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1895

I. Mathematisk-naturvidenskabelig Klasse.

Med 53 Afbildninger og 28 Plancher

Kristiania

I Kommission hos Jacob Dybwad

A. W. Brøggers Bogtrykkeri

1896

Indhold.

On some

South-African Entomostraca

raised from dried mud

By

G. O. Sars

With 8 autographic Plates

(Read 24 May 1895)

Videnskabs-Selskabets Skrifter. I. Mathematisk-naturv. Klasse. 1895. No. 8

In Commission by Jacob Dybwad

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Introduction.

In the year 1890 I received, through the kind intervention of my friend and colleague Prof. R. Collett, a sample of dried mud taken by Mr. Thesen from a swamp at *Knysna*, which is located some distance east of the Cape of Good Hope, and in the following year 3 additional samples from the same locality were kindly forwarded to me. As nothing hitherto has been published about the Fresh-water Entomostraca of that remote region, I was very anxious to get some forms raised from the mud. For that purpose I arranged numerous aquaria of different size, to receive each a small parcel of the mud, the date when prepared being in every case noted. The experiments have been continued for a space of 3 or 4 years, and have on the whole yielded very good results, a number of interesting forms having been successfully raised, and in most cases domesticated during several successive seasons. No less than 20 species have been raised in all, viz., 9 Cladocera, 10 Ostracoda and 1 Copepod. The greater number of them, viz., 14 species, are apparently new to science, and will be described and figured in the present paper together with 3 other species, which appear but little known. Of these species, 2 are so anomalous as more properly to be regarded as types of 2 distinct genera, the others are all referable to earlier known genera.

As in my earlier papers on exotic Entomostraca, the plates have been prepared by the autographic method, and the greatest care has been employed to make the figures as correct and instructive as possible. The habitus-figures are in every cases drawn from living specimens, and in the original drawings the natural colours also were added. As, however, I am not fully satisfied with the colour-printing of the plates to my latest paper on the New Zealand Entomostraca, I have preferred, in the present paper, to omit the colours, which however will be noted in the description of each species.

Cladocera.

Fam.: ***Daphnidæ***.

Gen.: ***Daphnia***, Müller.

1. ***Daphnia Thomsoni***, G. O. Sars.

Daphnia similis, Thomson, Trans. N. Zeal. Institute, Vol. XVI, p. 240, Pl. XIII, figs. 6—9 (not Claus).

Daphnia Thomsoni, G. O. Sars, Contributions to the knowledge of the Fresh-water Entomostraca of New Zealand p. 5, Pl. I.

Of this species, first detected by Mr. Thomson, and recently described and figured by the author in his above-quoted paper, several specimens were raised in one of my aquaria. The specimens exactly agreed with the New Zealand form, and grew to a rather considerable size, the largest specimen measuring in length, without the spine, 3,50 mm.

2. ***Daphnia dolichocephala***, G. O. Sars, n. sp.
(Pl. 1.)

Specific Characters. Carapace in female, seen laterally, oblong oval, in male considerably narrower, dorsal edge spinulose throughout, the spinules being in some cases even continued on the head, spiniform process slightly upturned and of somewhat variable length. Head in female of moderate size, and defined from the carapace dorsally by a shallow sinus, seen laterally, of a somewhat unusual form, its dorsal part being gibbously produced and scarcely at all keeled, anterior edge obliquely declining, and forming with the straight ventral edge a more or less pronounced angular bend, rostral projection short and blunted. Fornix very prominent, and terminating on each side in a rectangular corner. Head in male comparatively smaller and more regularly rounded in outline, with the rostral projection obsolete. Eye well developed, occurring just within the angular bend of the front; ocellus very minute. Antennulæ in female small, though distinctly projecting; in male, as usual, much larger, though not attaining the length of the head, flagellum rather short. Tail in female with the dorsal lappets very largely developed, the 2 upper ones contiguous at the base, the 2 lower confluent; terminal part conically tapering, with the dorsal edge nearly straight, anal denticles subequal, 18—20 on each side, terminal claws comparatively short and stout, spinulose at the base. Tail in male without any dorsal lappets, terminal part but little differing from that in female. Ephippium drawn out anteriorly to a long spinulose strip, ampullæ obliquely disposed. Body in both sexes pellucid, with a faint greenish or yellowish tinge. Length of adult female reaching 3 mm., of male 1,20 mm.

Remarks. This is a very distinct species, which exhibits some points of resemblance to the *D. Atkinsoni* Baird, though evidently specifically different. The specific name refers to the peculiar form of the head in the female.

Description of the female.

The largest specimens measure in length, excluding the spine, about 3 mm., and this form accordingly grows to a rather large size, though being in this respect somewhat inferior to *D. Thomsoni*.

As in most other species, the carapace is rather compressed (see fig. 1), the greatest width but little exceeding half the height. In a lateral view of the animal (fig. 2), it exhibits an oblong oval form, with the ventral margin in every case more curved than the dorsal one, which latter, even when the matrix is distended with ova or embryos, does not form any considerable curvature. The posterior part of the carapace is gradually narrowed, and is continued into the usual spiniform process. The latter is quite straight, and issues somewhat above the longitudinal axis. It is generally obliquely upturned, and of somewhat variable length, being in some individuals, especially of the earlier generations, about half as long as the carapace, whereas in other specimens it becomes quite short and stout. The edges of the valves are in their posterior halves densely clothed with small, appressed denticles, and similar denticles also occur along the whole dorsal edge, being in some instances even continued on the posterior part of the head, especially in specimens with ephippium (see fig. 10). The spine of the carapace has, as usual, 4 rows of appressed spinules. The surface of the shell is densely reticulated with 2 sets of curved striæ crossing each other at nearly right angles. In the anterior part of the valves the sigmoid shell-gland may be easily traced.

The head does not exhibit any pronounced dorsal crest, and is only defined from the carapace above by a very shallow sinus. Seen laterally (fig. 2), it exhibits a somewhat unusual form, its dorsal part being, as it were, gibbously produced, with the upper edge strongly curved in front. The anterior edge declines obliquely towards the front, and is sometimes slightly sinuated below. It joins the inferior, perfectly straight margin by an abrupt, almost angular bend. The rostral projection is very short and continuous with the lower edge, its tip being blunted. The fornix is strongly prominent, and terminates on each side in a rectangular, projecting corner. When the animal is viewed dorsally or ventrally (fig. 1), the edges of the fornix form, together with the anterior extremity of the head, a perfectly even curve, giving the head, in that view, an almost semicircular outline.

The eye (see figs. 1, 2, 10) is well developed, and located just within the angular bend of the front. It exhibits a number of very distinct crystalline bodies projecting from the dark ocular pigment.

The ocellus is extremely minute, but distinct, and occurs at some distance behind the eye, being imbedded within a projection of the cerebral ganglion.

The antennulæ (see fig. 3) are quite immobile and very small, though distinctly projecting from the shell of the head, just behind the rostral prominence. They are tipped with the usual delicate olfactory papillæ, and have besides each a single very minute sensory bristle.

The antennæ (see fig. 2) exhibit the usual structure, and are rather powerful, with both the scape and the rami finely hairy.

The tail has the dorsal processes (see fig. 2) very large and lappet-shaped, the 2 upper ones being, as usual, the largest, and arranged in close approximation at the base, though somewhat diverging at their extremities. The 2 lower ones are quite confluent, forming together a broad lamellar expansion, finely hairy at the edges. The terminal division of the tail (fig. 4) is conically tapering, with the dorsal margin nearly straight. The anal denticles occupy the distal half of this division, and are, as usual, arranged in a double row, flanking the anal fissure. They are of nearly uniform size and strongly recurved, their number being from 18 to 20 on each side. Above the anal denticles the dorsal face of this part is clothed with small appressed spikes. The terminal claws (see fig. 5) are comparatively short and stout, and are each armed at the base with a dense row of slender spinules, about 8 in number, their outer part being finely ciliated along the concave edges. The caudal setæ are well developed, biarticulate, and densely plumous.

Of the inner organs, the alimentary tube is very conspicuous in the lateral view of the animal (see figs. 2 & 10) by its yellowish green contents. Its anterior part forms a very strong curvature within the upper, gibbous part of the head. The cœcal appendages are rather elongated, and curved in a sigmoid manner.

The ova in the marsupial room or matrix are, in individuals of the earlier generations, very numerous and of a bluish green colour, with a yellowish central oil-globule.

The ephippium (see fig. 10) does not, as is generally the case, cause any pronounced deformity of the upper part of the carapace. Seen laterally, it is of an oblong fusiform shape, and is drawn out anteriorly to a narrow strip, which, like the whole upper margin of the ephippium, is densely spinulose. The ampullæ for the ova are, as in *D. magna* and *D. Thomsoni*, obliquely disposed. The colour of the ephippium is at first rather pale, but becomes gradually darker, and, when detached from the carapace, is of a very dark, nearly black hue.

The recently hatched young (fig. 6) exhibit an appearance rather different from that in the adults, the head being very much produced at the upper corner, assuming thereby an almost hood-shaped appearance. They are, moreover, remarkable for the large size of the spine of the carapace, which even equals in length the whole remaining part of the body, and is slightly arcuate. It has the appearance of being the immediate continuation of the straight dorsal margin of the carapace, and is, like the latter, coarsely spinulose.

The adult male (fig. 7) is of very small size, as compared with the female, measuring in length, without the spine, only 1,20 mm. The form of the carapace is, as usual, narrower than in the female, oblong, with the dorsal face far less vaulted, and the head also exhibits a rather different form, being comparatively shorter and more regularly rounded, without any true rostral projection. The spine of the carapace is of moderate length and considerably upturned. The free edges of the valves form, as in other male Daphniæ, anteriorly an angular corner, and are here densely clothed with long and delicate cilia, also continued for some distance along the ventral edges.

