

XXIII. *On the Freshwater Entomostraca of South America.* By JOHN LUBBOCK, Esq., F.Z.S.

[Read May 7th, 1855.]

PROFESSOR DANA, in his great work on the *Crustacea* collected by him in Captain Wilkes's expedition, has devoted a long and most interesting chapter to the geographical distribution of these animals. Great, however, as have been the pains he has bestowed on it, and many as have been the facts at his disposal, yet there are so many species yet to be described, and the geographical limits of those which are described are so little known, that it must be confessed that he excites rather than satisfies the interest of Naturalists. Also, as might have been expected, attention has been more directed to the higher and larger families than to the smaller and lower ones, which are both more rich in species, and have hitherto been less studied.

The freshwater provinces have necessarily more definite boundaries than the marine, because it is more difficult for freshwater species to migrate, or be accidentally carried away from their native haunts. For these reasons I was anxious to examine the *Crustacea* collected by Mr. Darwin in the rivers and lakes of South America. It can hardly be doubted that, when thoroughly examined, they will prove as rich in *Entomostraca* as our own; but owing to the meshes of Mr. Darwin's nets being too large, and to his attention not being especially directed to *Entomostraca*, I only find five species in his Collection, and one of them is so much injured that I cannot describe it. Professor Dana, in his great works, describes three species; Mr. Gay, in the *Fauna Chilena*, six; and Dr. Baird, in the Proceedings of the Zool. Soc., one; so that the list is at present as follows:—

- Cypris Donnettii*, Baird.
- Chilensis*, Dana.
- speciosa*, Dana.
- Australis*, mihi.
- Brasiliensis*, mihi.

- Candona albida*, Dana.
Lynceus nasutus, Gay.
 albicans, Gay.
 armatus, Gay.
Diaptomus Brasiliensis, mihi.
Cyclops brevicornis, Gay.
Daphnia spinifera, Gay.
 granaria, Gay.
 Brasiliensis, mihi.

Fourteen species, all belonging to genera also found in Europe, and affording several remarkable instances of representative species. *Daphnia spinifera* closely resembles *D. mucronata*. *Diaptomus Brasiliensis* in many points agrees perfectly with *D. Castor*. *Candona albida*, and all the *Cyprides*, are very like the English species, and if the *Lyncei* were described more in detail the same would probably be found to be the case with them also.

Mr. King has lately described some of the Australian fresh water Entomostraca in the Pro. Roy. Soc. Van Diemen's Land, January, 1853. He mentions four species of *Alona*, two of *Eurycercus*, two of *Chydorus*, two of *Dunhevedra*, n. g., one *Macrothrix*, two *Moinæ*, and four *Daphniæ*, one of which he considers identical with *D. mucronata*, Müller. These again are all European genera except one, *Dunhevedra*, which however does not differ materially from European forms.

This result is interesting, and I believe in accordance with what has been observed in other families. It is curious that fresh water genera have usually more extended geographical limits than those which inhabit either the land or the sea.

Genus CYPRIS.

Sp. 1. *Cypris Donnettii*, Baird, Proc. Zool. Society.

"Carapace valves elongate oval. Anterior extremity narrower than posterior, and considerably flatter; posterior extremity rounded, and very convex; dorsal edge arched; ventral slightly reniform. The surface of the valves is smooth and shining, of a brown colour, variegated with patches of a darker shade. The pediform antennæ are provided with about six bristles of considerable length."

Fresh water ponds, Coquimbo.

Sp. 2. *C. speciosa*, Dana, Wilkes, Exp. 1852, v. 13, 1285.

"Oblonga, subovata, antice angustior, subtus fere recta, vix excavata, alioque bene arcuata, latior et plus duplo longior quam alta; ad marginem anticum pubescens, posticum breviter ciliata. Flava et læte viridis, areis flavis paucis imperfectis viridi circumdatiis."

Rio Janeiro.

This species appears to differ from the last chiefly in the presence of hairs.

Sp. 3. *C. Chilensis*, Dana.

"Latere visa, subovata, pone medium parce altior, subtus paululo arcuata, dorso vix gibbosa, triplo longior quam lata, duplo longior quam alta, marginibus antico infero posticoque pubescentibus. Antennæ anticæ, 7-articulatæ, setis dimidio corporis vix longioribus."

Valparaiso.

Length $\frac{1}{8}$ nch.

Sp. 4. *C. Australis*, mihi.

"Latere visa, subovata, antice paulo angustior, setis passim sparsis, marginibus postico, inferoque fere rectis, antico superoque bene arcuatis."

Maldonado.

Collected by Mr. Darwin in June, 1833.

Length $\frac{1}{8}$ inch.

Closely resembles *C. Donnetii*, but differs in having scattered hairs, and the hind margin is straight.

Sp. 5. *C. Brasiliensis*, mihi.

"Marginibus supero inferoque fere rectis, aliis bene arcuatis, extremitatibus fere æquis. Setis passim sparsis."

