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# THE ANNALS

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XXXIX.—Description of eight new species of *Entomostraca* found at Weymouth. By JOHN LUBBOCK, F.G.S.

[With two Plates.]

DURING a short visit to Weymouth this autumn, I endeavoured to rediscover *Calanus* (or *Temora*) *Finmarchicus*, in order to clear up certain doubtful points in its anatomy.

Though unsuccessful in this search, I was amply repaid by the discovery of eight new species of *Entomostraca*, three of which belong to genera not previously caught in our seas, and two are even the representatives of families not hitherto recorded as British.

### *Calanus Euchæta.*

Frons obtusa. Cephalothorax 5-articulatus, postice obtusus, superne visus sinuatus. Antennæ anticæ cephalothoracis longitudine; setis apicalibus, et subapicali postera, æquis, subapicalibus anteris brevibus. Antennæ secundæ, ramo uno longo, altero plus duplo brevior, 1-articulato. Pedes primi, ramo uno 3-articulato, altero 2-articulato, articulo primo elongato. Pedes poster, parvi, uno tantum ramo, setis plumosis non instructi. Styli caudales breves, setis mediocribus.

This species is colourless, except the eye, which is bright red. The cephalothorax is of the ordinary form, and much resembles that of *C. comptus*, except that it is rather more obtuse; in this respect more nearly resembling *C. simplicicaudus*. The first segment of the cephalothorax occupies about  $\frac{2}{5}$ ths of its whole length. The antennæ, measured from end to end in the position they usually occupy, are as long as the cephalothorax, and about eight of the setæ are considerably longer than the rest,

and equal to one another; two of these are situated at the apex, one on the posterior side of the second segment, one on the anterior side of the fourth, and the others at nearly equal distances along the antenna. The penultimate anterior and the antepenultimate setæ are short. This diffusion of the long setæ over the whole length of the antennæ is very peculiar, and similar to what occurs in the genus *Euchæta*.

The second pair of antennæ, Pl. X. fig. 3, are also abnormal, and resemble those of no other species with which I am acquainted. They consist, as usual, of two branches, one of which is long and three-jointed, and bears at the apex two tufts, one of six, the other of eight long hairs. The second segment bears one hair, and the basal one eight, increasing in length from the base towards the apical end. This branch is neither rounded nor truncate at the free end, but ends in a sharp edge like an adze, or the gnawing tooth of a Rodent. The smaller branch is not jointed, and is truncate, with eight hairs at the end.

The first pair of legs (or, according to Prof. Dana's nomenclature, the second), Pl. X. fig. 4, have the outer ramus three-jointed, the first and second each bearing one hair on the inner side, and, as well as the third, a short spine on the outer margin. The inner branch consists of two segments, of which the basal is long and narrow, with parallel sides, and three hairs at equal distances.

The fifth pair of legs (Pl. X. fig. 5) have only one ramus, are four-jointed, and have no plumose setæ, and only one long, naked hair at the base.

The abdomen has four subequal segments and short lamellæ, with six diverging hairs, of which the fourth (counting from the outside) is a little the longest; the third and fifth are rather shorter, the second again rather shorter, and the first and sixth are quite small.

The cephalothorax had, in the greater number of specimens, three very minute spines on the posterior margin of the last segment; a few specimens, however, had four; and one or two had only two, or even none.

I also found other specimens which had the abdomen only three-jointed, and the posterior legs (Pl. X. fig. 6) consisting of a basal part bearing on each side a long and large hair, and of a small second segment ending in a stout spine about half as long as these hairs. These specimens I have little doubt were the females of this species, since they agreed in all the other characters, especially in the form of the cephalothorax, the structure of the two pairs of antennæ, and the first pair of legs.

I have described this species at length, in order to distinguish it from others that may hereafter be discovered; from all those

at present known, however, it is separated by the arrangement of the setæ of the anterior antennæ.

It was frequent at Weymouth this last September and October, and in confinement preferred the top of the water, and the sunny side of the glass in which it was kept. Several specimens had spermatic tubes attached to them.

Length  $\frac{1}{35}$ th of an inch.

Pl. X. figs. 1-6.

*Calanus anglicus*, n. s.

Frons rotundata, contracta. Cephalothorax 4-articulatus, postice rotundatus, superne visus sinuatus, subacutus. Antennæ corpore paulo breviores, setis brevibus, subapicalibus longioribus, postica penultima brevi. Pedes primi, ramo uno 3-articulato, altero 1-articulato. Pedes alii, ramis ambobus 3-articulatis. Abdomen 4-articulatum; stylis setisque abdominalibus mediocribus.

