, anticis brevibus, antica penultima articulo duplo longiore. Setæ caudales mediocres.

The front is produced .01 inch beyond the base of the antennæ; the frontal stylets are long, and rise just in front of the antennæ.

Seen from above this species is narrow in proportion to its length. The anterior antennæ are short, being about equal to the cephalothorax in length. The posterior penultimate and antepenultimate setæ are the longest, then the anterior penultimate and that of the third segment; few of the rest are equal to the segments in length.

The two branches of the second pair of antennæ are nearly equal in size, but the accessory branch is rather larger than the other, and has eight long hairs along its outer margin.

The teeth of the mandible are small, and nine in number, besides the usual spine. The outer branch of the palpus has six long plumose hairs; the inner one has twelve, four of which are situated on a prominence at the side, and four more along the margin.

The first and second pair of maxillæ and maxillipeds are formed as usual.

The branches of the natatory legs are three-jointed. In the first pair the basal segment of the inner and lesser branch bears one hair, the second segment two, and the third eight, of which two are on the outer margin, four on the inner, and two at the apex. The larger and external branch has one hair on the second segment, and five on the apical, besides the long terminal spine. In the fifth pair of legs the second segment of the smaller branch has only one hair, and the apical segment eight, three on each margin and two at the apex. The terminal segment of the larger branch has only four hairs, besides the terminal spine.

Abdomen four-jointed, segments gradually decreasing in size. The caudal setæ were in every case broken off, but from the size of the stumps they appear to be of the usual length.

Total length, .12.

Collected in the Atlantic, 35° 10' S. L.; 18° 4' E. L.

Pl. III.

#### *Rhincalanus cornutus*, Da.

Professor Dana found only four or five specimens of this beautiful species, and does not mention whether they were males or females. I also had only a few specimens, and all of mine had the abdomen two-jointed, while in his it was four-jointed. The antennæ also differ from his description. My specimens may therefore perhaps belong to a new species, but they agreed so closely with *R. cornutus*, except in the above particulars, that I did not like to describe them as new.

Collected by Dr. Sutherland, N. L. 27° 30', W. L. 20°.

„ Professor Dana, „ 1° „ 18°.

#### *Euchæta Atlantica*, n. sp.

Cephalothorax pubescens, 4-articulatus, capite non lateraliter angulatus, postice obtusus. Antennæ anticæ fere corporis longitudine, setas *Euchæta* diademæ fere similes, setâ posticâ penultimâ dimidium posticæ apicalis non superante, setis antepenultimis perbrevis. Pedes natorii quinti paris fœminæ nulli, quarti grandes. Abdomen fœminæ 3-articulatum, articulo primo fœminæ secundum longitudine non superante. Seta caudalis longa, fœminæ nuda. Abdomen maris 4-articulatum; segmento primo brevi.

The second pair of antennæ and first four pairs of legs of this species could hardly be distinguished from those of *Undina plumosa*.

It may be doubted whether the male and female here described belong to the same species, but they were several times collected together without any other nearly allied species, were caught in rather large numbers, and agreed in those organs which do not present sexual differences.

The anterior antennæ of the female are .093 in length; the setæ are very short, but arranged as usual; some few are very long, and one or two are plumose. Two of the apical hairs are very long, also the posterior penultimate, and the anterior hair of the fourth segment, counting from the apex. The posterior antepenultimate seta is very small. The anterior antennæ of the male are different in appearance, owing to the absence of long setæ; the small ones are very easily broken off, so that I never found a specimen with them all attached. There are three long hairs at the apex, one of them as long as the four apical segments.

The second pr. antennæ are formed as in *Calanus*. The long apical hairs of the organ are eleven in number. The accessory branch is longer than the organ, the four intermediate joints are short and indistinct, and the apical hairs are three in number.

The second pair of maxillipeds are .021 inch in length, and divided into four segments. They resemble those of *Calanus*, but are longer in proportion, and consist of four segments instead of three, as usual in that genus. The hairs are large, and seated on protuberances.

The third pr. maxillipeds are .05 in length, large, pediform, and consisting of seven segments; the basal segment is large, with several spinose hairs, the second is almost twice as long as the first, and forms almost a right angle with it. The five apical segments are small and indistinctly separated; they each bear two or

three strong, finely serrated hairs. In the male, the joints of these five segments are so indistinct, that the organ would be described as three-jointed.

*First pr. natatory legs*, .017 in length. The rami in the female are two and one-jointed. Those of the male are three-jointed. They are not spinous, but the margins are partly fringed with delicate hairs.

The *fourth pair of natatories* is much larger, and is similar in the two sexes. It is .03 inch in length, and the rami are both three-jointed. There is a ciliated hair at the apex of each of the basal segments, and the terminal segments have respectively four and five large, ciliated hairs.

The *fifth pair of legs of the male* are slender, and so long as to reach to the front of the cephalothorax when they are turned forwards. The shorter leg of the two consists of four segments, of which the second apparently represents the second basal segment of the natatory legs, and like it bears two branches, the inner one of which is as long as the first segment of the outer branch. The apical segment is long and gradually tapering. The longer leg resembles the shorter one in general appearance, but the inner branch is rudimentary, and the third segment bears at the apex a cylindrical appendage, swollen at the ends, and armed along the edges with a row of teeth.

I do not understand how these legs are used.

Total length .12 inch.

This species much resembles *E. diadema* of Dana, from which it differs chiefly—

1st, in having the angles of the head rounded off;

2nd, in the size of the maxillipeds; and

3rd, in the structure of the fifth pair of legs of the female.

It seems very common, but the females are much more numerous than the males. Dr. Sutherland found it in the Atlantic, from 31° 50' N. Lat. to 3° S. Lat., and from 26° to 18° 30' W. Long.

Some of the females had from five to eleven eggs, and several had a spermatid tube attached to the abdomen; the time of year being from the 9th of August to the 9th of September.

Pl. VIII.

*Euchæta Sutherlandii*, n. sp.

*Fœminæ*.—Cephalothorax nudus, 5-articulatus, postice obtusus, capite bene arcuato sed non angulato. Antennæ anticæ corpore paulo breviores, setas *E. communi* fere similes, setâ pos-

ticâ penultimâ dimidium posticæ apicalis non superante, setis antepenultimis brevibus. Maxillipedes magni. Pedes natatorii quinti paris magni, simplices.

Abdomen 3-articulatum, articulo tertio duos præcedentes longitudine fere æquante. Seta caudalis secunda corpore longior, nuda.

This species may perhaps be a young form, for the fifth pair of natatory legs has very much the appearance of being immature. I do not think, however, that it can be the young of any already described species, as it has five cephalothoracic segments instead of four, which is the common number; and although *E. pubescens* has, it is true, the same number, yet in that species the additional segment is the posterior one, while here it is formed by the separation of the head. For these reasons it cannot, I think, be considered as the young of the preceding species, with which it was found; besides which, it has a fifth pair of natatory legs, of which I could find no trace in *E. Atlantica*. The shape of the head when seen from above, the second pair of antennæ, mandibles, first and second pairs of maxillæ, maxillipeds and first pair of natatory legs, all very closely resemble those of the preceding species. The fourth pair is rather stouter in proportion. In *E. Atlantica* I could never find any fifth pair of natatory legs in the female, but in this species they are of a considerable size, .027 inch in length, and consist of a two-jointed basal part, bearing two unequal branches, each consisting of one segment, but the outer one much the largest. The two inner ones are not symmetrical. The abdomen is three-jointed, and the third segment is nearly as large as the two first put together.

Of this species there are only three or four specimens. They were caught on the 22nd August, in 12° 21' N. Lat. and 25° W. L.

Length .065 inch.

„ of the maxillipeds .035.

Pl. IX. figs. 1, 2.

*Undina Danæ*, n. sp.

*Maris*.—Frons quadratus. Cephalothorax 5-articulatus, postice rotundatus, articulo ultimo brevior. Antennæ anticæ corpore breviores; setis brevibus, posticâ penultimâ antepenultimâque articulos non æquante. Abdomen 4-articulatum. Styli caudales breves, setis quatuor plumosis.

This species may be at once distinguished from all of Professor Dana's species by the front being quadrate.

The anterior antennæ are .035 inch in length. Pl. IX fig. 7, represents the five apical segments.

The posterior antennæ are .02 inch in length; the four intermediate segments of the branch are obsolete, but their hairs still remain; the branch is rather larger than the organ itself.

Second pair of maxillipeds, .017 in length, elongate, 7-jointed, formed like the third pair of *Calanus*.

Third pair of maxillipeds, like those of *Euchæta* in shape, the two basal segments being very large, and the remaining five very short, and provided with eight large and strong hairs. Length .035.

First pair thoracic legs. Large ramus three-jointed. The apical segment has a strong spine at the apex, a row of very delicate hairs on the outer margin, and four long, plumose hairs on the inner side. The second segment has also a similar hair at the apex, and there is a small spine at the apex of each segment. The smaller or internal branch consists of one segment, bearing five long plumose hairs. The plumose hair, generally situated on the basal segment, was absent in the specimens I examined. The sides of the segments are clothed with very delicate hairs. Length .014.

