

Plate II. *Daphnia Elizabethæ.*

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| A. Gravid female. | d. Portrait. |
| B. Female not gravid. | e. Marks on carapace. |
| a. Inferior antenna. | f. Spines at extremity of abdomen. |
| b. Superior antenna. | |
| c. Seta or inferior antenna. | g. Extremity of abdomen. |

Plate III. *Daphnia honorata.*

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| A. Side view, female. | a. Superior antenna. |
| B. Front view, female. | b. Marks on carapace. |
| | c. Inferior antenna. |

Plate IV. *Moina lemnae.*

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| A. Side view, female. | a. Clasping apparatus. |
| B. Front view, female. | b. Superior antenna. |
| | c. Front view of young. |

Plate V. *Moina Macleayi.*

- A. Side view of female.

XVI. On Australian Entomostracans—in continuation.
 By the REV. R. L. KING, of Sydney. [Read 8th
 December, 1852.]

IN my former paper on the Australian Entomostracans, I described five species belonging to the genera *Daphnia* and *Moina*. I have since met with some remarkable varieties of those described, as well as two additional species of the same family.

Daphnia carinata. var. *gravis.* (Plate VI. A.)—
 This variety (of which I have figured an almost monstrous specimen) occurs constantly in the winter months in small ponds. It attains a larger size than the normal state.

At Plate VI. (G.), I have figured the nerves of the eye and of the black spot of this species. The black spot is very minute, and is placed on the thickened part of a small nerve situated between that supplying the superior antennæ and the optic nerve. This latter is very largely developed, and consists of several ganglia, connected with the brain by a small nerve.

The black spot is always in the *Daphniadæ* connected with the brain, and appears to me to represent the central eye of the young *Phyllopora*. I hope to return to this subject when I come to describe the Australian members of the last-named family.

D. carinata. var. *cephalata*. (Plate VI. B.)—I have met with this singular variety only twice:—At Campbell Town (several specimens); at Denham Court (a single specimen.)

D. Elizabethæ. var. *acuti-rostrata*. (Plate VI. C.)—I have been almost inclined to suspect that the differences between this variety and the normal state would indicate a difference of species. But I have never found any young specimens with the sharply-beaked head: nor have I ever found the variety but in company with *D. Elizabethæ*. The top of the head is produced into a sharp point: the dorsal margin is much produced. It attains a large size, and is of a greenish colour.

Habitat.—Denham Court: in ponds.

D. honorata. (Plate VI. D.)—The male (which I have figured, having met with it lately), is but a little less ventricose than the female. The superior antennæ are large.

Habitat.—Besides occurring in the locality previously mentioned, this species is found at Parramatta, and in a small pool close to Sydney Cove. This pond, in which

Daphnia carinata, a *Cypris*, and our present species are swarming, is close to the high-water mark. It is also close to a white sandstone rock, exposed to the whole afternoon sun. The direct and reflected heat on a warm afternoon must together raise the temperature of the water to a considerable height. But these animals appear to enjoy warmth: a miniature pond in my study, which I keep for the purpose of watching their habits, is sometimes of a temperature as high as 76° Fahrenheit; and yet all appear in high spirits, and are never so lively as when the sun is actually shining upon them. Then, even those that are decrepid, through disease and old age, put forth all their powers, and use the most vigorous exertions:—

“Nature awakes to renovated life.”

(4.) *D. mucronata*. (Müller.) (Plate VI. E.)—I copy the description of this species from Baird's British Entomostraca:—

“This species is readily distinguished by the anterior edge of the shell being quite straight, and terminating inferiorly by a spinous point of considerable length. The head is of a triangular shape, and the eye is large,” but not round. “Superior antennæ short. Filaments of inferior antennæ not plumose.”

“The beak is imperfect, with a deep indentation at the root of the head; and the anterior margin is marked with brownish-coloured bands, and is densely ciliated.”

“The colour of the whole animal is of a dark gray.”

European specimens have the upper part of the head sometimes terminated by a sharp-curved point, and directed upwards. I have not found any such variety here.

Habitat.—It occurs in the South Creek, and at Parramatta. It almost always swims near the surface of the

water, and is readily known by its dusky colour. I should mention that I have hitherto been only able to examine this species with a simple lens. Future observations may possibly prove that it is different from the European species. At present, the only difference which I can notice is that the head of each of Baird's figures is larger than that of the Australian species.

Genus *MACROTHRIX*. (Baird.)

Superior antennæ flat, one jointed, pendulous from the beak. Filament from the extremity of the first joint of the anterior branch of inferior antennæ much longer than any of the others.