Maldonado.

Collected by Mr. Darwin in May, 1833.

Length $\frac{1}{4}$ inch.

This species closely resembles some of the *Candonas*, but it has the antennary setæ long, and belongs therefore to *Cypris*.

GENUS CANDONA.

Sp. 6. *C. albida*, Dana.

"Latere visa, breviter subelliptica, extremitatibus fere æqua, late rotundata, subtus recta, supra obsolete gibbosa; triplo longior quam lata, non duplo longior quam alta, margine pubescente. Oculus margine superno remotus. Albido-margaritacea, posticæ et superne paulo brunnea."

Valparaiso.

Length $\frac{1}{4}$ inch.

GENUS LYNCEUS.

Sp. 7. *L. nasutus*, Gay.

"Alboflaviscens, capite elongato inflexo rostriformi; testa postice truncata, angulo externo spiniformi."

"A very small species, with the head prolonged into a large curved rostrum as in some *Circulionidæ*; a small oculiform spot in front of the eye; carapace truncated behind, and its latero-posterior extremities angular, with a strong spine."

Colour a pale yellowish, uniform white.

San Carlos de Chiloe among *confervæ*.

Sp. 8. *L. albicans*, Gay.

"Valvis postice rotundatis, inermis."

"Natatory antennæ with long hairs, the oculiform spots distinct; head prolonged into a beak, more thick but less large than that of the preceding species; inferior and posterior margins of the valves rounded, without angles or spines."

Colour a transparent white.

Sante Rosa.

Described as existing in "Los mares de Sante Rosa."

This species probably belongs to Dr. Baird's genus *Chydorus*.

Sp. 9. *L. armatus*, Gay.

"Albovirescens; valvis postice spiniferis."

"The hairs of the antennæ and feet are large and short, valves rounded inferiorly and terminated posteriorly by a dentated tail."

Colour a very pale greenish white.

With the preceding

GENUS DAPHNIA.

Sp. 10. *D. spinifera*, Gay, Fauna Chilena.

"Alba, valva spinis minutissimis hirsuta."

"Head separated from the back by a slight depression, and prolonged in the form of a rounded beak, valves terminated posteriorly by large, sharp points, a little curved at the apex. The whole surface of the shell covered with little spines, only visible with a microscope."

San Carlos de Chiloe.

This species resembles in shape *D. mucronata*.

Sp. 11. *D. granaria*, Gay, Fauna Chilena.

"Alba, valva subtilissime granaria."

"Head not separated from the back by a depression; valves shagreened on the whole surface like the elytra of the *Elafri*; feet of the last pair terminated by one stylet; external antennæ very large."

Colour white and transparent.

San Carlos de Chiloe.

Length .

Width $\frac{1}{4}$ line.

Sp. 12. *D. Brasiliensis*, mihi.

D. Pulici similis. Valvis lævibus margine supero regulariter arcuato et pone medium spinifero, postico acuto, infero fere semicirculari.

Collected by Mr. Darwin in June, 1833.

Length $\frac{1}{4}$ inch.

This species has a slight depression between the head and the body, and a few hairs on the lower posterior margin, as well as above.

There were three specimens of another species in Mr. Darwin's Collection, but they were so much injured that I did not like to found a new species on them.

Genus CYCLOPS.

Sp. 13. *C. brevicornis*, Gay.

"Albescens, antennis primi paris thorace brevioribus."

Antennæ of the first pair much shorter than the thorax; the terminal setæ of the lobes of the abdomen as large as the body; eggs in one group on the upper side of the abdomen. Colour rosy white, with patches of yellow on the back; feet white, eggs sea-green.

Length

San Carlos de Chiloe.

I have some doubts whether this is a fresh water species; it is not *C. brevicornis*, Müller.

Family CALANIDÆ.

Sp. 14. *Diaptomus Brasiliensis*, n. s.

Cephalothorax 6-articulatus. Antennæ anticæ corpore paulo breviores. Antennæ secundæ, mandibulæ, secundi et tertii maxillipedum pares, et quarti primi pedum pares, ut in *D. Castore*. Pedes postici maris prehensiles. Abdomen maris 5-fæminæ 3-articulatum.

Long. $\frac{1}{8}$ unc.

Collected by Mr. Darwin, at Port Desire, in Patagonia. It inhabits fresh water.

The anterior antennæ consist, as usual, of about twenty-four segments; the right antenna of the male is prehensile, and the hinge joint is situated between the fifth and sixth segments, counting from the apex. The sixth, seventh, eighth, ninth, tenth segments, are slightly swollen, and contain the strong muscle which closes the hinge joint. I believe that it is opened again by its own elasticity, as I could not see any muscle for that purpose. The fifth, sixth and seventh segments bear each a large spine, which is pressed close to the antenna itself. The arrangement of hairs is very similar to that which I have described in the *Annals and Mag. of Nat. Hist.* for September, 1853, as occurring

in certain other *Calanidæ*. The hairs are chiefly simple or lanceolate.