Fourth pair thoracic legs. Both branches consist of three segments. The hairs on the outer branch are arranged as in the first pair, but altogether larger, and the apical spine is serrated on the outer margin, plumose on the inner, and almost as long as the hairs. The hairs on the inner branch are situated as on the outer, but are finer. The margins of the segments are not fringed with hairs, nor is there any basal hair. Length .027.

The fifth pair of legs is prehensile and unsymmetrical, but not much larger than the preceding, being only .0303 inch in length. The right leg is the larger of the two, and consists of four segments, of which the two basal are short and broad, the third long and cylindrical, and the apical small. The left legs seemed to me to be more slender; the second segment is long, and bears two branches, the inner simple, the outer three-jointed.

The abdomen is four-jointed. The basal segment is smaller than the rest. The second segment is the largest, but not much longer than the two last. The caudal stylets are small, and bear four plumose hairs, of which the second is longer than, but not twice as long as, the others. The first pair of natatory legs of this species are very like those of the preceding. The fourth pair of legs have the spines larger in proportion.

Length of cephalothorax . . . . .055 inch.

„ abdomen . . . . .020 „

Pl. IX. figs. 6 to 9.

Collected in the Atlantic Ocean, N. L. 37° 20' to 12° 21', W. L. 14° 30' to 25°.

I have called this species after Professor Dana. The Atlas of his great work on *Crustacea* which has recently appeared is another proof of his talents and industry. The high price of it is the more to be regretted, as it is almost indispensable to every one who would study *Crustacea*.

*Undina longipes*, n. sp.

Maris.—Frons quadrata. Cephalothorax 5-articulatus, articulo ultimo brevior, postice rotundatus. Antennæ anticæ corpore breviores setis brevibus, setâ articuli secundi (terti?) longiusculâ, flexâ, setis apicalibus articulo longioribus, setis penultimis subæquis, articulo longioribus, setâ antepenultimâ posticâ aliis longiore. Abdomen 4-articulatum. Styli caudales 2-articulati, setis 5, secundâ fere duplo longiore.

The shape of the cephalothorax and the form of the apical hairs of the anterior antennæ are quite sufficient to distinguish this species from all that have been hitherto described. The shape of the fifth pair of legs is also peculiar.

Anterior antennæ .075 in length.

The second pair of antennæ have the accessory branch longer than the organ itself; and besides the usual four hairs belonging one to each of the four small intermediate segments, there are four or five others, signs of a tendency to the separation of other segments.

The second pair of maxillæ are like those of *Calanus*, and quite different from those of the other species of *Undina* which I have seen.

The maxillipeds are small, but like those of *Calanus*.

The first pair of legs are .018 in length; the rami are both three-jointed.

The fourth pair are larger, .03 in length.

The fifth pair are much larger, being .1 in length. The figure will give a better idea of their form than a description could convey.

The abdomen is four-jointed, the segments being nearly equal in size. The caudal lamellæ are two-jointed, and bear five hairs, of which the second is nearly twice as long as the rest.

Total length .1.

Collected in the Atlantic, 12° 20' to 8° 30' N. L., 25° to 23°

W. L. The species was rather common, but there are no females which I can with certainty refer to it.

Pl. VI. figs. 1 to 5.

*Undina plumosa*, n. sp.

Maris.—Frons obtusa. Cephalothorax postice rotundatus, 4-articulatus. Antennæ anticæ cephalothorace longiores, corpore breviores, aliquando dissimiles, setis brevibus, postica penultimâ antepenultimâ subæquis. Abdomen 4-articulatum. Styli caudales breves; setis 4, setâ secundâ longiore, sed non duplo longiore.

I could not find the usual furcate rostrum in this species.

The second pair of antennæ and first four pairs of legs could hardly be distinguished from those of *Enchæta Atlantica*.

The outline of this species much resembles *Undina vulgaris*.

The anterior antennæ are .09 in length; the setæ are very short, the largest being situated on the third basal segment; the anterior and posterior seta of the apical segment are longer than the segment, but all the others are very short.

The accessory branch of the second pair of antennæ is larger than the organ itself, and bears three long hairs at the apex. The four intermediate segments are small, and each provided with one long hair. The organ itself is terminated by two tufts of long hairs, six in the one and five in the other, besides a few short ones.

The third pair of maxillipeds are .082 inch in length, and are seven-jointed, but the five apical segments are very small. The apical segment bears three hairs, the next I believe two, the third one, the fourth and fifth respectively three and four, the sixth three, and the basal one, I believe, two at the apex, and one at the base.

First pair of legs .009 in length; the usual plumose hair at base is, I believe, absent; there are, however, on both the basal segments several small hairs. The external ramus is three-jointed. The middle segment bears one long hair, and a fringe of small ones; the apical segment has four long hairs, and a spine at the apex. The inner ramus consists of one segment only, which has five long hairs. All the large hairs on these organs are plumose.

The fourth pair are larger, .017 in length; the rami are both three-jointed. The smaller as long as the first two segments of the larger ramus, which has a spine at the apex of each segment, and two intermediate, as usual, to the apical segment. The usual plumose basal hair is present, but there is no fringe as in the first pair of legs, which may, however, have been broken off. Each

segment of the branches bears one long hair, and the apical one of each five, the small slender apical spine of the first pair of legs being developed into a strong hair, plumose on the inner and serrated on the outer margin.

Fifth pair of legs are .05 in length; both legs are five-jointed. The smaller leg ends in a sort of round knot, and bears a large spine at the apex of the third segment, and a small inner branch at the apex of the second segment. The larger leg consists of two branches; the inner one small, and appears to have three rudimentary joints, the larger branch has the two first joints large, the apical longer than the preceding segment, bearing a large spine near the middle, slender, and terminating in a fine point.

Abdomen is .036 in length, four-jointed; the first segment rather short, the three following nearly equal, the caudal lamellæ very short and small, bearing four hairs, of which the second is the longest.

This species was collected in 27° 30' N. L., 25° W. L.

I have found no females which I could refer to this species, but this is not to be wondered at, as I only had three or four specimens.

Pl. IX. figs. 3, 4, 5.

*Undina Helenæ*, n. s.

Maris.—Cephalothorax 5-articulatus postice obtusus, articulis tribus posticis subæquis. Frons triangulata. Antennæ anticæ corpore parçè breviores; setâ articuli secundi (tertii?) longâ, leviter flexâ, setâ apicali posticâ longâ, anticâ penultimâ sublongâ, posticâ brevi, posticâ ante-penultimâ articulum vix superante, aliis brevibus. Abdomen 4-articulatum, articulis subæquis; styli caudales parvi.

The second pair of antennæ have the accessory branch nearly twice as long as the organ itself. The four small intermediate joints are hardly distinguishable, but are indicated by the usual five long hairs. At the apex of the organ itself the one tuft consists of six subequal hairs, the other of four long hairs and three smaller ones.

The third pair of maxillipeds are formed as usual; but there is this peculiarity, that the fourth segment, counting from the base, is larger than the third, as in the longipes. The two basal segments are like those of *Calanus* and not like those of *Euchæta*.

Length .028.

The first pair of legs have the outer ramus three-jointed; and the inner one, I believe, two-jointed.

Length .025.

In the fourth pair both branches have three segments. The hairs on the outer margin are short, thick and spinous. On the inner branch each of the two basal segments has one hair at the apex. The apical segment has two hairs at the margin, and two at the apex. The apical segment has four hairs, and a large spine at the apex.

Length .04.

Fifth pair of legs. Length .055.

Length of cephalothorax . . . . .095.

„ abdomen . . . . .040.

„ Ant. antennæ . . . . .110.

Collected in N. L. 31° 50', L. W. 18° 30'.

Pl. VII. figs. 1 to 5. Pl. IV. fig. 4.

*Undina pulchra*, n. s.

Maris.—Frons triangulata. Cephalothorax 4? articulatus postice obtusus. Antennæ anticæ corpore parçè breviores, articulis ultimis tribus subæquis, setis brevibus, setâ articuli tertii longâ, rectâ, setis apicalibus brevibus, unâ tamen sublongâ, posticâ penultimâ, et antepenultimâ perbrevis. Maxillipedes parvi, articulis quinque ultimis exiguis, ut in *Euchætd*. Abdomen 4-articulatum. Styli caudales parvi.

In general form this species closely resembles *U. Helenæ*, from which, however, it differs in the form of most of the appendages.

The anterior antennæ have the three terminal segments nearly equal; the middle one rather the smaller of the three. The fourth segment was longer than the two succeeding in the right antennæ of the single specimen at my disposal; but in that of the other side it appeared as if it was in the process of division into two.

The accessory branch of the second pair of antennæ is half again as long as the organ itself, and appears to have only four hairs attached to the small intermediate segments. At the apex of the organ itself the one tuft consists of six long subequal hairs, the other of five long hairs and two short ones.