M. spinosa. (Plate VI. F.)—General shape of the carapace and head oval. Antennæ are those of the genus; but each of the long setæ of the inferior antennæ has its first joint produced beyond the articulation of the second into a spine. The setæ are not plumose.

Habitat.—The South Creek. Pond on the road side between Liverpool and Sydney.

LYNCEIDÆ.

This family includes the whole of the genus *LYNCEUS* of MÜLLER, LATREILLE, &c.

Character.—"Two pairs of antennæ; superior very short; inferior of moderate size and branched, with branch divided into three articulations. Feet five pairs. Eye single, but accompanied with a black spot in front of it. Intestine convoluted, having one complete turn and a half. Abdominal portion of the body jointed."—Baird.

The genus *Lynceus* was established by Müller in 1776. He called it by this name because, considering the black spot, which is often large, as a second eye, he thought that it was well provided with visual organs. Mr. Baird

appears to have been the first to classify these animals under separate generic names. The only remark that I feel justified in making is, that I think the name *Lynceus* ought to have been retained for one of the genera. The Australian species known to myself may be referred to four genera.

Genus EURYCERCUS. (Baird.)

“Carapace generally subquadrangular. Abdomen very broad, in the form of a flat plate, densely serrated. Beak short, slightly curved downwards.”

This is Baird's description, drawn up from a single species. My Australian species do not quite accord in all points with it, although they do agree with it in that important particular whence the name is taken.

(1.) *E. spinosus*. (Plate VII. D.)—The head is large, the dorsal margin is rounded, the anterior nearly straight throughout the greater part of its length, and ciliated. The carapace is striated obliquely. The inferior antennæ (which I shall call *Rami*, being throughout the family the main organs of progression), are large, and have a short spine at the extremity of each joint of the posterior branch, and at that of the third there are also three setæ, two only of which are jointed. The first joint of these setæ is produced beyond the articulation of the second into a short spine. The anterior branch wants the spines on the first two joints, but is furnished with the same number of setæ and a spine at the extremity of the third joint. The last segment of the abdomen is broad and short, the extremity rounded and serrated.

Habitat.—A small pond at the side of the road between Sydney and Liverpool.

(2.) *E. Cunninghamsi*. (Plate VII. A.)—Carapace oval: dorsal and anterior margins rounded, the latter ciliated.

The surface adorned with numerous prominent striæ dividing it into three parts, in each of which the striæ are parallel or concentric. Rami with a seta at the extremity of the second joint of the posterior branch, and a short spine at the extremity of the third joint of each branch.

Last segment of the abdomen broad and much sinuated near the joint.

It is a much larger species than the preceding. I have named it after the late Allan Cunningham, the botanist: it is found in profusion in the Sydney Botanic Gardens, in the pond in which an obelisk has been erected to his memory.

Habitat.—Pond in the Botanic Gardens, Sydney.

GENUS CHYDORUS. (Leach.)

Character.—“Nearly spherical in shape. Beak very long and sharp, curved downwards almost into the shape of a crescent. Inferior antennæ (*Rami*) very short.”

(1.) *C. augustus*. (Plate VII. B.)—Carapace nearly round, smooth, ciliated on the anterior margin, of a chestnut colour. Superior antennæ very short. Rami with four setæ on the posterior, three on the anterior branch. The last joint of the abdomen long, the dorsal edge being straight, except one deep curved notch in the centre, and parallel to the ventral edge.

The Ephippial eggs are oval: they are generally two in number, arranged one above the other, meeting, apparently, when seen in profile, towards the interior part.

Its motion is very quick.

Habitat.—Pond near Sydney, on the road towards Botany Bay.

(2.) *C. Leonardi*. (Plate VII. C.)—Carapace nearly globular, anterior margin ciliated. Rami very short, with but three setæ on each branch. The last segment of the

abdomen is small, and the dorsal edge much sinuated. The two Ephippial eggs, which are globular, are placed side by side, and seen through the back when the animal is placed on its anterior margin; when seen in profile they appear but one. This species is smaller than the preceding, and is very lively in its motions. It sometimes comes to the surface of the water, and remains there stationary for a considerable time. I have observed the same habit in *Eurycercus Cunninghamsi*; but it is not easy to discover much of the habits of species so minute that the aid of a magnifying glass is often required to detect even their presence. *Chydorus Leonardi*, on the under surface of the water and motionless, is certainly not a very striking object to the unassisted eye. I have found it a convenient test for deciding upon the powers of vision possessed by my friends.