The antennulæ (see fig. 8) are much larger than in the female, and freely movable. They do not, however, attain the length of the head, and are rather narrow. The flagellum is very small, scarcely exceeding 1/4 of the length of the stem, and terminates in a fine point. Immediately behind its base is seen the terminal fascicle of olfactory papillæ, and at a short distance from it anteriorly occurs a small sensory bristle.

The 1st pair of legs are modified in the usual manner, being each armed with a strong anteriorly curving claw, and terminating in a plumose seta or flagellum.

The tail does not exhibit any dorsal processes. Its terminal part is not very different in shape from that in the female, though differing in the smaller number of anal denticles, and in the fact that the tip, carrying the caudal claws, is more narrowly exserted (see fig. 9).

The testes are distinctly traceable through the shell as 2 narrow bags extending on each side of the intestinal tube (see fig. 7). They debouch each by a narrow duct near the tip of the tail.

In both sexes the body is rather pellucid, with a very faint yellowish green tinge. In adult females, especially of the earlier generations, numerous small reddish orange oil-globules are found to occur along the sides of the intestine, giving that part a slightly reddish hue. The recently hatched young are almost colourless.

Observations. This Daphnia was hatched in 3 of my aquaria, appearing at first only as solitary specimens. These, however, rapidly multiplied in the usual parthenogenetical manner, giving at last, by successive generations, rise to a vast progeny. At the close of the season, most of the specimens became loaded with ephippia, and at that time also male specimens were found, though in a very restricted number. In one of my aquaria the Daphnia also appeared in great abundance the next season, after the bottom-residue had been kept in a dried state during the winter.

As to habits, this form agrees with the other known species, keeping its body constantly suspended in the water by repeated strokes of the antennæ, whereby a somewhat jerking motion is effected. The attitude of the body is in every case a vertical one, the head upwards. As with most other species, the individuals of the earlier generations are rather active, moving about in all directions, allowing only with great difficulty, of being caught in the usual manner by the aid of a dipping tube. The individuals of the later generations become more slow in their movements, and are generally found aggregated not far from the bottom on one side of the aquarium, as a rule that turned to the light. The males are, as usual much more active than the females, and are often found, in their movements, to assume a somewhat prone attitude, as shown in the figure.

3. *Daphnia propinqva*, G. O. Sars. n. sp.
(Pl. 2, figs. 1—8.)

Specific Characters. Carapace in female, seen laterally, oval in form, dorsal margin more or less arcuate and spinulose in its posterior part only; spine of carapace rather small, and extending nearly in the longitudinal axis of the body. Head not very large, slightly carinated, and, seen laterally, evenly rounded in front, rostral projection terminating in a short, deflexed point; seen from above subtriangular in outline, tapering in front to an obtuse point; fornix moderately prominent, without any projecting corner. Carapace in male, as usual, narrower, oblong, with the dorsal margin straight, and the spine more elongated; head without any rostrum. Eye rather large. Antennulæ in female distinctly projecting, though immobile; in male modified in the usual manner, flagellum a little shorter than the stem. Tail in female with the usual dorsal lappets, in male without any processes; terminal part slightly tapering, anal denticles in female from 12 to 14 on each side, and of equal size, terminal claws of moderate length, spinulose at the base. Ephippium oval triangular blunted in front, without any projecting strip, ampullæ transversely disposed. Body in both sexes highly pellucid and almost colourless. Length of adult female 1,80 mm., of male 0,90 mm.

Remarks. The present species bears a considerable resemblance to certain northern forms of Daphnia generally referred to *D. pulex*, but differs, among other characters, in the absence of any dorsal process to the tail in the male. In the latter respect, it agrees with *D. obtusa* of Kurz, where however, the spine of the carapace is quite obsolete, whereas in the present species it is well defined, though in the female of rather small size. The specific name refers to the affinity of this form to the 2 above-named northern species.

Description of the female.

Fully adult, ovigerous specimens do not exceed in length 1,80 mm., and this form is accordingly very inferior in size to the 2 preceding ones.

Seen laterally (fig. 1), the carapace exhibits a rather regular oval form, the free edges of the valves being evenly curved throughout, and the dorsal margin more or less arcuate, according to the degree of distention of the matrix with ova or embryos. The spine of the carapace is rather small, though well defined, and in specimens with summer-eggs extends nearly in the longitudinal axis of the body, whereas in those with ephippium (see fig. 6) it occurs more dorsally. The posterior halves of

the free edges of the valves are densely spinulose, and similar appressed spinules also clothe the spine of the carapace, and are continued for some distance along the dorsal edge, the anterior part of which, however, is quite smooth.

The head is of moderate size, and not distinctly defined dorsally from the carapace, though the upper edge appears slightly concave in the nuchal region. It has, along the middle, a very slight keel, which is the immediate continuation of the dorsal crest of the carapace. Seen laterally (fig. 1), it slightly tapers towards the front, without forming any gibbous expansion dorsally, the dorsal margin being quite evenly curved, and continuous with the anterior edge. The latter joins the ventral edge by a strong, but quite even curve, whereby a somewhat projecting rounded frontal part is formed, within which the eye is located. The ventral edge is very slightly concave, and terminates in a short, but acute, deflexed rostral projection (see fig. 3), behind which is a rounded expansion carrying the antennulæ.

Seen from above (fig. 2), the carapace appears rather compressed, its greatest width but little exceeding half the height. The head, in this view of the animal, exhibits a somewhat triangular form, its anterior part being somewhat narrowed, and terminating in a short point, whereas its posterior part appears rather broad, owing to the prominent fornix. The latter joins the carapace, without forming any projecting corner.

The eye (see figs. 1, 2, 3) is comparatively large, with distinctly projecting crystalline bodies. The ocellus, on the other hand, is extremely minute, punctiform, and, as usual, located at some distance behind the eye, at the lower corner of the cerebral ganglion (see fig. 3).

The antennulæ (ibid) are distinctly projecting, though, as usual in the female sex, small and quite immobile, being tipped by the usual fascicle of olfactory papillæ.

The antennæ (see fig. 1) are of moderate size and quite normal in structure.

The tail exhibits the usual dorsal lappets, which, however, are less strongly developed than in *D. dolichocephala*. The 2 lower ones are well defined, though confluent at the base. The terminal part (fig. 4) is somewhat narrowed distally, and is armed on each side of the anal fissure with from 12 to 14 denticles of nearly equal size. The terminal claws (see fig. 5) are of moderate length, and exhibit at the base a dense series of slender spinules. Between these claws and the outmost of the anal denticles, a small sinus is formed.

The alimentary tube (see fig. 1) forms only a slight curve within the dorsal part of the head, and the cœcal appendages are also considerably smaller and less flexuous than in the 2 preceding species.

The ova in the matrix are comparatively large, and accordingly less numerous than in the 2 preceding species. They are, when recently received from the ovaries, of a pale greenish colour, with a large hyaline central oil-globule.

The ephippium (see fig. 6) differs conspicuously from that in the 2 preceding species, exhibiting a similar appearance to that of the European form *D. pulex*. As in that species, it causes a slight deformity of the upper part of the carapace, especially prominent shortly after the ephippium has been detached. Seen from the side, it exhibits an oval triangular form, being transversely truncated in front and gradually narrowed posteriorly, where it projects into a pointed process. The latter is nothing less than the spine of the carapace, which remains in connexion with the ephippium, when it is detached. The egg-ampullæ are, as is in *D. pulex*, transversely disposed. The colour of the ephippium becomes at last very dark, almost black.

The adult male (fig. 7) scarcely attains a length of 1 mm., and differs from the female in the usual manner, the carapace being much narrower, oblong, with the dorsal margin nearly straight, and the head without the rostral projection. The spine of the carapace is comparatively more fully developed than in the female, and slightly upturned. Moreover the free edges of the valves are anteriorly fringed with delicate cilia, and exhibit in front a distinctly projecting corner.

The antennulæ (fig. 8) are freely mobile, though not very large, with the flagellum well developed and terminating in a somewhat hooked point.

The 1st pair of legs are, as usual, modified to grasping organs, each being provided with an anteriorly curving claw, and terminating in a long seta.

The tail does not exhibit any trace of a dorsal process, and has the terminal part but little different from that in the female.

The body, in both sexes, is highly pellucid and almost colourless.

Observations. This Daphnia developed in great numbers in one of my aquaria, and continued to live and propagate during the whole summer, at last filling the aquarium with myriads of individuals. Male specimens were however, as usual, rather scarce, and only occurred at the close of the season. In habits, this form perfectly agrees with the northern species *D. pulex*.

Gen.: ***Ceriodaphnia***, Dana.

4. *Ceriodaphnia Rigaudi*, Richard.

(Pl. 2, figs. 9—15.)

Ceriodaphnia Rigaudi, Richard, Sur quelques animaux inférieurs des eaux douces du Tonkin. Mém. Soc. Zool. de France, T. VII, p. 239.

Specific Characters. Carapace of female rather tumid, seen laterally, rounded quadrangular, posterior projection short, and occurring above the longitudinal axis; that of male narrower, with the dorsal margin straight, and the ventral slightly sinuated. Head in both sexes much depressed, procumbent, being defined dorsally by a deep depression, front rounded and slightly projecting, inferior part produced to a very acute, deflexed rostrum; fornix simple, without any projecting corner. Surface of shell distinctly reticulated all over with rather large hexagonal meshes, free edges of the valves smooth. Eye of moderate size; ocellus small, punctiform. Antennulæ in female not extending to the tip of the rostrum, oblong fusiform, with a rather long sensory bristle anteriorly; those in male considerably larger, projecting far beyond the rostrum, and having a distinct setiform flagellum. Tail in female with the dorsal processes very small, terminal part rather narrow, and nearly of uniform breadth throughout, being obliquely rounded at the tip, anal denticles only 6 on each side; terminal claws quite smooth; caudal setæ rather elongate. Body semipellucid, of a pale orange colour, changing to light reddish. Length of adult female 0,55 mm., of male 0.38 mm.