This species occupies a place in the genus close to *C. lævis*, with which alone it can be confounded. The anterior penultimate seta of the anterior antenna is much longer than the posterior penultimate, and the antennæ themselves are rather shorter than the body. Moreover, all my specimens had the abdomen four-jointed. It might be objected to this, that my specimens may have been males, and those of Dr. Dana females; but I believe that I found both sexes,—at least some had the posterior abdominal segment quite short, while in others it was nearly as long as the preceding segment. One specimen had, attached to the first abdominal segment, a sac, containing a round, darkish body, which seemed too large to be an egg (Pl. X. fig. 10).

Colour red. Length of cephalothorax  $\cdot 028$  of an inch; total length  $\cdot 04$ . Length of anterior antenna (measured across the curve)  $\cdot 035$ .

Caught at Weymouth in October 1857.

Pl. X. figs. 9 & 10.

DIAPTOMUS.

This genus, when originally founded by Mr. Westwood, contained only our well-known freshwater species, *D. Castor*; and it maintained its freshwater character until I assigned to it, with some doubt, the marine form *D. dubius*. I have now to describe two new species, both characterized by having the eyes small and close together, if not united; the right anterior antenna of the male, and the fifth pair of legs in the same sex, prehensile; and the maxillipeds and second pair of antennæ Calanoid. Prof. Dana describes the posterior legs of the female as being long, thick, and unlike the preceding pairs. In these organs, however, there is considerable variation: in *D. longicaudatus*, now

to be described, they consist each of one three-jointed ramus, possess no hairs, but only a few spines, and altogether resemble the same organs in some species of *Pontella*. In *D. Castor* and *D. americanus*, on the contrary, both legs possess two three-jointed branches, and if not ordinary hairs, at any rate a very near approach to them.

Further, in *D. Bateanus*, my other new species, the organs in question much resemble the other legs, and indeed differ only in having a spine, stronger than usual, but varying considerably in size, on the inner side of the second segment of the outer branch. This spine is the representative of a much larger one which occupies a corresponding situation in the right leg of the male, but (and this is somewhat remarkable) is not present in the left leg of that sex, although present on both sides in the female.

It follows from Prof. Dana's description, that his species of *Calanopia* resemble *Pontella* in their maxillipeds and first pair of legs, but he does not expressly say so, and in other respects they so closely resemble the species now to be described, that I cannot doubt that they belong to the same group.

*Diaptomus Bateanus*, n. s.

Frons obtusa. Cephalothorax postice rotundatus, mucronatus. Antennæ anticæ corpore paulo breviores, setis brevibus, postica penultima articulum longitudine superante, setis aliis brevioribus. Pes posticus maris dexter magnus, digito elongato, inflexo. Pedes postici fœminæ pedibus aliis fere similes.

*The right male antenna* has a series of minute teeth occupying the anterior side of the fifth, sixth and seventh segments, counting from the free end, and the hinge-joint is between the fifth and sixth.

*The maxillipeds* resemble those of the species which I have named *Diaptomus dubius*.

*The first pair of legs* have both branches three-jointed; the basal segment of the lesser ramus bears one hair, the second two, and the third three on the inner margin and two at the apex. The second segment of the larger branch bears one hair, the inner margin of the terminal segment four, and the apex has a large spine, serrated on the outer side.

*The fifth pair of legs* resemble those of *C. brachiata*, but the long spine on the second segment of the outer branch of the right leg is curved, but not bent at a right angle.

The *abdomen* is four-jointed, and the caudal lamellæ and setæ are moderately long, the fourth from the outside being the longest.

I found some specimens agreeing with this species in the form of the second pair of antennæ, second pair of maxillæ, cephalothorax, the first and fourth pairs of legs, maxillipeds, and the abdominal lamella. The fifth pair of legs, however, were large and natatory, but the inner branch exactly agreed with that of the male. The outer one was two-jointed, the apical segment twice as large as the basal, and bearing at the free end a large spine, and on the inner margin four long hairs, all on the apical half of the segment. I believe therefore that these were females of this species.

I have named it after Mr. Spence Bate, who has done and is doing so much good service in the cause of science.

Caught at Weymouth, October 1857.

Length of cephalothorax  $\cdot 034$ ; of abdomen  $\cdot 016$ ; of anterior antenna  $\cdot 046$ .

Pl. XI. figs. 1-3.

Several specimens were attacked by one of the parasitic Isopods, apparently an *Anilocra*, which was firmly fastened to the back of its victim. This is the first time, I believe, that a Crustacean parasite has been observed attached to any of the Cyclopoidea. The *Anilocra* was more than half as long as the *Diaptomus*.