The two basal segments of the maxillipeds are long and thin, and the five terminal segments are small. Length .031.

The length of the first pair of natatory legs is .023. The outer branch has two segments. There is a hair at the apex of the basal, and two on the margin, and two at the apex of the apical, besides the spine. The inner branch has two hairs at the margin, and two at the apex.

The length of the fourth pair is .035. The margins are less entire, the hairs of the outer margin shorter and thicker, and the

branches both three-jointed. There is a hair at the apex of the two basal segments of each branch, and the apical segment of the inner branch has two hairs on the margin, and two at the apex; that of the outer three at the margin, and two at the apex. There are thus five hairs on the apical segment of the outer branch of the fourth pair, while the first pair had four. The addition arises from the development of the spine.

The fifth pair of legs is long, thin and four-jointed. The basal segment of the larger leg is long and cylindrical; the second segment is swollen, and gives rise to two branches, which in shape are not unlike the prongs of a pitch-fork, with, however, the power of meeting: the outer branch is two-jointed. The smaller leg is very simple, resembling a rod composed of four pieces, the two basal of which are short, and the two apical long and slender.

Length .06.

The abdomen is four-jointed, with the segments subequal; and the caudal stylets small: the second of the caudal setæ nearly twice as long as the others.

Length of cephalothorax . . . . .09.

„ abdomen . . . . .03.

Collected in N. L. 12° 21', W. L. 25°.

Pl. IV. figs. 5 to 8. Pl. VII. fig. 6.

*Diaptomus dubius*, n. sp.

Frons quadrata. Cephalothorax curtus, antice latior, 5-articulatus, angulis posticis acutis, segmento primo maximo, tertio quartoque brevibus. Antennæ anticæ corporis longitudine, setis brevibus; antenna maris dextra medio paulum incrassata, fere 24-articulata, articulis 18 et 19 antice serratis, articulis tribus anticis subæquis. Pes posticus maris maximus ad apicem obtusus, rotundatus; pedes postici fœminæ parvi. Abdomen maris 4, fœminæ 3-articulatum.

There is not a furcate rostrum, but under the front are two little appendages.

The two branches of the second pair of antennæ are nearly equal. The accessory branch has three hairs at the apex, and one at the middle of the apical segment, besides eight along the side, signs of a tendency towards the separation of other intermediate segments over and above the four usual ones.

The second pair of maxillæ and the maxillipeds are formed as in *Calanus*.

The first pair of natatories have the two rami respectively three and two-jointed; and in the fourth pair they are larger, but consist of only two and one segments respectively.

The abdomen is four-jointed in the male, and two-jointed in the female, and in both the caudal stylets are very long, fringed on the inner margin with delicate hairs, besides the five long ones, which are themselves plumose.

Length of cephalothorax (not including the spines) . . .04.

„ abdomen (including the stylets) . . . . .02.

Collected by Dr. Sutherland in 37° N. L. and 14° 30' W. L., and in 27° 30' N. L. and 20° W. L.

There were only four or five specimens, and one of the females had a spermatoc tube attached to the abdomen.

Pl. II. figs. 1 to 7.

*Diaptomus abdominalis*, n. sp.

Frons subtriangulatus. Cephalothorax postice obtusus, 5-articulatus, articulis posticis subæquis. Antennæ anticæ corpore paulo breviores, setis apicali posticâ, penultimâque anticâ, longis, aliis brevibus. Maxillipedes longæ ut in *Calano*. Abdomen fœminæ 3-articulatum, maris 4?-articulatum. Styli caudales breves divaricatæ.

The second pair of maxillæ are formed as in *Calanus*, and are much shorter than the maxillipeds, being .013.

The maxillipeds are .038 in length, and seven-jointed, the terminal segment being very minute. The basal segment is not much larger than the second.

The natatory legs of the female have both the rami three-jointed. In the first pair the spines are not conspicuous; the first segment of the inner (lesser) branch has one hair, the second two, the third two at the side and two terminal. The two first segments of the outer branch have each one hair; the terminal segment has three hairs at the side, and two at the apex, besides the small ones on the outer margin. Length .045.

In the fifth pair the hairs on the outer margin are more conspicuous. The terminal segment of the inner branch has three hairs on the margin, while on that of the outer branch there are five marginal hairs, and at the apex a short broad spine. Length .04.

The arrangement of the hairs in the male is similar, but the margins of the segments are more or less bulged out.

The fifth pair of legs of the male are small and unsymmetrical, about .022 in length. Those of the female are symmetrical, but not formed like the others, having no trace of an inner branch; they are .01 in length.

The abdomen is large. In the female it is three-jointed, the basal segment being the largest, and the caudal stylets large and rather

longer than the third segment. The abdomen of the male is very curious. It is five-jointed, and has along the sides several tufts of long hairs. I know nothing like this in any other species. The terminal setæ are of moderate length, and the second is rather longer than the others.

Length of cephalothorax .072.

„ abdomen . . . .040, including the stylets.

Collected by Dr. Sutherland in the Atlantic, N. L. 31° 50' to N. L. 27° 30', W. L. 18° to 20°.

Pl. X. figs. 1 to 8.

*Candace pachydactyla*, Da.

I have some specimens very like *C. pachydactyla*, but it is with great hesitation that I refer them to that species, because they differ in the number of segments of the cephalothorax, in the relative sizes of the two branches of the second pair of antennæ, and do not agree very closely in the structure of the first pair of antennæ. Dana has, however, himself figured a specimen with five cephalothoracic segments as belonging to this species, though, it is true, he expresses a doubt on the subject. The anterior antennæ vary a good deal in different specimens, unless, indeed, several separate species are here united together.

The second pair of antennæ have five long hairs at the end of the small accessory branch, and eleven at the end of the organ itself. In one specimen this organ resembled Dana's fig. 1b, Pl. LXXVIII., but in another the two branches were nearly equal in length. The first pair of maxillæ (Pl. VI., fig. 7) are of a very peculiar form, and quite unlike any other that I have seen. I do not know whether the form is generic or only specific. The maxillipeds are small, straight and seven-jointed (fig. 8).

I have several specimens of a female, which I refer to this species, because it agrees in form and in the arrangement of the setæ of both pairs of antennæ, and in the structure of all the organs, which do not present sexual differences. The fifth pair of legs are small and symmetrical (fig. 12), but differ in different specimens.

On the whole, I am inclined to think that two or more nearly allied species are here united, but I have not enough specimens to attempt to separate them.

Collected by Dr. Sutherland in N. L. 12° 21', W. L. 25°, and in N. L. 31° 50', W. L. 18° 30', and by Dana in S. L. 6°, W. L. 24°.

Pl. VI. figs. 6 to 12.



## Genus PONTELLA.

## Sub-genus PONTELLINA.

Cephalothorax postice productus, angulis acutis.

Seta antennarum anticarum apicalis setis subapicalibus brevior.

*Pontella setosa*, n. sp.

Frons subtriangulata. Cephalothorax 6-articulatus, articulo postico magno, angulis posticis brevibus. Oculi superiores grandes. Antennæ anticæ cephalothorace breviores, apicibus fronte valde anterioribus; setis fere rectis, prope basin fere articuli secundi longitudine, postica penultimâ duplo longiore quam apicales. Antenna dextra maris, medio incrassulata, 13-articulata, articulo 10 lamellâ dentatâ instructo, articulis sequentibus tribus (ultimis) normalibus. Pes posticus maris dexter cheliformis, digito elongato tenui et curvato. Abdomen maris 4, fœminæ 2-articulatum.

The species seems to form a link between the sub-genera *Pontellina* and *Pontella*, for though the sides of the head are not armed by two projecting angles, as in the latter, they are not quite flat as is usual in the former, but have two rounded swellings instead of angles.

The anterior antennæ are  $\cdot 08$  in length; those of the female, and the left of the male, are very like those of *P. acutifrons*.

The two branches of the second pair of antennæ are somewhat unequal in size.

The outer branch of the first pair of legs has three segments, the inner two.

The fourth pair also agree in this respect, but the spines along the outer margin are more conspicuous.

Fig. 5 represents the fifth pair of the male, and fig. 6 of the female.

The terminal setæ of the abdomen are five in number, and nearly equal in size.

The length of the cephalothorax is  $\cdot 09$  inch, and of the abdomen  $\cdot 02$ .

Collected by Dr. Sutherland in N. L.  $8^{\circ} 30'$ , W. L.  $23^{\circ}$ .

„  $2^{\circ} 22'$ , „  $19^{\circ}$ .

Pl. XI. figs. 1 to 7.

*Clytemnestra Atlantica*, n. sp.

Corpus pyriforme. Cephalothorax acute rostratus 5-articulatus, segmentis postice rotundatis, non dilatatis, marginibus posterioribus fere rectis, segmento postico tamen denticulato. Antennæ anticæ breves. Abdomen promiscue 4-articulatum. Styli caudales mediocres, setis quatuor.