Habitat.—Sydney, near Waverly Mills; the Waterfall, St. Leonard's; South Creek; Denham Court, &c.

Genus ALONA. (Baird.)

“Shell quadrangular shaped, grooved or striated longitudinally. Inferior antennæ or rami short. Beak short and nearly erect.”

(1.) *A. Bairdii*. (Plate VIII. A.)—Carapace nearly quadrangular, anterior margin sinuated and ciliated. The abdominal margin notched. Rami with a long seta from each of the first two articulations of the posterior branch, three setæ and a short spine at the extremity of the third. The anterior branch has also the same number at its extremity. In each of the setæ, at the extremity, the first joint is produced into a spine, and the setæ are plumose. The last segment of the abdomen is much sinuated near the joint.

I have dedicated this species—the largest of the family hitherto found in Australia—to the author of “the British Entomostraca,” a work from which I have derived much assistance, and not a little gratification.

At present it is confined to a single locality, from which I have procured it but once; when also my means of observation were very limited.

Habitat.—The Lachlan Swamp, Sydney.

(2.) *A. pulchella*. (Plate VIII. B.)—Carapace subquadrangular, obliquely striate; dorsal edge rounded, anterior slightly curved, convex above, concave below, ciliated, setæ of rami simple. The dorsal edge of the last joint of the abdomen is very slightly sinuated, but forms an obtuse angle near the joint. The terminal spines are long.

Habitat.—Varroville, near Denham Court. St. Leonard's, near Sydney.

(3.) *A. diaphana*. (Plate VIII. C.)—Carapace rounded on the dorsal margin, angular on the anterior margin, every where convex.

Rami and setæ as in *A. pulchella*, which this species greatly resembles.

In confinement it keeps close to the edge of the water. I had no difficulty in keeping it for a considerable time in a small basin of water, in which were a few plants of *Lemna minor*. Its transparency makes it a very beautiful microscopic object.

Habitat.—Pond near Sydney.

(4.) *A. Karua*. (Plate VIII. D.)—Resembles *A. pulchella* in contour, but is smaller and shorter in proportion to its breadth. The beak is very much produced. Rami with four setæ, and a short spine on the posterior branch; three on the anterior. The dorsal edge of the

last joint of the abdomen is sinuated nearly through its whole length.

Habitat.—River Karua, near Stroud.

Genus DUNHEVEDIA. (*nov. gen.*)

Carapace oval; the anterior margin ciliated, ending in a short spine directed downwards. Last segment of the abdomen short.

The two following species so remarkably agree in the characters referred to, that I have no hesitation in placing them together under a generic name, taken from the locality where the larger was discovered.

(1.) *D. crassa.*—(Plate VII. F.)—Antennæ with a small tubercle near the base, furnished with a short seta. When seen from the back, the outline of the animal is convex at every part, the thickest portion being a little below the middle.

Habitat.—The South Creek, at Dunheved; also Varra-ville, near Denham Court.

(2.) *D. podagra.* (Plate VII. E.)—Antennæ, with the tubercle near the base very prominent. When seen from the back, the outline at the middle is concave.

This species is much smaller than the preceding. When a number of them are placed together in a glass of water, they congregate near the surface. I have not been able to make out with distinctness the number of setæ on the rami of either species. The intestine is much convoluted, having in reality two whole turns, although they are not in the same or parallel planes: this, however, is common to all the Australian Lynceidæ.

Habitat.—Ponds behind the old Military Barracks at Parramatta.

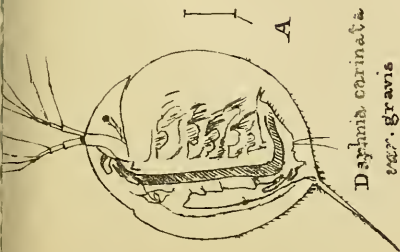
Besides the above, I have figured, as *Alona mascula*,

(Plate VIII. E.), an Entomostracan, which bears a remarkable resemblance in one respect to Mr. Baird's *Pleuroxus hamatus*. It was accidentally compressed too much to allow it to resume its original form, and I was without a microscope to examine further. I therefore figure the animal as it appeared. Baird thought that his *Pleuroxus hamatus* was a male form, because of the two hooks on the first pair of feet.

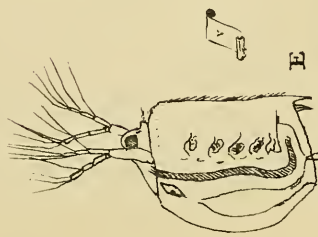
Habitat.—In the South Creek at Dunheved, May, 1852.