The total length of the organ is $\frac{1}{2}\frac{1}{8}$ of an inch.

The second pair of antennæ are very like those of *D. Castor*. The hairs do not appear to me to be plumose; they are much longer than represented in Dr. Baird's Plate XXVI. fig. 1 a, being as long as the organ itself. The second segment bears a row of small bristles, which occurs in all the allied species which I have examined. The palpus is 7-jointed, and the second segment, counting from the base, appears to consist of three, which have partially coalesced. Each segment bears a long simple hair, and the apical segment has three.

The mandibles are very like those of the European species, and both have eight teeth, but in the present the interior, as well as the exterior tooth, is larger than the others. The palpus is much thicker, and the hairs longer, in proportion, than in Dr. Baird's figure.

The second pair of maxillæ are very like those of *D. Castor*. They are indistinctly 3-jointed, and bear about twenty hairs.

Length $\frac{1}{4}\frac{1}{5}$.

The third pair of maxillipeds are 7-jointed; the two basal segments are the largest, and bear respectively two or three small hairs. The terminal portion is smaller than in *D. Castor*, especially the last two segments, which have almost coalesced.

Length $\frac{1}{3}\frac{1}{5}$.

The thoracic legs are very similar to those of *D. Castor*. The two branches are both 3-jointed. The hairs are arranged as follows. Beginning with the external and larger branch (fig. 5), the two basal segments have each two hairs at the apex, one at each side. The apical segment has eight; the three which are situated on the outside are short, stout and spine-like, while those on the inner side are long, slender and plumose. They evidently assist in swimming.

The smaller branch has one hair at the apex of the basal joint, two on the second and six on the apical joint, all on the inner side, and similar to those of the other branch. The large basal segment has, as usual, a plumose hair on the inner side, and the second, from which the two branches spring, has two hairs, one of which is lanceolate.

The basal segment appears to contain three muscles, two flexors and an extensor. The first flexor appears to move the plumose hair, and I am not sure that the other two are not con-

joined into the next segment, which also has three muscles, firstly, a flexor which, rising at the base of this segment, is inserted into the inner side of the apex of the penultimate segment of the inner branch. The other two are the flexor and extensor of the larger branch, and are inserted into its base. This larger branch also contains a muscle similar to that of the smaller one. The specimens, however, have been so long preserved in spirits that it is difficult to make the muscles out with certainty, and in some specimens the arrangement appeared to be different.

The fifth pair of legs in the female are $\frac{1}{8}$ inch in length, and similar to one another. They are formed on the same plan as the other legs, from which they differ in several particulars, but chiefly in the shortness of hairs. The basal portion, as usual, consists of two segments, the second of which is slightly bifid at the apex, and bears a small hair. The larger branch is composed of three segments, of which the basal bears a large spine at the outside of the apex; the second, a large spine on each side of the apex, the inner one of which is provided with a row of little spines on its upper edge, and the apical three spines; the lesser branch, which is also 3-jointed, has the two basal segments each provided with a spine on the inner side of the apex, and the terminal segment armed with six spines.

Those of the male are larger, about $\frac{1}{4}$ inch in length, and non-symmetrical. The right is rather the largest. The basal portion, as usual, consists of two segments, and bears two branches, the inner one small and 3-jointed, the apical segment armed with four spines. The outer large branch also consists of three segments, the two basal ones each bearing a spine at the apex externally. The second segment of this branch is crossed by a line, which appears to indicate that it consists nominally of two segments, especially as I have observed the same appearance in other species. The terminal joint has the form of a very large spine, and tapers very much to the end, which seems drawn out into a filament, and turned back. The apical half is dotted with a row of very fine teeth.

The left leg is rather smaller; the inner branch and the spine on the basal segment of the outer branch are wanting. The terminal segment is similar in form to that of the other legs, from which, however, it differs in having a spine externally at about a quarter of its length from the base, in not tapering quite so much, and in wanting the row of teeth or bristles.

The abdomen of the female consists of three segments, the first

rather larger than the other two put together. The males have five segments. In both sexes the abdomen is terminated by two short lamellæ, each bearing five long plumose hairs.

EXPLANATION OF PLATE XV.

- Fig. 1. *Cypris Brasiliensis*, mihi, outline.
 2. *Cypris Australis*, mihi, outline.
 3. *Diaptomus Brasiliensis*, mihi; second pair of antennæ.
 4. *Diaptomus Brasiliensis*, third pair of maxillipeds.
 5. *Diaptomus Brasiliensis*, first pair of natatory legs, male.
 6. *Diaptomus Brasiliensis*, left leg of the fifth pair natatory legs, male.
 7. *Diaptomus Brasiliensis*, right leg of the fifth pair natatory legs, male.
 8. *Diaptomus Brasiliensis*, fifth pair natatory legs, female.
 9. *Daphnia Brasiliensis*, mihi, outline.