This species may at once be recognised by the form of the body, which is almost pyriform, the posterior angles of the cephalothoracic segments not projecting laterally. The anterior antennæ are very short, scarcely as long as half the breadth of the cephalothorax. The posterior angles of the cephalothorax are acute. The abdomen is short, and the segments are not distinctly marked. It may be divided into two parts, one broad, and consisting, perhaps, of three segments, the last of which bears on each side a small appendage, terminated by two hairs; the other part narrow, short and bearing the two slender stylets.

It was collected in the Atlantic, and, as there was only one specimen, I did not dissect it, but I think there can be little doubt that it belongs to the genus *Clytemnestra* of Dana.

Length  $\cdot 09$ .

Pl. XII. figs. 12, 13.

*Corycæus Sutherlandii*.

Cephalothorax mediocris, segmento quarto elongate acuto. *Conspicilla* fere contigua. Antennæ anticæ 7-articulatæ, setis longissimis, nudis. Antennarum posticarum digitus articulo secundo brevior; setâ articuli primi nudâ. Abdomen 3?-articulatum  $\cdot 02$  unc. long.; styli caudales abdomine vix breviores  $\cdot 019$  unc. long.; seta caudalis maxima  $\cdot 013$  unc. long.

Anterior antennæ  $\cdot 012$  inch in length. The hairs are nearly twice as long as the organ itself.

Posterior antennæ  $\cdot 015$ . Four-jointed. The basal segment bears two setæ, one short, the other extending beyond the apex of the organ, and appears to be in some measure opposable to the fingers. The second segment bears two teeth at the inner apex, and two "fingers," of which the larger is two-jointed, and the basal part is provided with two teeth. The larger finger is shorter than the second segment, but very little so. The large spine is not plumose.

The third pair of natatory legs consist of a two-jointed basal part, and two three-jointed rami. The inner ramus is short, being shorter than the two first segments of the other. The outer



ramus has the apical segment longer than the other two together.

The fourth pair of natatories has the inner ramus obsolete; it is, however, represented by a little knob with a long seta. The other ramus has three sub-equal segments. There is a basal hair, but it is not plumose.

I am not sure whether the abdomen consists of two or three segments, for there is a line across the basal part, but I do not think it represents a joint.

In Dana's arrangement of the genus this species would come next to *C. latus*, from which, however, it may at once be known by the caudal stylets being almost as long as the abdomen.

Attached to the abdomen was, in one case, one, in another two, small oval membranous sacs, which I suppose to be spermatocysts.

Length .083.

Atlantic Ocean.

Pl. VII. figs. 7, 12.

*Corycæus styliferus*.

Cephalothorax angulis posticis elongatis. Conspicilla remotiuscula. Antennæ anticæ longe setulosæ. Antennarum posticarum carpus digito brevior, setis duabus carpi fere longitudine, nudis? Abdomen 2-articulatum. Styli caudales abdominis longitudine, seta una longa, stylis vix brevioribus, aliis brevibus.

Length of cephalothorax, including the angles, .036; of the abdomen, .025; total length .056.

Collected in N. S. 12° 21'; W. L. 25°.

Pl. V. figs. 7, 8.

*Copilia Atlantica*, n. sp.

Cephalothorax fronte latus, et profunde excavatus, segmentum anticum postice paulo latior, segmentis posticis latere obtusis, utroque præcedenti angustiore, ultimo ad apicem dorsalem posticum spinigero. Antennæ posticæ ad articulum primum setulosæ, digito longo. Pedes natatorii primi paris ramis triarticulatis, pedes postici ramis 3 et 1-articulatis. Abdomen tenue, sine stylis, cephalothoracis dimidio brevius, obsolete 5-articulatum. Styli abdomine longiore, tenuissimi.

This species very much resembles *C. mirabilis* of Dana, which was found in the Pacific Ocean. The chief differences are, the deeper frontal excavation, and the three-jointed branches of the

first three pairs of natatory legs, which in Dana's figure have four segments. He has not, however, described them, and the figure may be erroneous on this point. Length of cephalothorax, .06; of abdomen, .03; of abdominal stylets, .04; total length, .120. The depth of the frontal excavation is .004.

In the Atlantic, N. L. 12° 21'; W. L. 25°.

Pl. IV. figs. 11 to 14.

*Sapphirina Danae*, n. sp.

Cephalothoracis segmentum primum breve. Conspicilla contigua non-prominentia. Digitus antennarum posticarum paulo brevior quam carpus, unguiculo elongato. Lamellæ caudales subovatae, apice interno breviter denticulato, ad apicem rotundatae, setis quatuor duabus apicalibus, aliis externis, omnibus dimidio lamellæ, non brevioribus.

This species much resembles *S. coruscans*, but is broader in proportion, the conspicilla are not prominent, the first segment of the cephalothorax is not so long as broad, and the caudal lamellæ have no hair at the inner apex. The length is .092, the breadth .046. The length of the caudal lamellæ is .01, and the breadth .0046. The length of the second segment of the posterior antennæ is .011, of the finger .0099, and of the claw .004. The basal part of the anterior antennæ has no distinct articulations, and the second apparent segment is longer than the two following.

Colour a brilliant metallic blue.

Collected in the Atlantic, 27° 30', N. L.; W. L. 20°.

Pl. XII. figs. 9, 10, 11.

*Sapphirina opaca*, n. sp.

Fœminæ.—Conspicilla contigua. Digitus antennarum posticarum carpo brevior, unguiculo fere dimidii digiti longitudine. Cephalothorax 5-articulatus, ovatus, segmentum primum literæ  $\square$  formam similis, segmentis duobus posticis latere rotundatis. Abdomen 6-articulatum, segmento primo parvulo, secundo rotundato, tertio, quarto quintoque lunatis, postico parvulo. Styli caudales magni, longitudine .008, latitudine .005 unc., apice interno denticulato. Opaca.

This species very closely resembles *S. indigotica*, from which it differs only in having the anterior segment of the cephalothorax separated, and in the fourth and fifth segments being rounded at the margins. Length .063.

Atlantic Ocean.

Pl. V. figs. 9, 10, 11.

*Sapphirina stylifera*, n. sp.

Digitus antennarum posticarum tenuis, carpo fere duplo longior. Lamellæ caudales longæ, latitudine  $\cdot 002$ , longitudine  $\cdot 025$  unc.

This species may at once be distinguished from any other by the length and narrowness of the caudal stylets. I had only two specimens, neither of which were in a very good state of preservation, and I could not determine with certainty whether the conspicilla were contiguous or not.

Collected in N. L.  $12^{\circ} 21'$ ; W. L.  $25^{\circ}$ .

Pl. IV. figs. 9, 10.

*Halocypris Atlantica*, n. sp.

Forma *Conchæciam* refert, latere visa, literæ  $\cup$  elongatæ formam similis, postice paulo altior, margine supero recto, incisurâ medianâ, antico et infero leniter arcuato, postico obliquo, infernè rotundato, supernè angulato, ad apicem obtuso. Supernè visa, *C. agili* angustior.

This species appears to be somewhat intermediate between the genera *Conchæcia* and *Halocypris*. In external form it more resembles the former, but the structure of the anterior antennæ and the mandibles proves that it in fact belongs to the latter.

The anterior antenna (Pl. XII., fig. 3) differs from that figured by Dana in consisting only of one segment. The hairs belonging to it were all imperfect, except two. I only had two specimens, and did not succeed in detaching the maxillipeds uninjured. The figures are magnified thirty times, except figs. 1 and 2, which are magnified only fifteen times.

Length  $\cdot 086$ .

Collected in N. L.  $12^{\circ} 21'$ ;  $25^{\circ}$  W.

Pl. XII. figs. 1 to 8.

## DESCRIPTIONS OF THE PLATES.

## PLATE II.

- Fig. 1. *Diaptomus dubius*, n. sp. Outline, seen from above.  
 2. " " Right anterior antenna of male.  
 3. " " Maxilliped.  
 4. " " Leg of the first pair.  
 5. " " " fourth pair.  
 6. " " Fifth pair of legs of the male.  
 7. " " " female.  
 8. *Calanus inconspicuus*, n. sp. Outline seen from above.  
 9. " " Terminal segments of the anterior antenna.  
 10. " " Leg of the first pair.  
 11. " " " fourth pair.  
 12. *Calanus latus*, n. sp. Terminal segments of the anterior antenna.

## PLATE III.

- Fig. 1. *Calanus brevicornis*, n. sp. Outline, seen from above.  
 2. " " Antenna of the second pair.  
 3. " " Mandible.  
 4. " " Maxilla of the first pair.  
 5. " " Maxilliped.  
 6. " " Leg of the first pair.  
 7. " " " fifth pair.