Remarks. This form was first described from Tonkin by M. J. Richard, and subsequently recorded by the same author from another locality; but no figures have ever been given of the species. The most prominent character is undoubtedly the acute rostral projection, for which reason I at first noticed the species under the provisional name of *C. avirostris*. It agrees in this respect with the *C. cornuta*, described by the author from Australia; but this species has besides an acute horn-shaped projection on the front, not found in the present form. Two other species have been recorded as being likewise provided with a rostral projection, viz., *C. textilis* Dana and *C. asperata* Moniez, but these species would seem to differ in other respects from that here treated of.

Description of the female.

Fully adult, ovigerous specimens but little exceed in length $^1/_2$ mm., and this form accordingly belongs to the smaller species of the genus.

As in most other species, the general form of the body (see figs. 9 & 10) appears rather short and stout, nearly globular.

The carapace exhibits, in a lateral view of the animal (fig, 10), a rounded quadrangular form, with the dorsal margin more or less curved, according to the degree of distention of the matrix with eggs or embryos. The ventral edges are nearly straight in the middle, but join the anterior and posterior edges by a rather pronounced, though quite even curve. At the junction between the posterior and dorsal edges, the carapace projects as a short angular prominence, which is located considerably above the longitudinal axis. Seen from above (fig. 9), the carapace appears very tumid, though the greatest width is not generally equal to the height.

The head (see also fig. 11) is much depressed and procumbent, being defined from the carapace above by a deep depression. Its dorsal face is somewhat flattened, and exhibits in the middle a very slight sinus, beneath which is formed a somewhat prominent, obtusely rounded frontal part. The inferior part of the head is produced to an acute rostral projection pointing obliquely behind, and somewhat resembling a bird's beak. The fornix is rather prominent, but quite simple, without any projecting corner.

The surface of the shell is everywhere distinctly reticulated with rather large, and mostly hexagonal meshes (see fig. 13). This reticulation is, as usual, especially conspicuous on the valvular part of the carapace, but also occurs on its dorsal part and on the head (see fig. 11), though here somewhat more irregular. The free edges of the valves are perfectly smooth, without any denticles or bristles.

The eye (see figs. 9, 10, 11) is rather large, and located just within the obtusely rounded frontal part of the head. The crystalline bodies are not very conspicuous, though, on a closer examination, several of them are seen projecting from the edge of the black ocular pigment.

The ocellus is very small, punctiform, and located at some distance behind the eye, near the base of the antennulæ (see fig. 11).

The latter appendages (ibid) are, as in the other species of the genus, movably articulated to the sides of the head, projecting generally downwards. They are of moderate size and subfusiform in shape, but do not extend beyond the tip of the rostrum, except by the terminal fascicle of olfactory papillæ. Anteriorly, they have each a very long sensory bristle, which arises from a knob-like projection, and extends forwards.

The antennæ are well developed and of the usual structure. They have each at the base, exteriorly, an unusually long sensory bristle, which,

in the ventral or dorsal view of the animal (fig. 9), is very conspicuous, extending straight outwards.

The tail (fig. 12) is not very large, and has dorsally 3 small processes, the lower 2 of which are tipped with a bundle of hairs. The terminal part is rather narrow, as compared with that in other species, and nearly of uniform breadth throughout, with the dorsal margin in the greater part of its length nearly straight, and only in its outmost part gently curving towards the base of the terminal claws. The latter are rather strong and somewhat curved, but perfectly smooth. The anal denticles are only 6 on each side, gradually somewhat increasing in length distally. They are rather feeble and somewhat curved, terminating each in a very sharp point. The caudal setæ are comparatively slender, being nearly as long as the terminal part of the tail, and are finely ciliated.

The ova in the matrix, in individuals of the earlier generations, are sometimes rather numerous, causing the dorsal part of the carapace to be strongly arcuate. In specimens of the later generations, their number is generally restricted to 2, lying side by side (see figs. 9 & 10). The yolk-mass is at first bluish green, becoming gradually paler, and at last assuming a reddish orange hue.

The ephippium, as in the other species, is oval and contains but a single egg-ampulla placed longitudinally.

The adult male (fig. 14) is much smaller than the female, scarcely exceeding in length 0,38 mm. It has the carapace narrower and more regularly quadrangular, the dorsal margin being nearly quite straight. The lower edges of the valves are slightly sinuated in front of the middle, where they are fringed with fine hairs. The head does not differ much in its shape from that in the female, except that it is perhaps a little more erect. Male specimens are, however, easily distinguished from females of same size by the structure of the antennulæ. These appendages (fig. 15) are much more fully developed, extending far beyond the rostrum, and are moreover each provided with a distinct setiform flagellum arising from the tip in front of the fascicle of olfactory papillæ. The 1st pair of legs have each a distinct, though not very strong claw, and terminate in a long setiform flagellum, often extending beyond the valves. The tail does not seem to differ materially from that in the female.

The colour is somewhat variable. In females of the earlier generations it is often found to be more or less orange, turning to light reddish; whereas in specimens of the later generations it is generally paler, yellowish. The males are, as a rule, of a more pronounced reddish colour

than the females, owing to numerous red oil-globules acoumulated within the body, especially along the alimentary tube.

Observations. The present form developed in great abundance in some of my aquaria, and was successfully domesticated during several succeeding seasons, increasing in number with each season.

It is not very active, often keeping its body suspended in the water for rather a long time nearly in the very same place, by repeated strokes of the antennæ, whereby a slow jumping motion is effected. Generally the individuals are found aggregated in large shoals, now at a short distance from the bottom, now near the surface of the water.

Male specimens are rather rare, and their existence is restricted to a short period of the season.

Distribution. As above stated, the species was at first noticed from Tonkin by M. J. Richard, numerous specimens having been collected by Dr. Rigaud in a marsh off the fort Lao-Kay. Subsequently it has been recorded by Mr. Richard from Palestine, where it was found by M. Barrois in the Lake Tiberias. Finally, the author has raised the same form in considerable numbers from dried mud forwarded to him from Sumatra. This species accordingly has a very wide range of distribution.

Gen.; ***Simocephalus***, Schoedeler.

5. *Simocephalus australiensis*, Dana.

Daphnia australiensis, Dana, Unit. St. Expl. Exp. Crust. II, p. 1271, Pl. 89, fig. 4, a—c.

Simocephalus australiensis, G. O. Sars, Additional Notes on Australian Cladocera raised from dried mud, p, 15, Pl. 2, figs. 1—5.

Of this form, described and figured by the author in another paper, some specimens developed in one of my aquaria, and rapidly multiplied during the summer. The specimens agreed exactly with those raised by the author from Australian mud, some years ago.

6. *Simocephalus capensis*, G. O. Sars, n. sp.

(Pl. 3.)

Specific Characters. Carapace in adult female, seen laterally, rather broad, of a somewhat rhomboid form, and terminating in an obtuse median prominence, dorsal margin above the latter slightly sinuated and denticulated, posterior edge below it oblique, smooth. Head comparatively small, seen laterally, subtriangular in form, front produced to an angular, pro-

cumbent corner slightly denticulated anteriorly, lower edge straight and obliquely ascending, rostral projection extremely small, and occurring just in front of the insertion of the antennulæ. Carapace in male, seen laterally, narrower, gradually widening behind, terminal prominence less distinct and not defined above by any sinus. Eye rather large, located within the frontal part of the head; ocellus small, rhomboidal in form. Tail of the usual structure, terminal claws without any denticles at the base. Colour ochraceous, turning to pale chestnut along the back and lower edge of the carapace. Length of adult female 2.40 mm., of male 0,80 mm.

Remarks. The present new species is nearly allied to the European *S. serrulatus* Koch, but differs in the somewhat different form of the head, and in the circumstance that the hind edges of the valves, below the posterior prominence, are quite smooth, not, as in that species, serrulate.

Description of the female.

The length of the largest specimens measures nearly 2 1/2 mm., and this form accordingly somewhat exceeds in size the European species, *S. serrulatus*.

The general form of the body (see figs 1 & 2) is that characteristic of the genus, being rather broad, almost navicular.

Seen laterally (fig. 1), the carapace exhibits a broad, somewhat rhomboidal form, with the dorsal margin obliquely curved, its greatest curvature occurring behind the middle. The free edges of the valves are bulging in front, and in the middle nearly straight and horizontal, wheras behind they ascend obliquely towards the posterior prominence of the carapace. The latter, which extends nearly in the longitudinal axis, is distinctly projecting, though obtuse at the tip, and is defined above by a well-marked sinus, the edge of which is minutely denticulate. The adjoining edges of the valves, on the other hand, are quite smooth throughout. As in other species, inside the lower edges of the valves a somewhat flexuous ridge is traceable, fringed with delicate bristles, which partly project beyond the valves at their anterior and posterior corners. Seen from above or beneath (fig. 2), the carapace appears rather tumid, with the greatest width in front of the middle, its posterior part narrowing gradually and terminating in an obtuse point.

The head is comparatively small, and, seen laterally (fig. 1), of a somewhat triangular form. It is defined above from the carapace by a distinct, though small notch; but its dorsal face is otherwise continuous with that of the carapace, both forming together a perfectly even curve. Anteriorly it terminates in a procumbent frontal part, which forms an

acute angle with the ventral edge, and carries, anteriorly, a few small denticles. The ventral edge of the head is quite straight and obliquely ascending, terminating with a very small rostral projection just in front of the insertion of the antennulæ (see also fig. 3). Viewed from above or beneath (fig. 2), the head appears rather broad, nearly semicircular in outline, on account of the greatly prominent fornix, which latter joins the carapace on each side at a very acute angle.

The surface of the shell, as in other species, is sculptured with closely set, oblique striæ, partly anastomosing with each other. These striæ are especially distinct on the valvular part of the carapace, running parallel to the hind edges, and, anteriorly, forming a somewhat irregular network.

