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# IV.—On some freshwater Entomostraca from Egypt and the Soudan

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than long, separated from the eye by two superposed præoculars, below which a subocular may be present; two (rarely three) postoculars; temporals 2+2 or 3; eight or nine upper labials, fourth and fifth or fifth and sixth entering the eye; first lower labial in contact with its fellow behind the symphysial; two or three pairs of chin-shields, first a little longer than broad. Scales in 15 rows, vertebrals strongly enlarged, but not twice as broad as long. Ventrals 176–194; anal entire; subcaudals 77–101. Blackish brown, with light cross-bands or rings, which are narrow and white on the anterior part of the body and then become gradually broader and brown edged with white; first light bar across the occiput; head dark brown above, with light vermiculations and some black spots and a bar across the forehead; a broad black bar below the eye,

Total length 600 mm.; tail 140.

Several specimens from Pueblo Rico, slopes of San Juan River, Colombian Choco, 5200 feet, from the collection of Mr. G. Palmer.

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## IV.—*On some Freshwater Entomostraca from Egypt and the Soudan.* By Robert Gurney, M.A.

[Plate II.]

Our knowledge of the Entomostraca of the Nile Valley is exceedingly small, and the following list of species is offered as a slight contribution to its extension. The species mentioned are derived from two sources—(1) from my own collections in Upper Egypt, and (2) from small collections made by my brother, Mr. Eustace Gurney, in the White Nile and the Blue Nile near Khartoum in 1902.

My own collections were made in Egypt in the months of February, March, and April of 1907 and 1909. During these visits I examined various pools of fresh water from Luxor northwards, as well as the Nile itself near Luxor and the Birket el Kurun in the Fayûm.

My investigations were not so complete as could be wished, owing to the distraction of other interests, the Fayûm in particular deserving much more attention; but I believe they present a fairly complete picture of the Entomostracan fauna of the region at that season of the year. They show that the fauna is not very varied, and that, like the physical

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features of the country, it is remarkably uniform in distribution. The long, unvaried, valley of the Nile seems, both for the fauna and the flora, to effect a transition between the Ethiopian and the Palæarctic regions, and to produce a uniformity which can rarely be met with in other parts of the world. Such a uniformity with regard to the Entomostraca is only to be expected, since all the water of the country is supplied from the same source, and the majority of the smaller pools are only temporary, drying up in the summer. Where there are permanent pools of water in which there is vegetation the fauna is more varied, but, on the whole, the species are evenly distributed.

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## List of Species.

(1) *Diaphanosoma brachyurum*, Liévin.

Abundant in pools by the road to the Pyramids of Gizeh, and also found in a canal at Lecht. A few males were found among the specimens taken on Feb. 15 in the former place.

(2) *Diaphanosoma excisum*, Sars.

A number of specimens of this species were found in the collections from the Blue and the White Nile. Ekman (1901) has described a variety (var. *longiremis*) from the White Nile which differs from the type in the greater length of the antennæ and the presence on the postabdomen of a few short hairs. My own specimens have the shorter antennæ of the type, but the same hairs on the postabdomen as Ekman describes.

(3) *Daphnia lumholtzi*, Sars.

A few specimens, including males and ephippial females, were taken in a pool near the Pyramids, and ephippia which I refer to this species were found in a pool at Dahchour. A single adult specimen, somewhat decayed, was found in the Nile at Luxor.

(4) *Daphnia longispina*, O. F. M.

Pools near the Pyramids, pool at Dahchour, and in the Nile at Kous.

(5) *Daphnia longispina*, var. *cucullata*, Sars.

I have a rough drawing by my brother of a species of

***Daphnia*** from the White Nile which belongs to the *Daphnia cucullata* group, and probably represents *D. jardinei*, var. *barbata*, Weltner. As the specimen is lost I cannot be sure of its identity.

(6) *Simosa vetula*, O. F. M.