## PLATE IV.

- Fig. 1. *Calanus penicillatus*, n. sp. Outline, seen from above.  
 2. " " Maxilla of the first pair.  
 3. " " Leg of the first pair.  
 4. *Undina Helenæ*, n. sp. Maxilla of the first pair.  
 5. *Undina pulchra*, n. sp. Maxilliped.  
 6. " " Leg of the first pair.  
 7. " " " fourth pair.  
 8. " " Fifth pair of legs, male.  
 9. *Sapphirina stylifera*, n. sp. Outline.  
 10. " " Antenna of the second pair.  
 11. *Copilia Atlantica*, n. sp. Front.  
 12. " " Leg of the first pair.  
 13. " " " fifth pair.  
 14. " " Antenna of the second pair.

## PLATE V.

- Fig. 1. *Calanus mirabilis*, n. sp. Outline, seen from above.  
 2. " " Antenna of second pair.  
 3. " " Mandible.  
 4. " " Leg of first pair.  
 5. " " " fourth pair.  
 6. " " Abdomen and end of cephalothorax, seen from the side.  
 7. *Corycæus styliferus*, n. sp. Outline, seen from above.  
 8. " " " the side.  
 9. *Sapphirina opaca*, n. sp. Outline, seen from above.  
 10. " " Antenna of the first pair.  
 11. " " " second pair.

## PLATE VI.

- Fig. 1. *Undina longipes*, n. sp. Outline, seen from above.  
 2. " " End of anterior antenna.  
 3. " " Maxilla of the first pair.  
 4. " " " second pair.  
 5. " " Fifth pair of legs, male.  
 6. *Candace pachydactyla*. End of anterior antenna.  
 7. " " Maxilla of the first pair.  
 8. " " Maxilliped.  
 9. " " Leg of the first pair.  
 10. " " " fourth pair.  
 11. " " " fifth pair of legs.  
 12. " " Leg of the fifth pair.

## PLATE VII.

- Fig. 1. *Undina Helena*, n. sp. Outline.  
 2. " " End of anterior antenna.  
 3. " " Maxilliped.  
 4. " " Leg of the first pair.  
 5. " " Fifth pair of legs.  
 6. *Undina pulchra*, n. sp. End of anterior antenna.  
 7. *Corycæus Sutherlandii*.  
 8. " " Maxilliped?  
 9. " " Anterior antenna.  
 10. " " Leg of the first pair.  
 11. " " Fifth pair of legs.  
 12. " " Abdomen.

## PLATE VIII.

- Fig. 1. *Euchæta Atlantica*, n. sp. Outline of the front and of the anterior antenna, seen from above.  
 2. " " End of the anterior antenna, female.  
 3. " " Leg of the first pair, male.  
 4. " " " fourth pair, female.  
 5. " " Fifth pair of legs, male.  
 6. " " Abdomen and part of the cephalothorax, seen from the side, female.

## PLATE IX.

- Fig. 1. *Euchæta Sutherlandii*, n. sp. Outline, seen from the side.  
 2. " " Fifth pair of legs.  
 3. *Undina plumosa*, n. sp. End of anterior antennæ, male.  
 4. " " Posterior antennæ.  
 5. " " Fifth pair of legs.  
 6. *Undina Danae*, n. sp. Front, seen from above.  
 7. " " End of the anterior antennæ.  
 8. " " Maxilliped.  
 9. " " Fifth pair of legs, male.

## PLATE X.

- Fig. 1. *Diaptomus abdominalis*, n. sp. Outline, seen from above.  
 2. " " End of anterior antenna, male.  
 3. " " Posterior.  
 4. " " Leg of the first pair.  
 5. " " " fourth pair.  
 6. " " Fifth pair of legs, female.  
 7. " " " male.  
 8. " " Abdomen and end of cephalothorax of female, seen from above.  
 9. } *Calanus communis*, Dana. End of cephalothorax, seen from the side.  
 10. }

## PLATE XI.

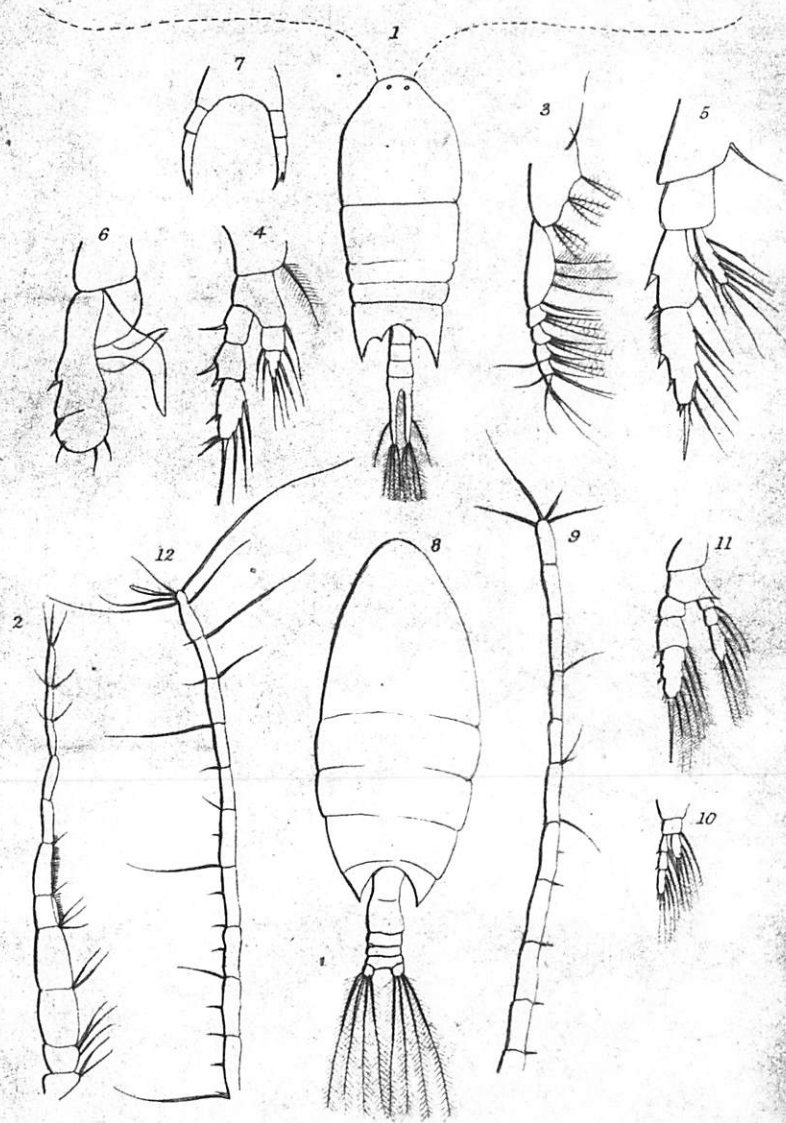
- Fig. 1. *Pontella setosa*, n. sp. Outline, seen from above.  
 2. " " Maxilliped.  
 3. " " Leg of the first pair.  
 4. " " " fourth pair.  
 5. " " Fifth pair of legs, male.  
 6. " " " female.  
 7. " " End of cephalothorax, seen from the side.  
 8. *Calanus latus*, n. sp. Front, seen from above.  
 9. " " Posterior antenna.  
 10. " " Maxilla of the first pair.  
 11. " " Abdomen and end of cephalothorax.

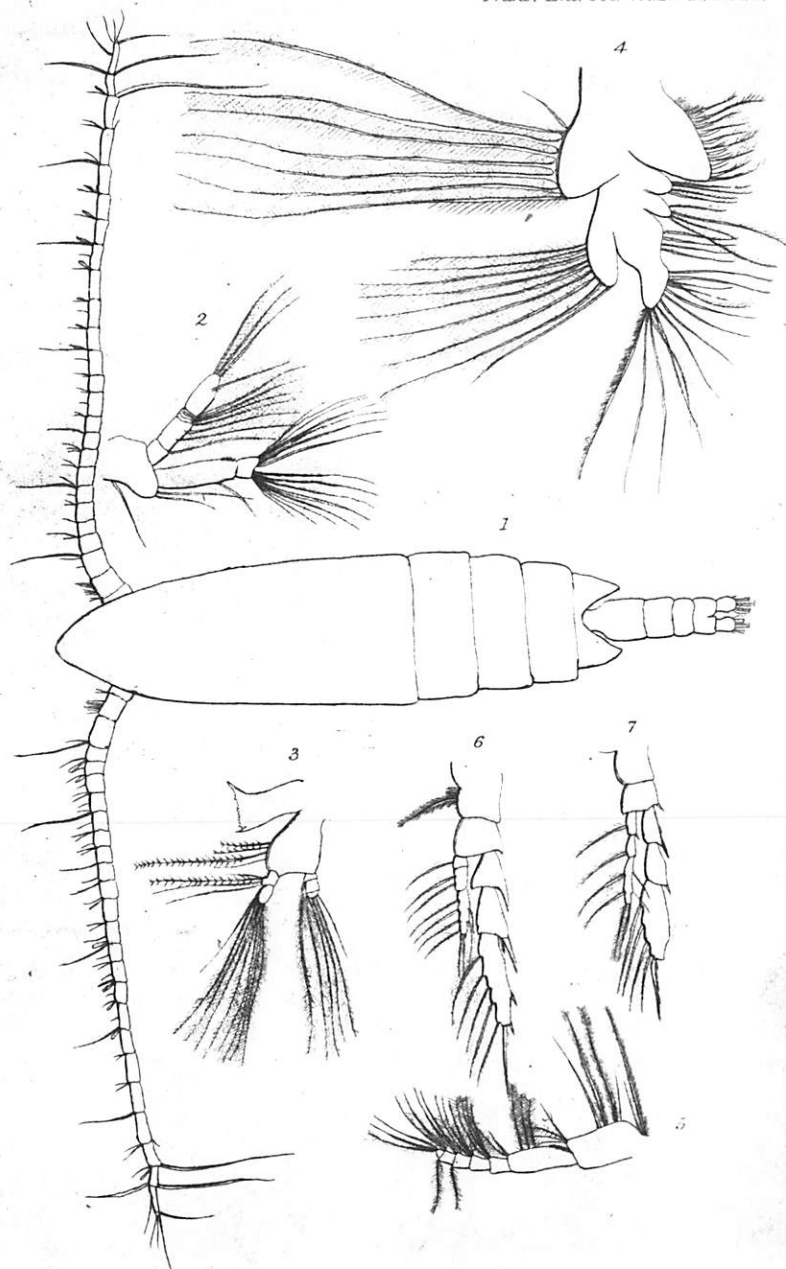
## PLATE XII.