The eye, located just within the projecting frontal part of the head (see fig. 3), is rather large, with distinct crystalline bodies, and dark brown pigment.

The ocellus (ibid.), on the other hand, is very small, subrhomboidal in form, and occurs just in front of the insertion of the antennulæ.

The latter appendages (ibid.) exhibit the usual subfusiform shape, and carry each, in addition to the apical bundle of olfactory papillæ, a delicate, anteriorly pointing sensory bristle, arising from a knob-like prominence about the middle of the anterior edge. They are, as in other species, movably articulated to the shell of the head, and are, generally, extended obliquely behind, without, however, in this species being covered by the anterior part of the valves.

The antennæ (see figs. 1 & 2) exhibit the structure characteristic of the genus.

The tail (see fig. 1) also, does not differ essentially in its general form from that in other species. As in these, it is rather broad and compressed, exhibiting, dorsally, 2 distant falciform processes for occluding the matrix behind. Its terminal part (fig. 4), has the posterior edge slightly bulging in the middle, and terminates in an obtuse point carrying the caudal claws. The anal sinus is well marked, and defined, above, by an obtuse prominence; it is armed, on each side, with about 10 denticles, the outer of which rapidly increase in size, and are strongly curved. The terminal claws (fig. 5) are very slender, and but very slightly curved; they want all traces of secondary spinules, but are finely ciliated along their concave edge.

The alimentary tube (see fig. 1), is rather wide, and forms, anteriorly, only a very slight curve. The cæcal appendages are short and deflexed.

The ova in the matrix are, in individuals of the earlier generations, (see fig. 1) rather numerous, and of a pale greenish colour, with a large central oil-globule. In specimens of later generations their number becomes much more restricted.

The ephippium (fig. 6) exhibits the usual structure, being triangular in form, and containing but a single egg-ampulla placed longitudinally.

The adult male (fig. 7) is very small, not even attaining a length of 1 mm. It differs, moreover, from the female, in the carapace being narrower, and gradually widening behind, with the posterior prominence less projecting, and not defined, above, by any sinus. The dorsal margin appears nearly straight, whereas the inferior edges are slightly sinuated in front of the middle. The head is comparatively larger than in the female, with the frontal part more obtuse.

The antennulæ are more fully developed, and have each two sensory bristles, instead of a single one, anteriorly.

The 1st pair of legs are each armed with a distinct, though rather small claw, and the terminal part of the tail appears narrower, with the posterior edge straight.

The testes are very conspicuous, forming 2 rather large, and somewhat twisted bags extending along the sides of the alimentary tube, and debouching within the anal sinus of the tail.

The colour of the female is yellowish or ochraceous, turning on the back, and along the ventral edge of the carapace, to pale chestnut; that of the male is much paler, the body being in most cases nearly colourless.

Observations. This form developed in considerable numbers in several of my aquaria, and multiplied during the season in quite an astonishing manner, so as to cause the aquaria literally to swarm at last, with individuals in different stages of development. Contrary to what is generally the case, male specimens occurred at the close of the season in innumerable shoals. In habits this form exactly agrees with the other known species.

Fam.: ***Lynceidæ.***

Gen.: ***Leydigia***, Kurz.

7. ***Leydigia acanthocercoides***, (Fischer).

(Pl. 4, figs. 1—4).

Lynceus acanthocercoides, Fischer, Bullet. Soc. Imp. des Natural. de Moscou, p. 431, Pl. III, figs. 21—25.

Specific Characters. Carapace of female, seen laterally, subquadrangular, widening somewhat posteriorly, upper margin forming, together with

that of the head, a quite even curve, inferior edges somewhat arcuate, posterior edges obliquely descending, and slightly bulging in the middle, joining the inferior edges by a strong curve. Head remarkably erect, rostrum obtusely pointed. Surface of shell distinctly striated longitudinally, inferior edges of valves fringed with long and delicate bristles. Ocellus scarcely larger than the eye. Tail large and expanded, with the posterior edge evenly curved throughout, without any notch at the tip, lateral denticles very slender, subuniform, and, as in the other species, arranged on each side in a double row, terminal claws quite smooth. Adult male much smaller than the female, with the carapace less broad, and the head more erect. Antennulæ thicker, and having the olfactory papillæ more fully developed. First pair of legs each with an exceedingly strong, anteriorly curving claw. Tail much narrower than in female, with the lateral denticles fewer in number and more crowded, terminal claws shorter; efferent ducts of the testes produced to 2 cylindrical appendages projecting from the tip of the tail, in front of the terminal claws. Colour in both sexes more or less vivid blood-red. Length of adult female 0,90 mm., of male 0,50 mm.

Remarks. This form is, I believe, that originally described by Fischer as *Lynceus acanthocercoides*. But as that species does not occur in Norway, I am, at present, not enabled by direct comparison, to ascertain the identity of both. As far as I can judge from earlier descriptions, there seems, however, to be nothing to forbid such an identification. From the Australian species, described by the author as *L. australis*, it is at once distinguished by the very distinct sculpturing of the shell, and, moreover by the smaller size of the ocellus, as well as by the form of the tail. In the latter respect it more resembles the *L. quadrangularis* Leydig, a species also found in Norway, but in that form the terminal claws have each a distinct denticle at the base, which is wanting in the present species, while the sculpture of the shell is also different.

Description of the female.

Adult specimens attain a length of nearly 1 mm., and this form accordingly grows to a considerably larger size than the Australian species.

The carapace is rather compressed, and, seen laterally (fig. 1), very broad, of an irregularly quadrangular shape, being gradually expanded towards the posterior extremity, which is rather obliquely truncated. The dorsal margin is but slightly arcuate, and quite continuous with that of the head, both forming together a perfectly even curve. The inferior edges

of the valves are likewise gently curved, and join both the anterior and posterior edges by a strong curve. The hind edges are about half as long as the ventral ones, and obliquely descending, with a slight bulging in the middle. They join the dorsal margin at an obtuse angle, whereas the rather prominent infero-posteal corners appear obtusely rounded, and quite unarmed. The head is, as in the other species of the genus, remarkably erect, and quite immobile. Seen laterally, it tapers to a somewhat procumbent acute rostral projection, which, however, in a ventral or dorsal view of the animal, appears more blunted. The fornix is rather prominent and, on each side, joins the carapace at a very acute angle, being accordingly defined from the anterior edges of the valves by a narrow incision.

The surface of the shell is sculptured with rather distinct longitudinal striæ, about 25 on each side. These striæ are, especially, very conspicuous in the posterior part of the carapace, becoming, anteriorly, more irregular and flexuous, as well as partly anastomosing with each other, thus forming an irregular reticulation. On the head the striæ are scarcely visible at all, though perhaps some of them are continued for some distance on its dorsal part. The inferior edges of the valves are, throughout, fringed with very delicate, and rather long bristles, which are also partly continued on the anterior edges, but do not extend to the infero-posteal corners.

The eye is not very large, and has the crystalline bodies rather indistinct. The ocellus is about same size as the eye, and occurs much nearer to it than to the tip of the rostrum. It exhibits, in the lateral view of the animal, a triangular form, being drawn out above to an acute corner.

The antennulæ do not extend to the tip of the rostrum, and exhibit a rather narrow, subfusiform shape. They are tipped by the usual fascicle of olfactory papillæ, and have, moreover, each anteriorly, at some distance from the tip, a delicate sensory bristle.

The antennæ, oral parts and legs agree exactly with those parts as described by the author in the Australian species.

The tail (fig 2), on the other hand, differs conspicuously, in being comparatively broader and more expanded, with the posterior or dorsal edge forming quite an even curve until the base of the terminal claws, no angular projection or sinus occuring distally, as in the Australian species. The edge itself is finely ciliated in its distal half, whereas, laterally, a double series of very slender, and strongly recurved, spiniform denticles occurs, 10 to 12 in each row, those in the lower row being the longer. In some

cases it has an appearance as if some additional series of denticles were present; but, on a closer examination, it may be easily seen, that this is only due to the individual being about to cast its skin, the apparent additional denticles belonging, in reality, to the underlying new skin in process of formation. The double spine-rows occupy about the distal half of the tail, its upper part having only, at some distance from the edge on each side, a single series of short straight denticles. Close to the very movable articulation connecting the tail with the adjoining part of the body, occurs posteriorly a small tubercle carrying the caudal setæ, and, at a short distance below this tubercle, the posterior edge forms a very slight angular prominence, representing the postanal angle. The terminal claws are rather slender and but slightly curved, being quite smooth, without any trace of a basal denticle.

The alimentary tube is rather wide in its anterior part, and here generally filled with yellowish orange contents. Posteriorly it forms, as usual in the Lynceidæ, a nearly double wind, and has the contents very dark. Before joining the short, muscular rectum, it forms a considerable dilatation, but wants any true cœcal appendage. The anal orifice is found at a short distance below the base of the tail dorsally.

The ovaria are often very conspicuous, shining through the shell as 2 rather broad dark green masses, partly covering the intestine laterally.

In the matrix, generally only a single ovum or embryo is found, more rarely two, and in this case, owing to the inconsiderable width of the matrix, arranged the one in front of the other.

The adult male (fig. 3) is much smaller than the female, scarcely exceeding in length $^1/_2$ mm. It somewhat resembles in form, young female specimens, but has the head more erect, and is, moreover, at once distinguished by the structure of the antennulæ, the 1st pair of legs, and the tail.

The antennulæ are scarcely longer, but much thicker than in the female, and have the olfactory papillæ more fully developed, extending considerably beyond the tip of the rostrum.

The 1st pair of legs are each armed with an exceedingly large, anteriorly curving hook, which is horn-coloured and generally projects beyond the valves.