Zoological Gardens, Cairo; pools near the Pyramids; pools at Sakkara and at Tamiah (Fayûm). Common.

(7) *Ceriodaphnia reticulata*, Jur.

Pools near the Pyramids and at Dahchour. Specimens taken on March 25, 1907, in the former place bore ephippia. A few individuals possessed the toothed fornix characteristic of the variety *serrata*.

(8) *Ceriodaphnia rigaudi*, Richard.

Pool by the Pyramids, at Dahchour, and in the Blue Nile. Rare.

(9) *Ceriodaphnia dubia*, Richard.

In the Nile at Luxor and Kous.

(10) *Ceriodaphnia quadrangula*, O. F. M.

Pools by the Pyramids and at Sakkara.

(11) *Bosmina longirostris*, O. F. M.

The typical form of this species appears to be generally distributed and common in pools. The variety *cornuta* occurred in the Zoological Gardens at Cairo in February and in the Nile at Luxor and Kous in March.

(12) *Moina dubia*, Richard. (Pl. II. figs. 1, 2.)

This species appears to be the commonest plankton Cladoceran in the Nile valley. It was found abundant in Lake Victoria by Daday, and in the Nile from Omdurman to Assouan by Ekman. My own collections show that it is common in the Blue Nile and in the Nile itself from Khartoum to below Luxor.

The specimens taken in the Blue Nile in March 1902 include some males and ephippial females. The ephippium is not distinguishable from that of *Moina rectirostris*, since it has but a single egg-space surrounded by an incomplete

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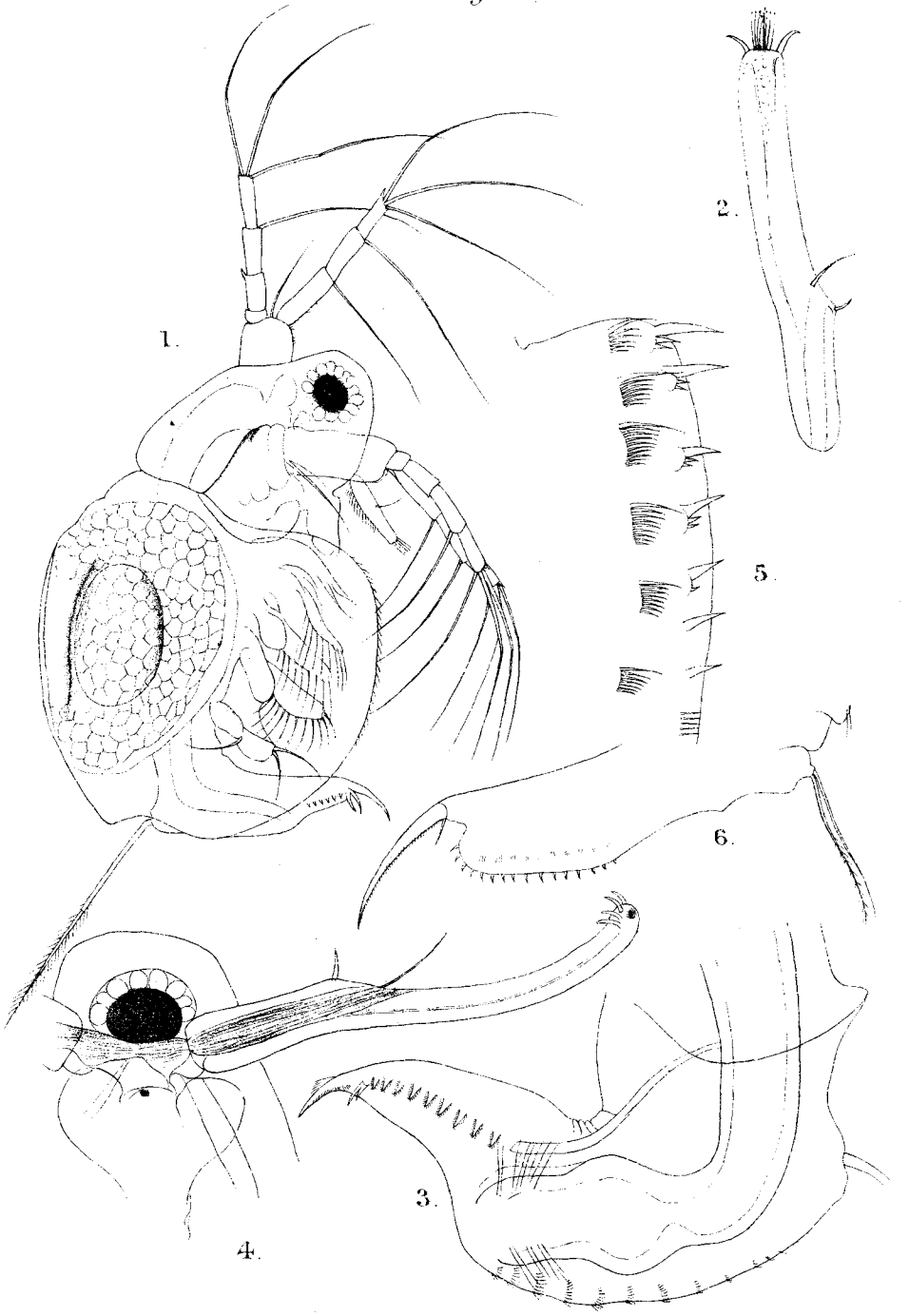