Description of the Plates.

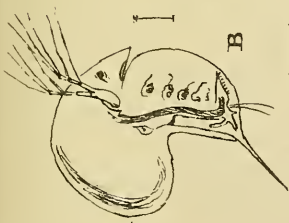
- Plate VI. A. *Daphnia carinata*; var. *gravis*: one of its endless varieties.
- B. var. *cephalata*.
- C. *Elizabethæ*; var. *acuti-rostrata*.
- D. *honorata*; male, b. the superior antennæ.
- E. *mucronata*, (Müller.)
- F. *Macrothrix spinosa*; b. articulation of the long seta of ramus; c. last segment of the abdomen.
- G. Part of the nervous system of *D. carinata*; showing the following parts: a. the eye; b. the optic ganglia; b'. the nerve connecting them with the central nervous mass or brain; c. c. the muscles moving the eye; d. the black spot; e. the point of attachment to the inner side of the carapace of the nerve which carries the black spot; f. a short nerve attached at the extremity to the carapace; g. nerve leading to the superior antennæ; h. commencement of the labrum; k. point of attachment of the head to the body; l. the œsophagus; m. m. the intestine; n. n. the two cœca; p. p. p. place of attachment of



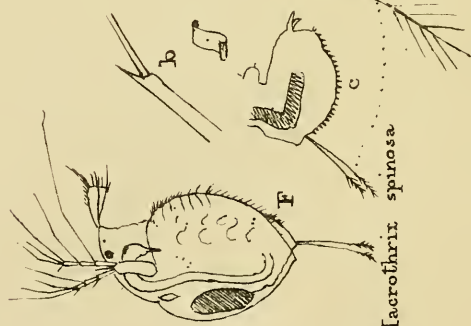
A
D. carinata
var. *gravis*



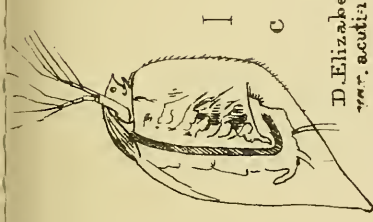
E
D. mucronata (Müll.)