The tail (fig. 4) is considerably narrower than in the female, being but very slightly expanded distally. The lateral spines are fewer in number, and restricted to the outer third part of the tail only, though, as in the female, arranged in a double series on each side. The terminal claws are comparatively shorter, and, in front of them, there proceed from the tip of the tail 2 peculiar soft, cylindrical appendages, constituting the outer sexual organs.

The testes are located between the winds of the intestine, and are apparently divided into several bag-like divisions. Their efferent ducts enter the tail at its ventral side, and run along the anterior edge until the tip, where they are continued into the above mentioned cylindrical appendages.

In both sexes the colour appears more or less vivid blood-red, which colour chiefly affects the enclosed body, whereas the valves are more pellucid, and of an orange hue.

Observations. This Lynceid developed rather plentifully in some of my aquaria, and in one of them has been domesticated until the present time.

As with other Lynceids, it is a true bottom-form, burrowing with great dexterity within the loose deposit at the bottom. It is therefore most frequently found on the floor of the aquarium, but at times it may also be seen to ascend the walls generally on the side turned to the light. It moves through the water rather slowly, by rapid strokes of the antennæ, whereby a rather even, though somewhat trembling run is effected, the body being generally kept in a horizontal attitude, with the back downwards. The males were only observed at a very restricted period of the season, but at that time rather abundantly.

Distribution. Russia, Germany, British Isles, Sweden.

Gen.: ***Alonopsis***, G. O. Sars.

8. *Alonopsis Colletti,* G. O. Sars, n. sp.

(Pl. 4, figs. 5—8).

Specific Characters. Carapace of female much compressed, seen laterally, oval quadrangular in form, greatest breadth anteriorly, posterior extremity nearly transversely truncated, with the lower corner rounded and unarmed, dorsal margin boldly curved in front, inferior edges subflexuous in the middle. Head slightly erect, terminating in a comparatively short and obtusely acuminate rostrum; fornix rather prominent. Surface of shell nearly smooth, with a very faint trace of reticulation, inferior edges of valves finely ciliated, and excised in front of the middle, so as to leave, ventrally, an open oblong oval space leading to the inner shell-cavity. Eye of moderate size. Ocellus smaller than the eye, and occurring nearly in the middle between the latter and the tip of the rostrum. Antennulæ narrow subfusiform, and not fully extending to the tip of the rostrum. Antennæ of moderate size. Tail slender, and considerably narrowed distally, tip incised behind the base of the terminal

claws, the latter rather elongated and nearly straight, with a remarkably strong secondary denticle at the base, anteanal denticles well marked, about 22 on each side, and more crowded at the tip, postanal angle inconspicuous. Male not very different from the female in its general appearance, though exhibiting the usual sexual characters. Colour in female dark yellowish or olivaceous, in male considerably paler. Length of adult female 1,05 mm., of male 0,70 mm.

Remarks. This is a very distinct species, which I have much pleasure in dedicating to my friend and colleague, Prof. R. Collett, to whom I am indebted for the material that yielded this, and the other species here described. Its nearest ally is *Alonopsis latissima* Kurz, a species which differs considerably from the type of the genus, *Alonopsis elongata* G. O. Sars, though perhaps it is more strictly related to *Alonopsis* than to *Alonella*, with which latter genus I formerly have associated it. The present new species would seem to be somewhat intermediate between the two, though easily distinguishable from any of them by several well-marked characters, among others by the want of any perceptible striation of the shell.

Description of the female.

The length of the largest specimens somewhat exceeds 1 mm., and this form accordingly grows to a considerably larger size than *A. latissima*.

The body is very much compressed, its greatest width not nearly attaining half the height (comp. fig. 5 and 6).

The carapace is ,dorsally, confluent with the head, and exhibits, in a lateral view of the animal (fig. 5), a rather broad oval quadrangular form, with the greatest breadth in front of the middle, and the posterior extremity nearly transversely truncated. The dorsal margin is boldly curved, and continuous with that of the head, joining the posterior edges at an obtuse angle. The inferior edges of the valves appear somewhat irregularly flexuous in the middle, and join both the anterior and posterior edges by a strong curve. The posterior edges are very slightly oblique, with the lower corner more projecting and rounded off. Seen from above or beneath (fig. 6), the carapace appears very narrow and gradually tapering posteriorly.

The head is somewhat more erect than in *A. latissima*, and quite immobile. It terminates in a rather short, and somewhat obtuse rostrum. The fornix is rather prominent, from which cause the head appears, in a dorsal or ventral view of the animal (fig. 6), almost as broad as the carapace.

The surface of the shell is nearly quite smooth, without any trace of a longitudinal striation. Only near the free edges of the valves a very faint and indistinct reticulation is sometimes traced. The inferior edges of the valves are finely ciliated, the cilia being more prominent in the middle. If the animal is viewed from the ventral side (fig. 6), these edges are found to be excised in front of the middle, so as to leave between them an oblong oval, open space, through which the spines and setæ of the anterior pairs of legs may be exserted.

The eye is of moderate size, with the crystalline bodies well marked, though not very large.

The ocellus is somewhat smaller than the eye, and located about half way between the latter and the tip of the rostrum.

The antennulæ are of the usual narrow subfusiform shape, and do not extend to the tip of the rostrum.

The antennæ are of moderate size, and quite normally constructed.

The lamellar expansion of the labrum is rather large and securiform in shape, with the edge perfectly smooth.

The tail (fig. 7) is very slender and considerably narrowed distally, exhibiting at some distance from the base, just above the anal sinus, a very slight angle. The tip is deeply incised, the incision being defined in front by an obtuse projection carrying the terminal claws. The latter are rather strong, horn-coloured, and nearly straight, carrying each, at the base, a remarkably large secondary denticle. The posterior edge is armed, below the anal sinus, with a double row of small, but well defined denticles, about 12 in each row, the outer ones being more crowded. The caudal setæ are rather small.

The alimentary tube forms an almost double wind, and has, at the junction with the rectum anteriorly, a rather elongate cœcal appendage.

The matrix generally contains but a single ovum, or embryo, more rarely 2, arranged the one in front of the other. Of winter-eggs there is, invariably, but a single one placed in the anterior part of the matrix (see figs 5), and, in individuals carrying such an ovum, the dorsal part of the carapace often assumes a rather dark hue.

The adult male (fig. 8) scarcely exceeds in length 0.70 mm., and does not differ much in general apparance from young females. On a closer examination, it is, however, easily distinguished by the usual sexual characters. Thus the antennulæ are comparatively thicker than in the female, with the olfactory papillæ more fully developed. The 1st pair of legs are each provided with the usual, anteriorly curving hook, which however is comparatively less strong than in the male of *Leydigia*, and scarcely

projects beyond the edges of the valves. The tail agrees in shape with that of the female, except that its anterior edge is provided, at some distance from the tip, with a slight notch, indicating the place where the efferent ducts of the testes debouch.

The colour is a more or less dark yellowish brown, being, as usual, paler in the male than in the female. As above stated, in females carrying winter-eggs, the upper part of the carapace sometimes assumes a very dark, almost blackish hue.

Observations. This interesting form was only raised in one of my aquaria, but multiplied rather plentifully in this during the course of the summer. It did not however reappear the succeeding seasons.

In habits it agrees with most other Lynceids, being generally found within the loose deposit at the bottom, at times, however, especially during sunshine, ascending the walls of the aquarium. Its movements, when swimming, are rather slow, and cause a quite even run through the water, the body being, as a rule, kept in a horizontal attitude, with the back downwards. Male specimens were very scarce.

Gen.: ***Chydorus***, Baird.

9. ***Chydorus Barroisi***, (Richard).

(Pl. 4, figs. 9—13.)

Pleuroxus Baroisi, Richard, «Cladocères, receuillis par Mr. Barrois en Syrie et en Egypte» (Revue Biol. du Nord de la France, Tome VI), p. 16.

Specific Characters. Body very tumid, subglobose, resembling in shape that of *Ch. sphæricus*. Carapace of female, seen laterally, about as broad as it is long, posterior extremity narrowly truncated, dorsal margin boldly curved, ventral obtusely produced in the middle and nearly straight behind. Head prôcumbent, mobile, terminating in an acute rostrum. Carapace of male less broad than in female, dorsal face gibbous in front of the middle, inferior edges slightly sinuated behind the median expansion. Surface of valves sculptured in their anterior part with very conspicuous curved transverse striæ, posterior part distinctly reticulated, infero-posteal corners armed with a distinct denticle. Ocellus smaller than the eye, and located about half way between the latter and the tip of the rostrum. Inferior expansion of the labrum having the edge divided into 4 very conspicuous serrations. Tail in female with the postanal angle acutely produced, outer part of uniform breadth and slightly incised at the tip, anteanal denticles about 12 on each side, terminal claws moderately

strong, with a distinct denticle at the base. Tail in male somewhat narrower, with the postanal angle obtuse, being deeply sinuated below the latter. Colour yellowish brown. Length of adult female 0,40 mm., of male 0,27 mm.

Remarks. This form has been described by Mr. Richard as a species of the genus *Pleuroxus*. In my opinion, it is, however, a true *Chydorus*, exhibiting, as it does, all the essential characters of that genus. From the other known species it is easily distinguishable by the very conspicuous curved striæ on the anterior part of the valves, the serrated expansion of the labrum, and by the presence of a distinct denticle on the infero-posteal corners of the carapace.

Description of the female,

The length of adult, oviferous specimens does not exceed 0,40 mm., and this form is accordingly of very small size.

The general form of the body (see figs. 9 & 10) is that characteristic of the genus, being very short and stout, almost globose.

In a lateral view of the animal (fig. 9), the carapace exhibits a very broad irregularly rounded form, with the greatest breadth about the middle, and the posterior extremity narrowly truncated. The dorsal margin forms, along with that of the head, a strong and quite even curve, whereas the inferior edges of the valves are abruptly bent in the middle, forming an almost angular protuberance, behind which they are straight and obliquely ascending towards the infero-posteal corners. In front of the median protuberance, the inferior edges are slightly arcuate and join the anterior ones by a strong curve. The posterior edges are straight and vertical, joining both the dorsal and ventral margin at an obtuse angle. Seen from above (fig. 10), the carapace appears somewhat less broad, and terminates, posteriorly, in an obtuse point.