J. Green lith.

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circle of reticulations which do not extend over the egg-space itself (Pl. II. fig. 1). The male resembles that of *M. rectirostris* in shape and in the form of the first leg and first antenna, but differs from it in having only three hooks at the end of the first antenna (fig. 2). The number of these hooks does not appear to be quite so constant a character as has been supposed, as I have shown (1909) that a form of *M. rectirostris* occurs in Tunisia in which the male has only four hooks in place of five. It appears, therefore, that the differences between the species in question and *Moina rectirostris* are:—

(1) Its small size.
(2) Small number of teeth on the postabdomen.
(3) Less pronounced comb on the postabdominal claws.
The presence or absence of transversely arranged cilia on the postabdomen has been shown by Ekman not to be distinctive.
(4) There is a slight difference between the proportions in the two species between the præanal and postanal parts of the postabdomen.

The first three of these differences seem to me to be probably accountable by the limnetic habit of the species, and the sum of the differences does not seem to amount to specific distinction.

(13) *Moina salinarum*, Gurney. (Pl. II. figs. 3, 4.)

In the plankton of the Birket el Kurun a species of *Moina* which is identical with that recently found by me in a salt lake in Tunisia, and described under the name *M. salinarum*, is abundant. There is no perceptible difference between the two, except that I cannot detect in the Egyptian specimens any cilia on the first pair of antennæ. I give a figure of the postabdomen for comparison (fig. 3). I have nothing to add to the description already given, except that the first leg of the female agrees in all respects with that of *M. rectirostris*.

No ephippial females were found, but a few males occurred in a collection made in the Lake on Feb. 20, 1909. These males do not differ in any important respect from those of *M. rectirostris*, though the head is somewhat longer and more conical and the depression above the eye is very slight. The form of the first leg is also the same. On the other hand, the shape of the postabdomen differs in the same way as does that of the female, and the first antennæ bear four hooks instead of five. In one male a distinct trace of a pigmented ocellus was seen (fig. 4).

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The occurrence of this species in the Birket el Kurun seems further to justify the specific name, as it appears to be a species characteristic of water of a high salinity.

(14) *Ilyocryptus sordidus*, Liévin.

Four rather immature specimens occurred in a collection made in a canal at Lecht which runs from the Nile near El-Wasta northwards as far as the barrage below Cairo.

A much mutilated specimen of a species of *Ilyocryptus* was found in the Blue Nile, but I am unable to identify it with certainty. In the form of the postabdomen it agrees most closely with *I. longiremis*, Sars.