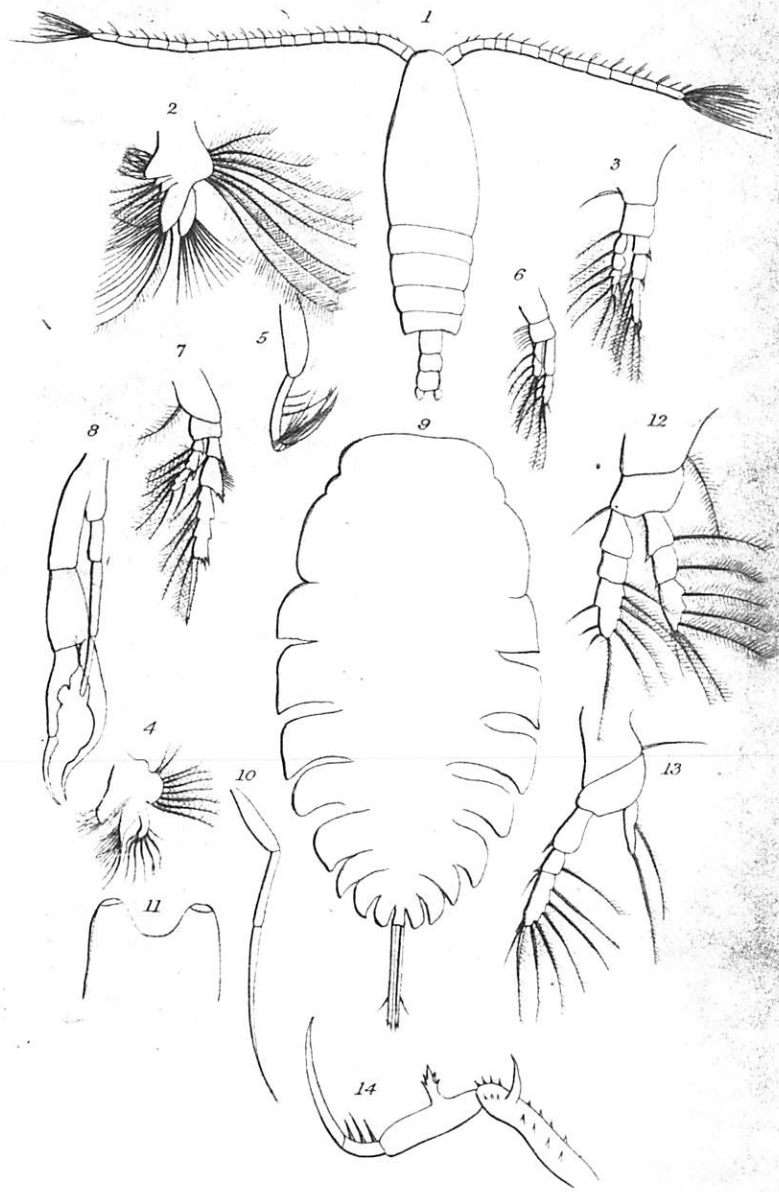
- Fig. 1. *Halocypris Atlantica*, n. sp. Outline, seen from the side.  
 2. " " " above.  
 3. " " First antenna.  
 4. " " Second "  
 5. " " Mandible.  
 6. " " Maxilla.  
 7. " " Leg of the first pair.  
 8. " " " second pair.  
 9. *Sapphirina Danae*, n. sp. Outline, seen from above.  
 10. " " First antenna.  
 11. " " Second "  
 12. *Clytemnestra Atlantica*, n. sp. Outline, seen from above.  
 13. " " Antenna of the second pair.

These drawings were made with the help of the Camera lucida.  
 The secondary hairs in figs. 2, 3, 4 and 5 of Pl. V. are too thick.