The head, as in the other species of the genus, is procumbent and to some degree mobile, admitting of being bent in against the anterior part of the valves. Seen laterally (fig. 9), it tapers to an acute, but not very elongate, and slightly curved rostrum. In a dorsal view of the animal (fig. 10), the head appears very broad, on account of the greatly prominent fornix, and of an almost semicircular form.

The surface of the valves exhibits a very distinct sculpture, their anterior part being provided with about 10 curved transverse striæ, which run parallel to the anterior edge, and are very conspicuous. In the posterior part the valves appear reticulated with oblong rectangular meshes. On the dorsal part of the carapace scarcely any sculpturing is traced,

except in individuals provided with winter-eggs. In these, however, this part is very distinctly and regularly reticulated with, mostly, hexagonal meshes. The inferior edges of the valves are, in their posterior part, finely ciliated, the cilia originating, as in most other species, from a ridge just within the margin. The infero-posteal corners are each armed with a well-marked, posteriorly-pointing denticle, of which no trace is found in any of the other known species.

The eye is of moderate size, and has the crystalline bodies rather small, though distinct.

The ocellus is somewhat smaller than the eye, and located about half way between the latter and the tip of the rostrum.

The antennulæ are subfusiform in shape and tipped by the usual fascicle of olfactory papillæ. They do not fully extend to the tip of the rostrum.

The antennæ are comparatively short and of quite normal structure.

The lamellar expansion of the labrum is rather large, securiform, and has the edge divided into 4 very conspicuous serrations, not found in any of the other species.

The tail (fig. 11) agrees in its shape with that in most other species of the genus, being rather narrow, and not much elongated. The postanal angle is strongly prominent, acute, and occurs almost in the middle of the dorsal edge. The distal part of the tail is of an almost uniform breadth, and slightly incised at the tip, the incision being defined, in front, by an obtuse prominence carrying the caudal claws. The latter are not particularly strong, horn-coloured, and each armed, at the base, with a well-marked denticle. The anteanal denticles are well defined, and from 10 to 12 on each side.

The colour is yellowish brown or corneous, the upper part of the carapace assuming, in specimens with winter-eggs, a very dark, almost black hue.

The adult male (fig. 12), as usual, is much smaller than the female, scarcely exceeding in length 0,27 mm., and has the body comparatively less broad, with the dorsal face, as it were, gibbous in front of the middle, its posterior part being straight. The inferior edges of the valves exhibit, behind the median protuberance, a slight sinus not found in female specimens. The antennulæ are comparatively thicker, with the olfactory papillæ much more fully developed. The 1st pair of legs have each a strong hook, which projects with its tip beyond the edges of the valves. The tail (fig. 13) is comparatively narrower than in the female, and has the postanal angle far less prominent and rounded; below it, the dorsal

edge forms a rather deep sinus. The terminal claws are well developed, though somewhat smaller than in the female, and the anteanal denticles are fewer in number. The colour is rather pale yellowish.

Observations. This small species developed rather abundantly in some of my aquaria, and was domesticated for several succeeding seasons. In spite of its diminutive size, it is, when observed in the living state, at once recognizable from any of the other species by the peculiar mode in which it moves through the water. While in the latter the motion generally consists in a rather even, and somewhat revolving run, the present species swims by short, abrupt jerks, similar to what is found in some species of the genus *Aloncila*, as *A. exigua* Lilljeborg.

Distribution. According to Mr. Richard, this form was collected in rather great abundance by Mr. Barrois in a pond at Abbâdi in Palestine.

Ostracoda.

Fam.: ***Cypridida***.

Gen.: ***Cypria***, Zencker.

10. *Cypria capensis*, G. O. Sars, n. sp.

(Pl. 5, fig. 1. a—c.)

Specific Characters. Shell much compressed, and but sparingly hairy at each extremity; that of female, seen laterally, oval reniform, with the greatest height behind, dorsal margin nearly straight in the middle, and subangular both in front and behind, ventral margin distinctly sinuated, anterior extremity obliquely rounded, posterior blunted, and somewhat expanded below; — seen from above, narrow oblong, slightly tapering in front, both extremities obtuse. Shell of male comparatively shorter and higher, with the dorsal margin forming a very strong and quite even curve. Valves in both sexes somewhat unequal, the left one being the larger, and overlapping the right at both extremities by a thin hyaline border. Surface of shell smooth, polished. Colour light orange, with reddish brown shadows dorsally, and irregular small dots of same hue laterally. Length of adult female 0,78 mm., of male 0,60 mm.

Remarks. This new species, which undoubtedly belongs to the genus *Cypria* of Zencker, is easily distinguished from the other known species

of this genus by the somewhat angular form of the shell in the female, as well as, partly, by its colouring.

Description of the female.

Fully adult specimens do not exceed in length 0,78 mm., and this form is accordingly of rather small size.

The shell is very much compressed (comp. fig. 1 a & 1 b), and nearly quite smooth, with only a few delicate hairs on both extremities.

Seen laterally (fig. 1 a), it exhibits a somewhat irregular oval reniform shape, with the greatest height considerably behind the middle, and about equalling 3/5 of the length. The dorsal margin is nearly straight in the middle, and slightly ascending posteriorly, joining both the anterior and posterior edges by an abrupt, almost angular bend. The ventral margin is distinctly sinuated in the middle. The anterior extremity appears somewhat obliquely rounded, whereas the posterior is blunted and somewhat expanded below. Seen from above (fig. 1 b), the shell exhibits a very narrow oblong form, the greatest width scarcely exceeding 2/5 of the length, and occurring behind the middle. Both extremities appear somewhat blunted, though the anterior one is somewhat narrower than the posterior.

The valves are slightly unequal, the left one being the larger and overlapping the right, in front, by a rather broad hyaline border. A similiar, though somewhat narrower border, is also seen along the inferior part of the hind extremity. Within the ventral sinus the left right valve is likewise found to be overlapped by the left. The inner duplicatures of the valves are not very large, though the anterior one is somewhat broader than the posterior.

The surface of the shell is perfectly smooth and polished, without any perceptible sculpturing.

The colour is yellowish orange, clouded with irregular dark reddish brown patches, and small dots of a somewhat lighter hue.

The eye, as in most other species, is very large and conspicuous. Likewise the muscular pits in the centre of the valves may be clearly discerned. The several appendages would seem to agree in all essential respects with those in other species of the genus.

The adult male (fig. 1 c) is somewhat smaller than the female, scarcely exceeding in length 0,60 mm. It is easily distinguished by a somewhat deviating shape of the shell, its dorsal margin forming a very strong and quite even curve, and declining more gently to the posterior extremity, which latter appears far less broad than in the female. In living specimens,

besides, the mucous glands may be rather clearly traced through the hind part of the shell.

Observations. This form was only found in 2 of my aquaria, and did not occur in any abundance. It was at first caught quite occasionally by taking up small quantities of the deposit at the bottom by the aid of a dipping tube, and submitting that to a closer examination. Sometimes, however, solitary specimens were observed creeping up the walls of the aquarium, and in such cases it could be at once destinguished, by the aid of a hand-magnifier, from other Cypridida occuring in the same aquarium. It was also seen, occasionally, to swim rather quickly through the water in a similar manner to that observed in other species of the genus.

Gen.: ***Cypris***, Müller.

11. ***Cypris corpulenta***, G. O. Sars, n. sp.

(Pl. 5, fig. 2, a—c.)

Specific Characters. Shell all over densely hairy, and extremely tumid, the greatest width even considerably exceeding the height, — seen laterally, of irregular oval form, with the greatest height somewhat in front of the middle, dorsal margin subangular just above the eye, and sloping gently behind, ventral sinuated in the middle, the sinus being limited anteriorly by a slight expansion, anterior extremity broadly rounded, posterior obtuse and not expanded below; — seen dorsally, broadly oval, side-contours evenly curved, anterior extremity more pointed than the posterior. Valves subequal, both exhibiting, in front, a rather broad pellucid border surmounted by a narrow hyaline rim, inner duplicatures rather broad. Surface of shell smooth. Appendages of the typical structure. Caudal rami very narrow, linear, with the terminal claws slender. Colour yellowish brown clouded, dorsally, with dark green. Length of adult female 2,10 mm.

Remarks. This is a quite typical *Cypris*, being somewhat intermediate in character between the European species *C. pubera* and *virens*, though well defined from any of them. It is chiefly characterised by the densely hairy and extremely tumid shell, which latter characteristic has given rise to the specific name.

Description of the female.

The length of adult specimens somewhat exceeds 2 mm., and this form accordingly belongs to the larger sized species.

The shell is extremely tumid, being considerably wider than it is broad, and is all over densely hairy.

Seen laterally (fig. 2 a), it exhibits a somewhat irregular oval form, with the greatest height in front of the middle, and about equalling 3/5 of the length. The dorsal margin has its greatest curvature just above the eye, where it appears almost angularly bent, sloping from thence gently behind, more steeply anteriorly. The ventral margin exhibits, in the middle, a distinct sinus, which, anteriorly, is bounded by a slight expansion. The anterior extremity is rather broad, and somewhat obliquely rounded, whereas the posterior appears more obtuse, and not expanded below, being, as it were, cut off inferiorly.

Seen from above (fig. 2 b), the shell exhibits a rather regular, broadly oval form, with the greatest width about the middle, and the side-contours evenly curved. The anterior extremity terminates in a rather acute point, whereas the posterior one appears more obtuse.