(15) *Camptocercus australis*, Sars.

Found in the sweet-water canal at Port Said and in pools in the Zoological Gardens at Cairo. Hitherto the species has been recorded only from the Oriental and Neotropical regions.

(16) *Alona affinis*, Leydig.

Two rather decayed specimens were found in the Nile near Luxor.

I cannot agree with Keilhack (1909) in regarding this species as a variety only of *Alona quadrangularis*. The two species differ, in my experience, not only in habit, but in quite constant structural features.

(17) *Alona rectangula*, Sars. (Pl. II. fig. 5.)

In pools by the road to the Pyramids and at Dahchour. Ekman describes specimens from Gizeh and the White Nile which he refers to *Alona bukobensis*, Weltner, but it seems to me that Daday (1907) is right in considering *A. bukobensis* as a synonym of *A. rectangula*. The form of the postabdomen in both is extremely variable and the variations in form and arrangement of the denticles evidently overlap each other. My own specimens are very few and do not show much variation; the postabdomen closely resembles that of the typical European form of the species (fig. 5).

(18) *Leydigia quadrangularis*, Leydig.

Two specimens only were found in a pool in the Zoological Gardens at Cairo.

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(19) *Alonella diaphana,* King, var. *punctata*, Daday.

A few specimens identical with Daday's species *A. punctata* were taken on Feb. 12, 1907, in the sweet-water canal at Port Said. *Alonella punctata* has been recorded by Daday from Ceylon, South America, and East Africa, and it seems probable that it is not specifically distinct from *A. diaphana*, King, and *A. davidi,* Richard. Sars (1901) has already expressed his opinion that the two latter are identical; and the description given by Stingelin (1904) of specimens attributed to *A. davidi* and taken in Java and Honolulu seems to indicate that the group *diaphana-davidi* passes by intermediate forms into *punctata*. The distinction or otherwise of these forms turns upon the presence and arrangement of the cilia and teeth on the postabdomen. The dorsal margin of the postabdomen bears in the *punctata* form a series of distinct bundles of minute denticles. In *A. diaphana* and *A. davidi* these denticles seem to be generally arranged singly, though in *A. davidi* var. *iheringi* there is a tendency to arrangement in groups. In Stingelin's specimens from Java and Honolulu the denticles are almost as clearly united into groups as in the true *punctata* form.

In *A. davidi* and *A. punctata* there are always lateral groups of delicate cilia; but these are not figured by Sars, and their absence constitutes the only real difference between *A. diaphana* and *A. davidi.* I am disposed, therefore, to regard *A. punctata* and *A. davidi* as only varieties of *A. diaphana,* King.

(20) *Dunhevedia crassa,* King.

One specimen found in a pool in the Zoological Gardens at Cairo.

(21) *Chydorus sphæricus*, O. F. M.

Pools by the road to the Pyramids; Zoological Gardens; Dahchour. Ephippial females were found on Feb. 15 and March 25, 1907, and Feb. 22, 1909.

(22) *Chydorus* sp.? (Pl. II. fig. 6.)

The shell of a single decayed specimen of a species of *Chydorus* was found in a collection made in the Zoological Gardens.

The specimen appears to resemble *Chydorus globosus* very closely, but differs from it to some extent in the slight

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prominence of the preanal angle, the very regularly placed postanal denticles (fig. 6), and the shorter and broader post-abdomen. The latter difference is, perhaps, attributable to immaturity, but the remains are too incomplete for satisfactory identification.

### Copepoda.

(23) *Diaptomus galebi,* Barrois.

In pools in the Zoological Gardens at Cairo, at Lecht, and by the Pyramids; abundant. Also found in the Blue and the White Nile.

(24) *Diaptomus alluaudi,* De Guerne & Richard.

Pools by the road to the Pyramids, Sakkara, Lecht, Dahchour; a common species. A few specimens were also found in the Birket el Kurun, but it is evidently not common there.