*Diaptomus longicaudatus*, n. s.

Frons obtusa. Cephalothorax postice rotundatus. Antennæ anticæ corpore breviores, setis brevibus, subæquis. Pedes primi, ramo uno 3-articulato, altero 2-articulato. Pedes postici, uno tantum ramo præditi. Abdomen 5-articulatum; styli caudales longi, abdomine vix breviores.

The absence of angles to the cephalothorax, and the structure of the fifth pair of legs, separate this from the preceding species; but as it has the right antennæ and right posterior leg of the male prehensile, and the second pair of antennæ Calanoid, it must belong to this genus.

The first pair of antennæ are shorter than the body, but longer than the cephalothorax; the setæ are all short, none of them much exceeding the length of one of the segments.

The second pair of antennæ are Calanoid.

The maxillipeds closely resemble those of *Diaptomus dubius*.

The first pair of legs have one segment three-, the other two-jointed. This is also the case with the first pair.

The fifth pair of legs are prehensile and Pontelloid. The figure will give a better idea of their form than description can convey.

The abdomen is five-jointed. The caudal lamella is nearly as long, and has five hairs at the end, of the usual relative lengths.

Length of cephalothorax  $\cdot 03$ , of abdomen  $\cdot 012$ , of lamella  $\cdot 01$ . Total,  $\cdot 052$ . Length of antenna  $\cdot 043$ .

Colour opaque brown; eye red. Not so numerous as *D. Thompsoni*, but not unfrequent.

Weymouth, October 1857.

*Female*. I also caught several specimens of a female, which I believe belongs to this species. It agreed in the general form of the cephalothorax and abdominal lamellæ, antennæ, maxillipeds, and first pair of legs. The fifth pair of legs are small, symmetrical, and three-jointed; the apical segment bearing four spines, two at the end and one on each side. The abdomen was three-jointed.

Pl. X. figs. 11, 12; Pl. XI. figs. 12, 13.

#### PONTELLA.

The genus *Pontia* was instituted by Milne-Edwards; but the name was altered by Dana to *Pontella*, *Pontia* having been already used. Before the appearance of Dana's work on Crustacea, three species only were known; but that great naturalist described and figured no less than twenty-seven new species, and divided them into three highly natural groups: 1st, *Calanopia*, the species of which ought rather, I think, to be referred to *Diaptomus*; 2nd, *Pontellina*, having the head unarmed; and 3rd, *Pontella*, in which it has a reversed spine on each side.

The present species is the first that has been found in our seas, and may be described as follows:—

#### *Pontella Wollastoni*.

Frons subtriangulata, apice rotundata. Cephalothorax 7-articulatus, postice acutus. Oculi magni. Antennæ anticæ cephalothorace non breviores, maris dextra, crassa, prehensilis, setis brevibus. Pedes primi paris, ramo uno 3-articulato, altero 2-articulato. Pes posticus maris dexter, crassus. Abdomen 4-articulatum, stylis setisque caudalibus mediocribus.

In this species the front is subtriangular, rounded in front. The cephalothorax is seven-jointed, the posterior segment being short and having its angles slightly elongated. The anterior antennæ are swollen; the fourth and fifth segments (counting from the apex) are elongated, and toothed along the inner margin. The setæ are short.

The posterior antennæ have the larger branch only about  $\frac{1}{4}$  longer than the other.

The maxillæ and maxillipeds are as usual.

The first and fourth pairs of legs have both rami three-jointed.

The fifth pair (Pl. XI. fig. 11) are as usual. The penultimate



segment, or hand, is swollen, and bears at the base a long immoveable spine, which acts in opposition to the still longer curved finger. The left leg appears to consist of two rami.

*Caudal setæ* as usual; the fourth (counting from the outside) being the longest.

*Female.* The preceding description applies to the male. The female, which I believe to correspond to this species, agreed with the male in the general form of the cephalothorax, which was  $\cdot 07$  of an inch in length, but the posterior segment was not very clearly separated from the penultimate. The anterior antennæ were rather longer than the cephalothorax; the posterior penultimate seta was about half as long again as its segment. The other setæ scarcely exceeded the length of the segments to which they were attached. The maxillipeds and first pair of legs agreed with those of the male.

Prof. Dana observes, that the fifth pair of legs in the female do not afford good specific characters in this genus; but, with all respect for so great an authority, I venture to offer a different opinion, at least as regards all those which I have been able to examine. In this species the two branches are reduced to simple, ovate, inarticulate lobes; the outer and larger being about  $\frac{1}{4}$  longer than the other, and having a small tooth on the inner margin near to the apex.