The valves are nearly equal, though, on a closer examination, the right one is found to project a little beyond the left along the anterior extremity. They both exhibit, in front, a well defined, narrow semilunar, marginal area, which is quite colourless and is surmounted by a thin hyaline rim; and also along the inferior part of the posterior extremity a similar, but much narrower, pellucid border may be traced. The inner duplicatures of the valves are rather broad, especially the anterior one.

The surface of the shell is smooth, of a dull appearance, without any distinct sculpturing, except the usual small pits. It is, as above stated, clothed all over with rather strong, mostly recurved hairs, which along both extremities form a dense fringe. The lucid spots (muscular pits) in the centre of each valve are easily observable, and of the usual number and arrangement.

The eye is faintly traced through the shell, occurring, as usual, somewhat dorsally in front of the middle.

The several appendages are constructed as in the typical species of *Cypris*, the natatory setæ of both pairs of antennæ being very long and densely plumose.

The caudal rami (fig. 2 c) are narrow linear, and, as usual, each armed with 2 slender claws and 2 short bristles.

The colour of the living animal is yellowish brown, changing to olivaceous, with an irregular dark green patch across the back, extending down the sides to the muscular pits. Behind the latter 2 narrow, dark stripes are seen running obliquely backwards, bounding the place where the cœcal appendages of the intestine lie imbedded within the valves, and above them, the shell generally exhibits an orange hue owing to the

ovicells shining through the valves. In spirit-specimens the colour rapidly changes to a rather uniform bluish green.

Observations. This large and pretty species developed in considerable abundance in some of my aquaria, and was succesfully domesticated during several successive seasons. In habits it agrees with the other species, being enabled to swim rather quickly through the water by the aid of its long natatory setæ. More frequently it is, however, found creeping slowly on the bottom, or along the plants growing in the same, at times also ascending the walls of the aquarium in search of food. Only female specimens occurred, and I am therefore much inclined to believe, that it, like most other species of this genus, is exclusely parthenogenetical.

12. *Cypris trigona*, G. O. Sars, n. sp.

(Pl. 5, fig. 3 a—c.)

Specific Characters. Shell less tumid than in the preceding species and also less densely hairy: — seen laterally, of a pronouncedly triangular form, with the greatest height in the middle, dorsal margin boldly curved, being almost angularly bent in the middle, and sloping rather steeply to each extremity, ventral margin slightly sinuated in the middle, the sinus being defined in front by a slight expansion, anterior and posterior extremities nearly equal, both being obliquely rounded: — seen from above, regularly oval, the greatest width not attaining the height and occuring in the middle, anterior extremity more pointed than the posterior. Valves nearly perfectly equal, each with a well-defined semilunar marginal area both anteriorly and posteriorly, that of the anterior extremity being particularly broad, and surmounted by a narrow hyaline rim; inner duplicatures rather large. Surface of shell smooth. Caudal claws comparatively smaller than in the preceding species, but of a similar narrow linear form. Colour light greenish, clouded dorsally with irregular darker shadows. Length of adult female 1,75 mm.

Remarks. The present species is nearly allied to the preceding one, though easily distinguishable by the less tumid shell, and its pronouncedly triangular form, as well as by the somewhat different colour.

Description of the female.

The length of fully adult specimens measures 1,75 mm., and is accordingly somewhat inferior to that of the preceding species.

The shell is, on the whole (comp. figs. 3 a & 3 b), far less tumid than in *C. corpulenta*, its greatest width not nearly attaining the height, and is also less densely hairy.

Seen laterally (figs. 3 a), it exhibits a rather pronounced trigonal form, with the greatest height in the middle, and somewhat exceeding half the length. The dorsal margin is very boldly curved, being almost angularly bent in the middle, and sloping rather steeply and at an equal rate to both extremities. The ventral margin appears nearly straight, though, on a closer examination, a very slight sinus is found to occur in the middle, and in front of the latter, as in the preceding species, the edges form a slight convexity. Both extremities are nearly equal, and rather obliquely rounded, the posterior one not being, as in *C. corpulenta*, obliquely cut off inferiorly.

Seen dorsally (fig. 3 b), the shell appears regularly oval in outline, with the greatest width about the middle, and the side-contours evenly curved. The anterior extremity tapers to an acute point, whereas the posterior one is somewhat broader and more blunted.

The valves are nearly perfectly equal, though perhaps the left one, as in the preceding species, may be found, on close examination, to be, in reality, a little larger than the right. They exhibit, both at the anterior and posterior extremities, a very sharply defined semilunar marginal area, the anterior one being particularly broad. Both areas are finely striated transversally and surmounted by a thin hyaline rim. The inner duplicatures of the valves are very broad and shelf-like, especially that of the anterior extremity.

The surface of the shell is smooth, without any sculpturing, and is clothed at both extremities with delicate hairs.

The structure of the several appendages nearly agrees with that in the preceding species.

The caudal rami (fig. 3 c) are, however, comparatively smaller, though exhibiting a similar narrow, linear form.

The colour is light greenish clouded with darker green shadows. As in the preceding species, this colour does not extend to the marginal areas, which are nearly colourless and thereby very sharply marked off from the adjoining part of the shell (see fig 3 a). The coecal appendages of the intestine shine through the shell with a pale chestnut hue, whereas the ovarian ova exhibit a light yellow tinge.

Observations. Only a few female specimens of this form developed in one of my aquaria. They did not multiply, and partly died off, ap-

parently owing to the aquarium not being suitably arranged, only 2 or 3 specimens having been secured for closer examination.

13. *Cypris aurea*, G. O. Sars, n. sp.

(Pl. 5, fig. 4 a—c.)

Specific Characters. Shell rather compressed and but sparingly hairy at each extremity: — seen laterally, oval reniform, nearly of same height anteriorly and posteriorly, dorsal margin slightly curved, ventral nearly straight, anterior extremity evenly rounded, posterior somewhat blunted, and, in female, having, above, a slight sinus: — seen dorsally, oblong cuneiform, anterior extremity considerably narrower, and terminating in a somewhat twisted, rostriform point, posterior more obtuse. Valves very unequal, the left one being much the larger, and considerably overlapping the right at each extremity; edges of the latter distinctly crenulated both anteriorly and posteriorly. Surface of shell smooth, polished. Caudal rami comparatively small, sublinear, claws not very elongated. Colour in female, beautiful golden yellow, with a dark patch across the back, and the cœcal tubes of the intestine, likewise, very dark coloured, ovarial eggs shining through the shell with a reddish orange hue. Colour of male more uniformly yellowish. Length of adult female 1,60 mm., of male 1,32 mm.

Remarks. This form is nearly allied to the well-known European species, *C. incongruens*, Rambdohr., but easily distinguished by the much more unequal size of the valves, partly also by the form of the shell and its colour. It also looks rather like the Australian species *C. Sydneia*, which latter comes still nearer to the European form, and these 3 species should, perhaps, be more properly referred to a distinct genus, having some peculiarities of the shell in common, and also closely agreeing in several other respects.

Description of the female.

Fully adult specimens attain a length of about 1.60 mm., and this form, accordingly, grows to a somewhat larger size than both the European and Australian species named above.

The shell is somewhat compressed (comp. figs. 4 a & 4 b), the greatest width not nearly attaining the height. Seen laterally (fig. 4 a), it exhibits a rather regular oval reniform shape, being about the same height anteriorly as posteriorly, the greatest height but little exceeding half the length. The dorsal margin forms a very slight, and quite even curve,

being continuous with the anterior edge, whereas, behind, it slopes rather steeply to the posterior extremity. The ventral margin appears nearly straight, though a slight concavity may be found in the middle. The anterior extremity is quite evenly rounded, whereas the posterior one appears more blunted, with a shallow sinus above.

Seen from above (fig. 4 b), the shell appears rather narrow, of an oblong cuneiform shape, with the greatest width behind the middle and not nearly attaining half the length. The anterior extremity appears considerably narrowed, tapering to a somewhat twisted, almost rostriform point, whereas the posterior one is broader and more obtuse.

The valves are very unequal, the left one being much the larger and considerably overlapping the right at both extremities, as well as along the ventral face. The left valve has the edges quite smooth, and surmounted, both anteriorly and posteriorly, by a narrow hyaline rim, whereas the right one exhibits a closely set row of small tubercles along the inferior part of the anterior and posterior edges, which, thereby, acquire a finely crenulated appearance. The inner duplicatures of the valves are not very broad, though distinct at both extremities.

The surface of the shell is perfectly smooth and polished, being only clothed with delicate hairs towards each extremity.

The several appendages agree, on the whole, in their structure rather closely with those in *C. incongruens* and *sydneia*.

The caudal rami (fig. 4 c) are comparatively small, sublinear in form, and have the outer claw scarcely half as long as the ramus.

The colour is a beautiful golden yellow turning to orange, with a dark patch across the back, and extending, down the sides, towards the muscular pits. From this patch issues on each side, immediately above the muscular pits, a very conspicuous dark band extending obliquely backwards, and caused by the underlying cœcal appendage, the walls of which are clothed with very dark coloured cells. The ovarial ova, contained in the body, shine through the shell with a vivid reddish orange hue.

The adult male (fig. 4 a) is somewhat smaller than the female, measuring, in length, only 1,32 mm.

The form of the shell is but little different from that in the female, though, on a closer comparison, it is found to be somewhat more pronouncedly reniform, with the dorsal margin nearly straight in the middle, and the posterior extremity more regularly rounded, without the shallow sinus that occurs in the female. Male specimens are, moreover, easily recognized by the spermatic ducts shining through the shell, and exhibiting the usual arrangement.

As in other male Cyprididæ, the palps of the 2nd pair of maxillæ are modified to hooked prehensile organs and may at times, together with the copulative apparatus, be seen extruded beyond the shell. The mucous glands are constructed in the usual manner, and are faintly traced through the shell posteriorly.

The colour is generally more uniformly yellowish, than in the female, being sometimes tinged with brownish, sometimes with a light ochraceous colour.