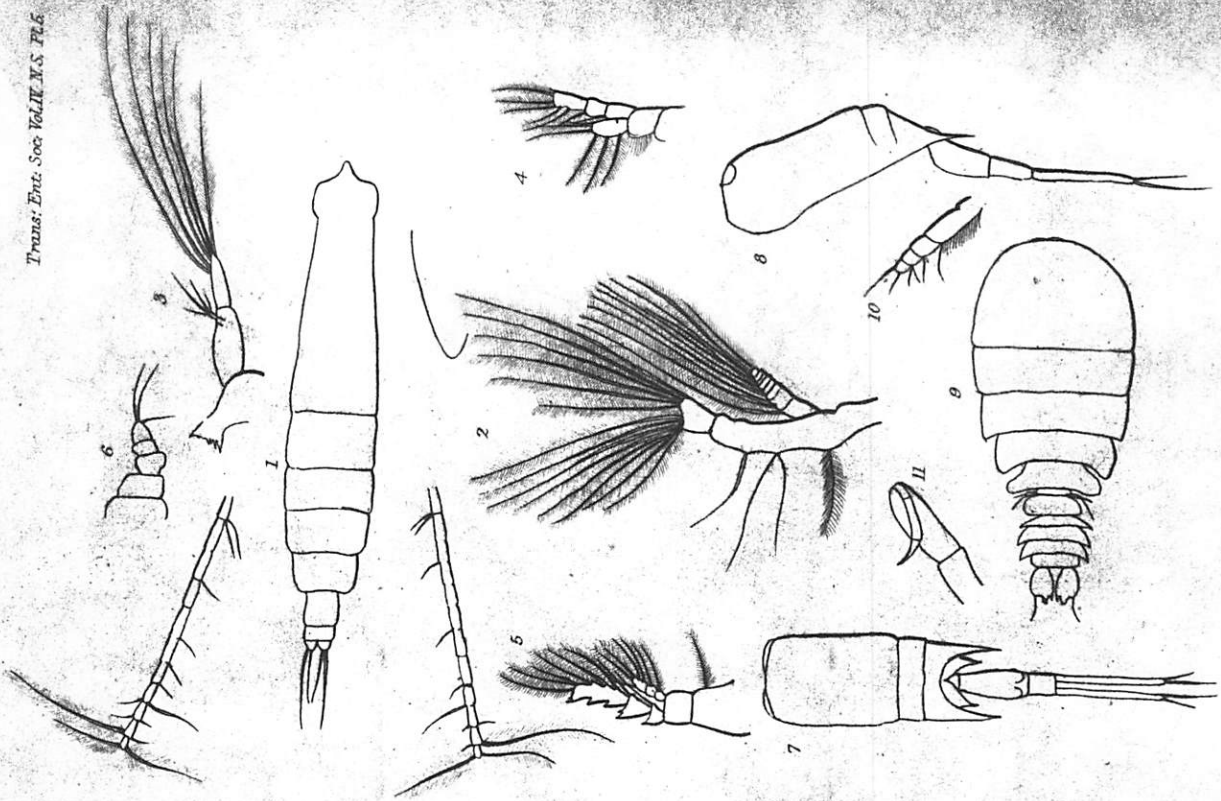


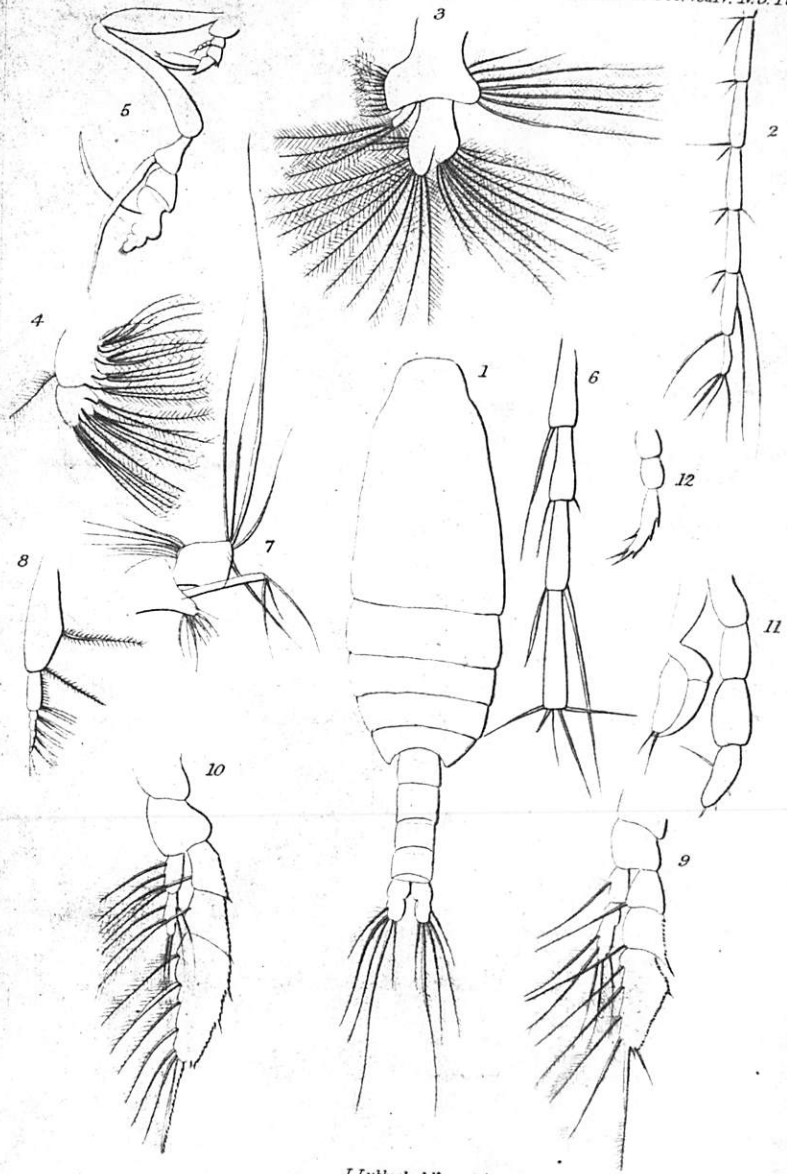




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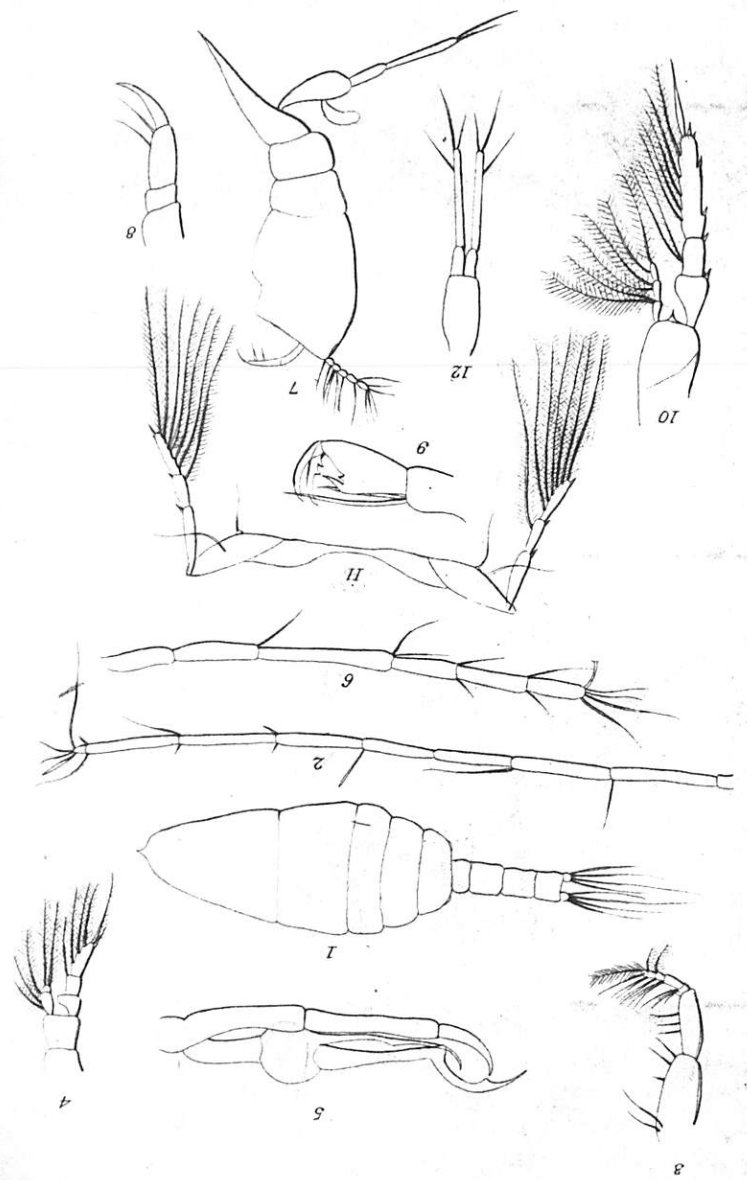






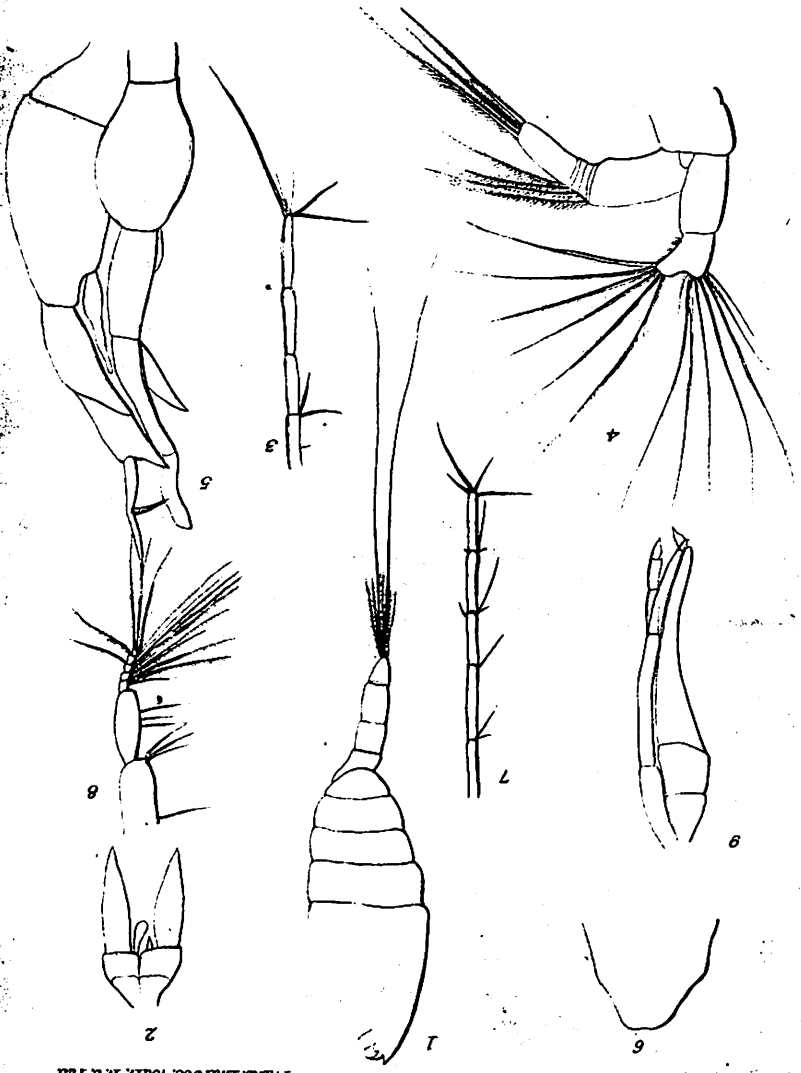
J. Lubbock, del. et sculp.