Colourless, except the bright red eyes.

Collected at Weymouth in October 1857.

I have named the species after my friend Mr. Wollaston, so well known for his excellent work on the Coleoptera of Madeira, and for other interesting essays on various branches of entomology.

Pl. XI. figs. 9, 10, 11 & 18.

*Pontellina brevicornis.*

Frons rotundata. Cephalothorax 5-articulatus, articulis quatuor posticis subæquis, postice in angulis productus, dextro longiore; segmento primo non lateribus angulatis. Antennæ primæ cephalothorace breviores, setis brevibus, apicalibus longioribus, articulum longitudine superantibus. Antennarum posticarum rami non valde inæquales. Pedes primi, ramis 3-articulatis. Pedes postici maris crassi. Abdomen 5-articulatum, stylis setisque mediocribus.

This species represents the third of the groups into which Prof. Dana has divided the genus, and consequently wants the reversed spine on the side of the first cephalothoracic segment. The front is rounded, and the posterior corners of the cephalothorax are produced into short angles.

The anterior antennæ are shorter than the cephalothorax; some of the apical setæ are more than twice as long as the seg-

ment; the penultimate setæ are short, the anterior antepenultimate is longer again.

The second pair of antennæ have the lesser ramus nearly as large as the other, and with six long terminal hairs.

The maxillipeds have the five terminal segments united into one, which, however, shows its compound nature by being provided with five lobes or shallow projections on one side.

The first pair of legs have both rami three-jointed; the outer branch has one hair on each of the two basal segments; the inner branch has one hair on the basal segment, two on the second, and six in all on the apical.

The fifth pair of legs differ so much in *Pontella*, that the different species may generally be distinguished by them alone. Their forms, however, are so irregular, as to be somewhat difficult of description. In this case both legs consist of three subequal swollen segments, differing, however, in the two legs, and ending in the right by a simple, rather long spine. There are no setose hairs.

The abdomen is five-jointed; the caudal lamellæ are about as long as the posterior segment, and the setæ are of the usual length and comparative sizes.

All the upper part of the body was colourless, the lower part dark brown.

Length of cephalothorax  $\cdot 03$  of an inch, of abdomen  $\cdot 01$ ; total  $\cdot 036$ . Length of anterior antenna  $\cdot 028$ .

Found at Weymouth, October 1857. There were not many specimens.

The female which I suppose to belong to this species was the only female *Pontellina* I met with, as the male was the only male; they agree in the general form, in the anterior antenna of the left side, the maxillipeds, first pair of legs, abdominal lamellæ and setæ. Most of the specimens were colourless, but one was black.

The branches of the fifth pair of legs (Pl. XI. fig. 8) consist of only one segment, and are of almost equal breadth throughout; the lesser branch ends in two equal teeth, and the larger has the external angles produced into two spines, the inner one being the longer, and also a still larger spine projecting from the apex; there is also a small spine on the middle of the outer margin.

Pl. XI. figs. 4-8.

#### *Corycæus anglicus*, n. s.

Cephalothorax crassiusculus, postice acutus. Conspicilla larga, remotiuscula. Antennæ anticæ longe setigeræ. Antennarum secundarum digitus articulo secundo longior. Abdomen 2-articula-

tum. Styli caudales abdomine breviores. Setæ caudales stylis longiores.

This species belongs to a small group of the genus which contains four others also. From *C. crassiusculus* it may be at once distinguished by the two-jointed abdomen; from *C. laticeps* by the caudal lamella being more than half as long as the abdomen (excluding, of course, the lamella itself); and from *C. vitreus*, *agilis*, and *orientalis* by the finger of the second antenna being considerably longer than the second segment.

The cephalothorax, seen from above, much resembles that of *Corycæus styliferus*, mihi.

Specimens of this species were often found *in coitu*, and when so, clung together very tenaciously, not being in some cases separated when put into spirits of wine, so that they were not divided even by death. Prof. Dana was unable to discover any sexual differences in the genus, but I always found in this species the first segment of the abdomen of the male occupied by a bright mass, which was absent from that of the female. The vermiform mass of pigment attached to the eye, also, went considerably further back in the male than in the female; so that I should be inclined to regard Prof. Dana's representation of *C. vitreus* as that of a male, and that of *C. agilis* as that of a female.

Being the first species found in the British seas, I have named it *C. anglicus*.