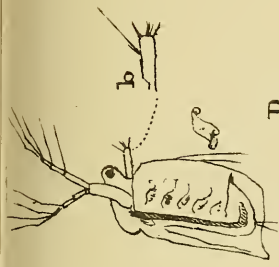
B
D. cephalata
var. *cephalata*



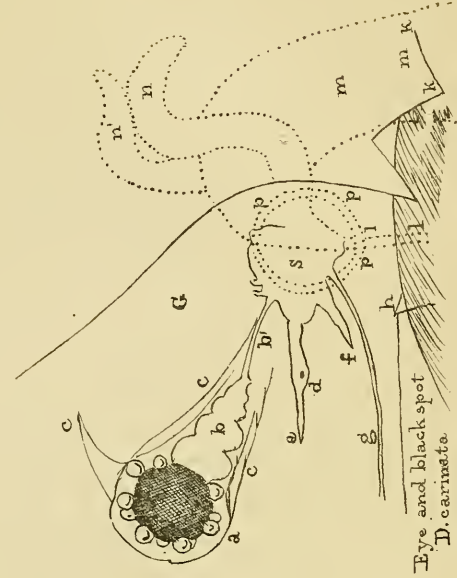
F
Macrothrix spinosa



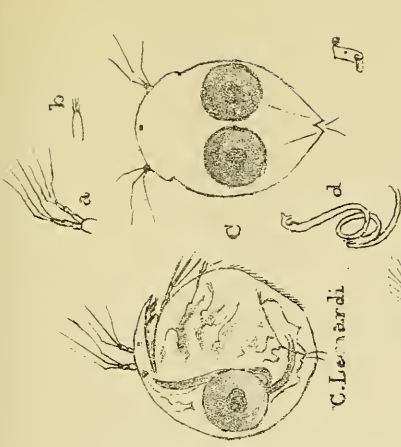
C
D. Elizabetha
var. *acutirostrata*



D
D. honorata ♂

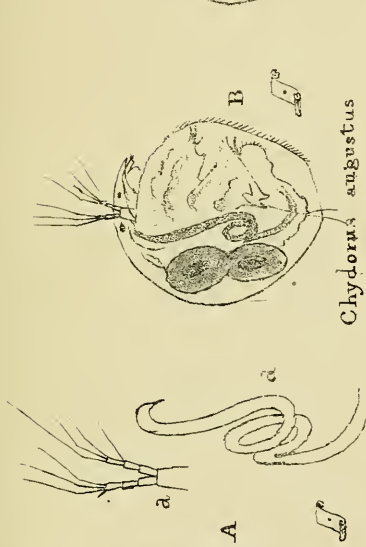


G
Eye and black spot
D. carinata

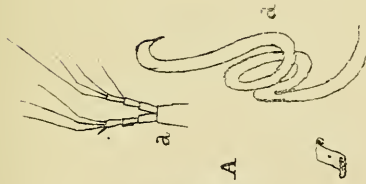


C. Lemardi

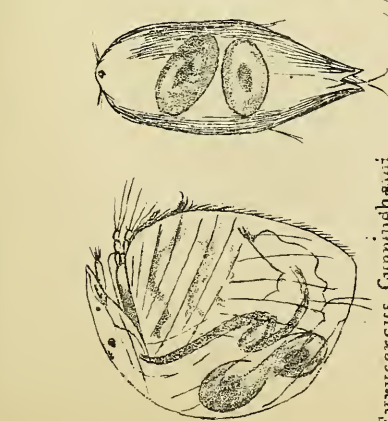
D. crassa



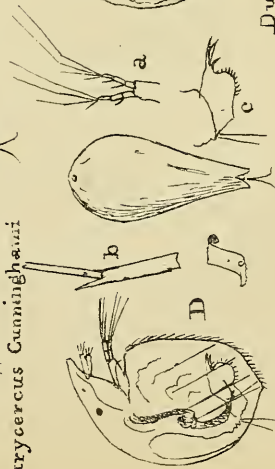
Chydorus angustus



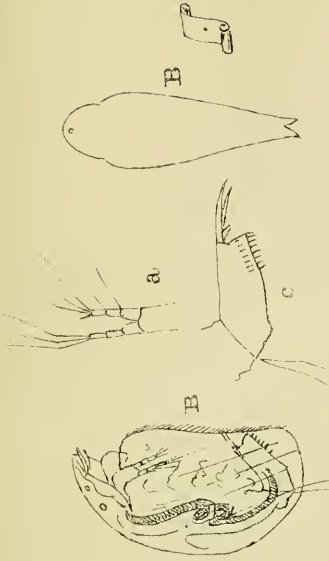
Dunhevedia podagra



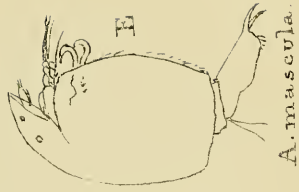
Eurycerus Cunninghami



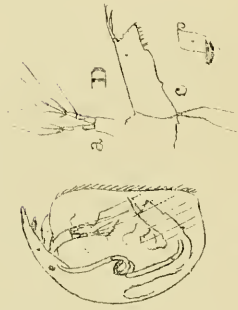
E. spinosus



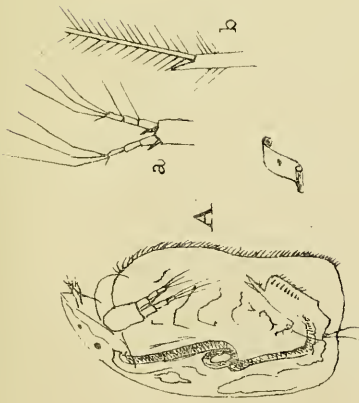
Alona pulchella



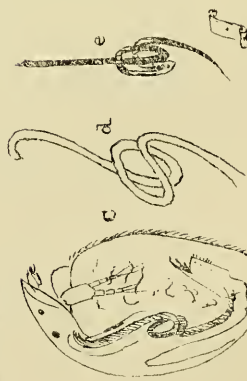
Alona mascula



Alona karua



Alona bairdii



Alona diaphana

the left ramus; s. central ganglia supplying the rami œsophagus, &c.

- Plate VII. A. *Eurycercus Cunninghamsi*; back and side view; a. ramus; d. intestine.
- B. *Chydorus augustus*.
- C. *Leonardi*; a. ramus, b. antennæ; d. intestine.
- D. *Eurycercus spinosus*; a ramus; b. articulation of seta on ramus; c. the last segment of the abdomen.
- E. *Dunhevedia podagra*; b. antennæ; c. abdominal segment.
- F. *crassa*: b. antennæ.
- Plate VIII. A. *Alona Bairdii*; a. ramus; b. articulation of seta.
- B. *pulchella*; a. ramus; c. abdominal segment.
- C. *diaphana*; c. intestine, side view; e. ditto, back view.
- D. *Karua*; a. ramus; c. abdominal segment.
- E. *mascula*.
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