*J. Lubbock del. & sculp.*

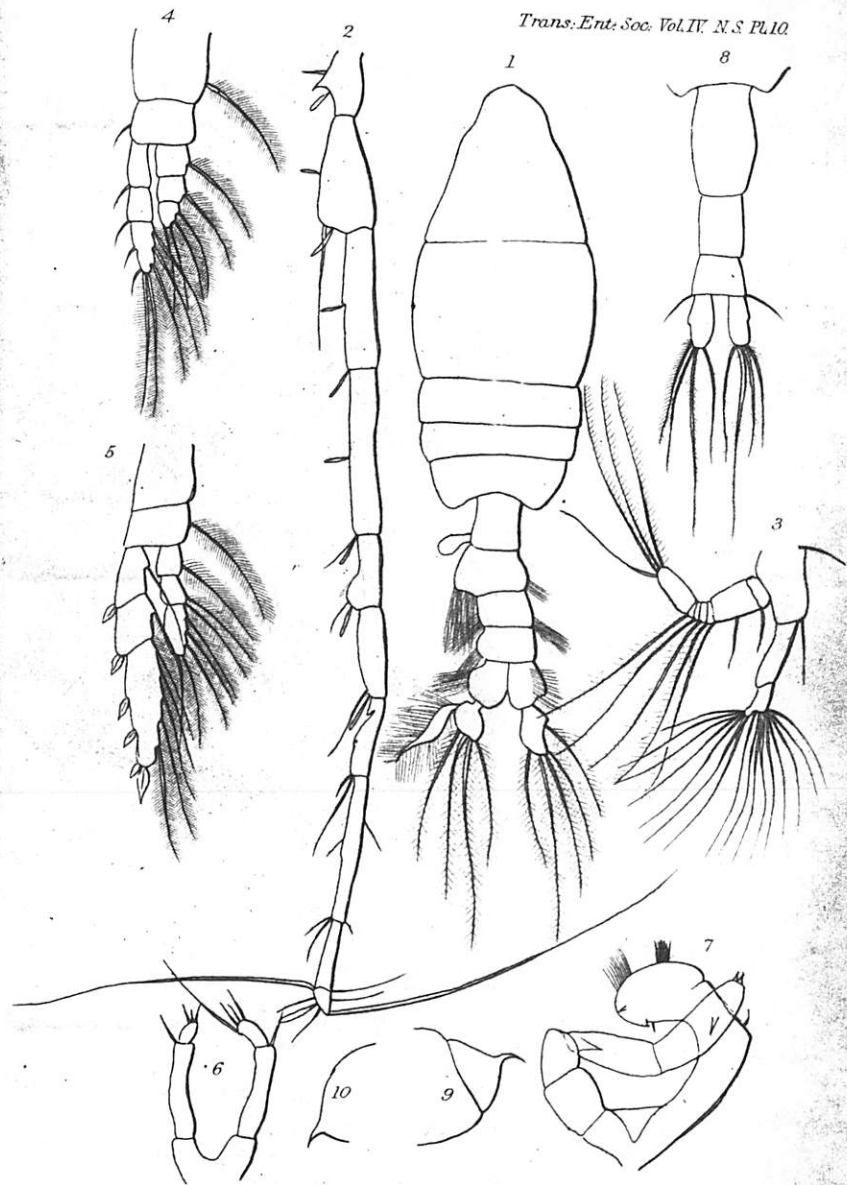


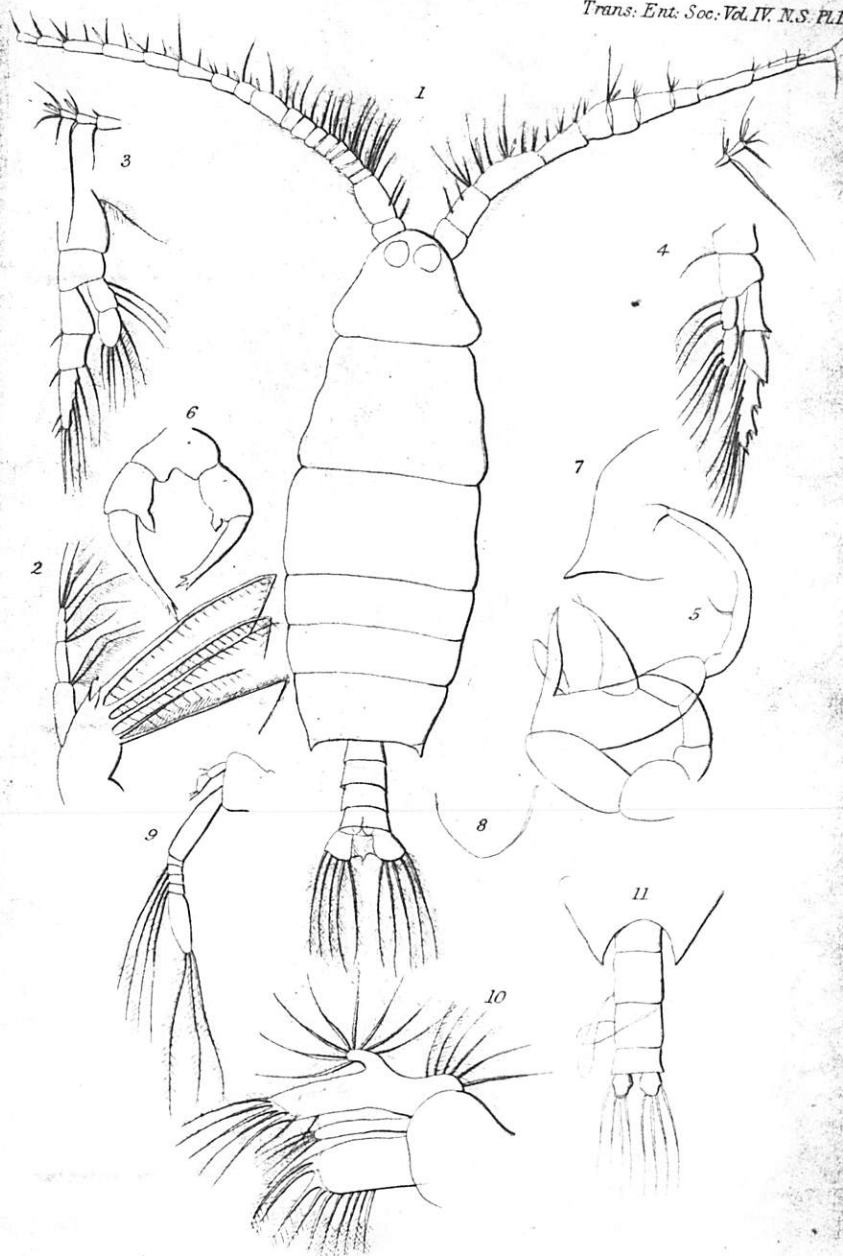


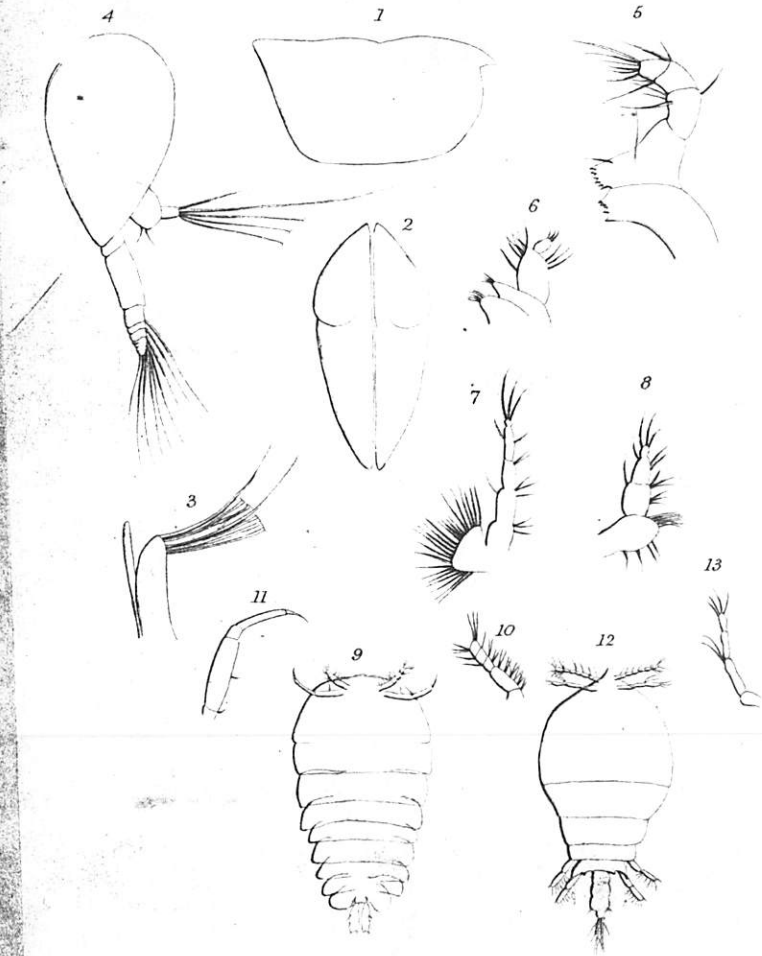
*J. Lubbock del. et sculp.*

*Trans. Entom. Soc. Vol. IV N. S. Pl. 9*









J. Lubbock, del<sup>s</sup> et sculp<sup>s</sup>



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TRANSACTIONS

OF THE

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OF

LONDON.

NEW SERIES.

  
VOL. IV.

43  
807A

LONDON:

PRINTED FOR THE SOCIETY BY C. ROWORTH AND SONS,  
BELL YARD, FLEET STREET.

SOLD BY LONGMAN, BROWN, GREEN AND LONGMANS  
PATERNOSTER ROW.

1856—1858.