(25) *Diaptomus salinus,* Daday.

Only found in the Birket el Kurun, where, with *Moina salinarum,* it forms the bulk of the plankton.

My specimens agree in almost all respects with the descriptions of Schmeil and others and with specimens from Algeria, but they differ in the shape of the last thoracic segment and the first abdominal segment of the female. The last thoracic segment is scarcely at all produced into "wings," being simply rounded behind on the left side and armed with two small spines, while on the right side it is produced into a short outwardly directed point. The first abdominal segment is very short and slightly asymmetrical, the spine on the left side being larger than that on the right. The proportional lengths of the furca and the abdominal segments are, on an average, as follows :—

| | Abdominal segments. | | | |
|---|---|---|---|---|
| | 1. | 2. | 3. | Furca. |
| Length..... | 13 | 5 | 8 | 11 |

(26) *Cyclops leuckarti,* Claus.

Abydos, near the Pyramids, Sakkara, White Nile, and Blue Nile.

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(27) *Cyclops hyalinus,* Rehberg.

A few specimens found in pools near the Pyramids.

(28) *Cyclops emini,* Mrazek.

This Central-African species was found in collections from the Blue Nile, but a few specimens were also taken near the Pyramids of Gizeh.

(29) *Cyclops dybowskii,* Lande.

Pools by the Pyramids and at Dahchour.

(30) *Cyclops planus,* Gurney.

This species, which is common in Algeria and Tunisia, occurred in collections made near the Pyramids of Gizeh and at Kostamneh in Nubia.

(31) *Cyclops varicans,* Sars.

Zoological Gardens at Cairo.

(32) *Cyclops bicolor,* Sars.

Zoological Gardens and near the Pyramids.

(33) *Cyclops serrulatus,* Fischer.

Specimens of the typical form occurred in the Zoological Gardens, at Lecht, and near the Pyramids, but the form *varius,* Lillj., was also found in a pool in the Gardens.

The distinction between the various forms of *Cyclops serrulatus* seems to me of doubtful value. The presence or absence of hairs in the hyaline membrane of the first antennæ is often exceedingly difficult to ascertain with certainty, and the remaining characters are variable and difficult to estimate. The so-called hairs in the membrane are, I believe, not hairs, but a striation due to a wrinkling of the membrane.

(34) *Cyclops prasinus,* Fischer.

Zoological Gardens at Cairo.

(35) *Cyclops phaleratus,* Koch.

One specimen only was found in the Zoological Gardens.

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### EXPLANATION OF PLATE II.

*Fig.* 1. *Moina dubia*, Richard. Female from the Blue Nile, × 100.
*Fig.* 2. Ditto. First antenna of male, × 260.
*Fig.* 3. *Moina salinarum*, Gurney. Postabdomen of female, × 190.
*Fig.* 4. Ditto. Head of male from below, × 150.
*Fig.* 5. *Alona rectangula.* Part of postabdomen of female, × 1050.
*Fig.* 6. *Chydorus* sp.? Postabdomen, × 260.

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## V.—*New Species of Heterocera from Costa Rica.*—IV.

By W. SCHAUS, F.Z.S.

### *Eriopyga duruscula*, sp. n.

♂. Head, collar, thorax, and fore wings light brown tinged with lilacine. Abdomen fuscous, the last segment and subdorsal tufts brown; anal hairs yellowish. Fore wings thinly irrorated with black; a fine black antemedial shade, incurved in cell, outcurved below cell; orbicular and reniform very large, outlined in buff; the postmedial fine, black, indistinct, slightly incurved below reniform, followed on veins by black and greyish irrorations; a subterminal straight buff line; the veins terminally irrorated with black and greyish; base of fringe finely buff. Hind wings thinly scaled, fuscous grey; the fringe luteous.

Expanse 31 mm.

*Hab.* Volcano Poas.

Belongs to the group of *E. purpurigera*, Gn.



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