Length of cephalothorax  $\cdot 029$ , of abdomen  $\cdot 014$ ; total  $\cdot 04$ .

Pl. XI. figs. 14 to 16.

#### MONSTRILLA.

The genus *Monstrilla* and the family Monstrillidæ were founded by Prof. Dana for a single specimen caught by him in the Sooloo Sea; and I have now the pleasure to record a second species found by me at Weymouth. Both appear to be very rare; at least Prof. Dana in all his travels met with only one specimen; and though I searched with great diligence, I was scarcely more fortunate.

#### *Monstrilla anglica*.

Frons quadrata, angulis rotundatis. Cephalothoracis segmentum primum postice paulo latius. Antennæ 5-articulatæ, setis antenna brevioribus. Abdomen 4-articulatum, segmentis subæqualibus. Styli caudales oblongi, divaricati, setis 6 subæquis, diffusis.

This species differs considerably from *M. viridis*. In the first place the cephalothorax is rather broadest behind instead of in the middle, and the three posterior segments are somewhat moniliform, so that their sides do not form an even line. The

abdomen is four-jointed, and the basal segment bears on each side a large plumose hair, which passes backward and outward. Upon the fourth caudal seta (counting from the outside) is another, rather smaller than the other five. It lies so close to the fourth seta, that it might easily be overlooked. For the sake of clearness, however, I have in my figure separated them.

Length of cephalothorax  $\cdot 037$ , of abdomen  $\cdot 012$ ; total  $\cdot 049$ ; of antenna  $\cdot 027$ .

Caught at Weymouth, October 1857.

Pl. X. figs. 7 & 8.

## EXPLANATION OF THE PLATES.

### PLATE X.

- Fig. 1. *Calanus Euchaeta*, in outline, seen from above;  $\times 65$ .  
 Fig. 2. Ditto. End of left anterior antenna;  $\times 65$ .  
 Fig. 3. Ditto. Antenna of the second pair;  $\times 250$ .  
 Fig. 4. Ditto. Leg of the first pair;  $\times 65$ .  
 Fig. 5. Ditto. Fifth pair of legs of the male;  $\times 125$ .  
 Fig. 6. Ditto. Fifth pair of legs of the female;  $\times 125$ .  
 Fig. 7. *Monstrilla anglica*;  $\times 30$ .  
 Fig. 8. Ditto. Antenna;  $\times 65$ .  
 Fig. 9. *Calanus anglicus*; end of antenna;  $\times 125$ .  
 Fig. 10. Ditto. End of cephalothorax and abdomen, seen from the side;  $\times 65$ .  
 Fig. 11. *Diaptomus longicaudatus*; end of anterior antenna of male;  $\times 140$ .  
 Fig. 12. Ditto. Fifth pair of legs of male;  $\times 125$ .  
 Fig. 13. *Pontella Wollastoni*; fifth pair of legs of female;  $\times 30$ .

### PLATE XI.

- Fig. 1. *Diaptomus Bateanus*;  $\times 65$ .  
 Fig. 2. Ditto. End of cephalothorax, and beginning of abdomen, seen from the side;  $\times 65$ .  
 Fig. 3. Ditto. Fifth pair of legs of male;  $\times 50$ .  
 Fig. 4. *Pontella brevicornis*; end of left anterior antenna of male;  $\times 100$ .  
 Fig. 5. Ditto. End of left anterior antenna of female;  $\times 65$ .  
 Fig. 6. Ditto. Fifth pair of legs of male;  $\times 100$ ?  
 Fig. 7. Ditto. End of maxilliped;  $\times 250$ .  
 Fig. 8. Ditto. Fifth pair of legs of female;  $\times 100$ .  
 Fig. 9. *Pontella Wollastoni*; front seen from above.  
 Fig. 10. Ditto. Anterior antenna of male;  $\times 65$ .  
 Fig. 11. Ditto. Fifth pair of legs of male;  $\times 65$ .  
 Fig. 12. *Diaptomus longicaudatus*; end of anterior antenna of female;  $\times 65$ .  
 Fig. 13. Ditto. Leg of fifth pair of female;  $\times 130$ .  
 Fig. 14. *Corycaeus anglicus*; abdomen seen from above;  $\times 65$ .  
 Fig. 15. Ditto. Abdomen and end of cephalothorax, seen from the side;  $\times 65$ .  
 Fig. 16. Ditto. Antenna of second pair;  $\times 80$ .  
 Fig. 17. Ditto. Eyes;  $\times 250$ .  
 Fig. 18. *Pontella Wollastoni*; end of anterior antenna of female;  $\times 65$ .