Observations. This form developed in great abundance in some of my aquaria, and was successfully domesticated during several successive seasons. As to habits, it is, on the whole, much more active than its ally *C. sydneia*, being often found to swim through the water with considerable speed. Unlike what is generally the case with the Cyprididæ, male specimens were, at all times of the season, nearly as numerous as female ones. They are very passionate, swimming actively about in pursuit of the females, and it did not seldom happen that even one and the same female was seen to be solicited by 2 or 3 males at the same time. The copulation is generally effected at the bottom, after the 2 sexes have remained in company for some time.

Gen.: ***Cyclocypris***, Brady & Norman.

14. *Cyclocypris pusilla*, G. O. Sars, n. sp.

(Pl. 5, fig. 5, a—b.)

Specific Characters. Shell not very tumid, the width and height being about equal: — seen laterally, rounded oval in form, somewhat higher behind than anteriorly, dorsal margin slightly arcuate, ventral nearly straight, anterior extremity obliquely rounded, posterior blunted: — seen from above, regularly oval, with the greatest width about the middle, anterior extremity somewhat narrower than the posterior. Valves but slightly unequal, the right one being the larger and overlapping the left, anteriorly, by a hyaline border. Surface of shell smooth, being only hairy towards each extremity. Colour dark sepia. Length of adult female 0,48 mm.

Remarks. This small form bears a considerable resemblance in its general appearance to the European species, *C. ovum* Jurine, but seems to be specifically distinct, to judge from its rather different colour, which is dark sepia, instead of light brown or orange, as in the European form. There would also seem to be some slight differences in the form of the shell.

Description of the female.

Fully adult specimens do not even attain a length of ½ mm., and this form is, accordingly, one of the smallest known Cyprididæ.

The shell is not very tumid (comp. figs. 5 a & 5 b), the width and height being about equal.

Seen laterally (fig. 5 a), it exhibits a rather regular, rounded oval form, being however somewhat higher behind than in front. The dorsal margin is slightly arcuate, sloping gently towards the anterior extremity, more steeply to the posterior one. The ventral margin is almost straight, without any distinct median sinus. The anterior extremity appears somewhat obliquely rounded, whereas the posterior one is obtusely blunted.

Seen from above (fig. 5 b), the shell is rather regularly oval in outline, with the greatest width occurring about the middle, and the anterior extremity a little narrower than the posterior, both being somewhat blunted at the tip.

The valves are slightly unequal, the right one being the larger and overlapping the left along the anterior extremity by a hyaline border.

The surface of the shell is perfectly smooth and polished, being only sparingly clothed with delicate hairs towards each extremity.

The structure of the several appendages, and of the caudal rami, I have not been enabled to make out, but, in all probability, they do not differ essentially from those in other species of the genus.

The colour is a dark sepia, darkest around the edges and across the back.

Observations. Only a small number of specimens of this diminutive species were detected in one of my aquaria, and of these I only succeeded in securing 2 or 3 for a closer examination. In habits it agrees with the other species of the genus, being enabled to swim rather quickly by the aid of its long natatory setæ. Only female specimens were observed: but it is most probable, that male specimens were also present.

Gen.: ***Cypricercus***, G. O. Sars, n.

Generic Characters. Shell narrow oblong, tumid, subcuneate behind. Valves slightly unequal, the left one being the larger, surface smooth. Natatory setæ of both pairs of antennæ well developed. Palp, and masticatory lobes of 1st pair of maxillæ narrow. Caudal rami exceedingly large and elongated, terminating with 2 strong claws and 2 bristles. Cœcal appendages of intestine unusually short, ovarial tubes, on the other

hand, much elongated, with the terminal part doubled upon the proximal one. Spermatic ducts in male forming within the anterior part of each valve a dense coil; mucous glands comparatively small and narrow.

Remarks. This new genus is chiefly characterised by the unusual development of the caudal rami, which form exceedingly powerful locomotive organs. Moreover, in the structure of the cœcal appendages of the intestine, the ovarial tubes and the spermatic ducts, it differs rather conspicuously from the other genera. It is, as yet, only represented by a single species.

15. *Cypricercus cuneatus*, G. O. Sars, n. sp.

(Pl. 6, fig. fig. 1, a—h.)

Specific Characters. Shell in both sexes rather tumid, the width even exceeding the height: — seen laterally, oblong cuneiform, highest in front, dorsal margin slightly arched, ventral somewhat convex, with an indistinct sinus in front of the middle, anterior extremity broadly rounded, and flanked by a hyaline border, posterior obtusely acuminate: — seen from above, oblong oval, greatest width behind the middle and nearly equalling half the length, both extremities obtuse. Valves somewhat unequal, the left overlapping the right both anteriorly and ventrally, whereas it is slightly overlapped by the right at the posterior extremity; inner duplicatures not very broad. Caudal rami, including the claws, exceeding half the length of the shell, sublinear, finely denticulated inferiorly, distal claw about $^1/_3$ as long as the ramus. Colour of female, yellowish, clouded, dorsally with light green: that of male, generally more uniformly ochraceous. Length of adult female 1,75 mm., of male 1,55 mm.

Remarks. This is, as above stated, the only as yet known species of the genus, and may at once be recognized by the peculiar shape of the shell, and by the greatly developed caudal rami.

Description of the female.

The length of fully adult specimens measures 1,75 mm., whereas the greatest height is only 0,80 mm.

The shell is rather narrow, but comparatively tumid (comp. figs. 1 a & 1 b), the greatest width even exceeding the height, and has the dorsal face somewhat flattened posteriorly. Seen laterally (fig. 1 a), it exhibits a rather peculiar form recalling somewhat that in the marine Cytherid *Pythocythere simplex* Norman, being oblong cuneiform in outline, with the greatest height not attaining half the length, and occurring in front of the middle. The dorsal margin is slightly, and somewhat irregularly curved, with its greatest curvature somewhat behind the ocular region, and also the ventral margin exhibits, behind the middle, a distinct convexity, whereas, in front of the middle, a very shallow sinus occurs. The anterior extremity is broadly rounded, the posterior one, on the other hand, tapers gradually to an obtuse point extending nearly in the longitudinal axis of the shell.

Seen from above (fig. 1 b), the shell exhibits an oblong oval form, with the greatest width about equalling half the length, and occurring behind the middle. Both extremities appear somewhat blunted, the anterior one being, however, a little narrower than the posterior.

The valves are rather thin and somewhat unequal, the left one being the larger and overlapping the right anteriorly, as well as along the ventral face, whereas, at the posterior extremity, it is slightly overlapped by the right one. Anteriorly, both valves form a thin hyalin border, which is somewhat broader on the left valve, and also, along the posterior part of the ventral face a similar narrow border may be traced. The inner duplicatures of the valves (see fig. 1 e) are not particularly broad, that of the anterior extremity being, as usual, more fully developed than that of the posterior.

The surface of the shell is quite smooth, without any perceptible sculpturing, and only provided with scattered delicate hairs towards each extremity. The muscular pits in the centre of each valve are pretty conspicuous, and of an appearance similar to that found in the genus *Cypris*.

The eye is rather large, and easily observable through the shell, being placed as usual.

The several limbs nearly agree in their structure with those in the genus Cypris (see fig. 1 e).

As in that genus, the natatory setæ on the antennæ are rather elongated, those of the inferior antennæ extending until the tips of the terminal claws.

The masticatory lobes, and palp of the 1st pair of maxillæ (fig. 1 f) likewise agree with those in the typical species of *Cypris* in being very narrow and digitiform.

The 2nd pair of maxillæ have each a distinct branchial plate fringed with 5 plumous setæ (see fig. 1 g).

The 2 pairs of legs (see fig. 1 c) do not differ materially in their structure from those in the genus *Cypris*.

The caudal rami, on the other hand, are highly distinguished by their powerful development, and, in accordance therewith, the posterior part of the body appears also unusually much produced and strongly muscular, being strengthened on each side by a very conspicuous, horn-coloured

chitinous stripe (see fig. 1 c). When inflected within the shell, the rami extend with their claws nearly to the oral region, and, including the claws, they considerably exceed in length half the shell. In form they are (see fig. 1 d) linear, or very slightly narrowed distally, exhibiting a very faint sigmoid flexure. They terminate each, as in the genus *Cypris*, with 2 strong, and but slightly curved claws, the outer of which about equals in length 1/3 af the ramus. Just in front of it issues from the tip of the ramus a slender bristle, and a similar bristle originates from the dorsal edge at a short distance from the other claw. Above this bristle the dorsal edge is minutely denticutaled for about 1/3 of its length. The rami are highly mobile, admitting of being thrown out of the shell and extended behind in the longitudinal axis of the latter.

Of the inner organs, both the coecal appendages of the intestine and the ovarial tubes, exhibit characteristic differences from those parts in other Cyprididæ. The first named appendages (see fig. 1 a, 1 c) are unusually short, not even extending midway to the hind extremity of the shell. On the other hand, the ovarial tubes are very much elongated, with the terminal part doubled upon the proximal one (see fig. 1 a).

The colour is generally a golden yellow, clouded dorsally, behind the ocular region, with light green. The ovarial eggs shine through the shell with a yellow orange colour.

The adult male (fig. 1 c) is somewhat smaller than the female, scarcely exceeding in length 1,35 mm., and does not differ essentially in the form of the shell. It is however easily recognizable by the spermatic ducts being rather distinctly traced through the shell, and partly also by a somewhat darker, ochraceous colour.

As to the arrangement of the spermatic ducts, they show this peculiarity, that the anterior ones are bent downwards and coiled up in a dense whorl within the anterior part of each valve (see fig. 1 c & 1 e), instead of, as in most other Cyprididæ, extending along the edges of the anterior extremity.

The mucous glands are rather small and narrow, and are only faintly traced through the walls of the posterior part of the body, being concealed by the strong muscles passing on each side to the caudal rami (see fig. 1 e).

The sexual characters are, otherwise, the usual ones, the palps of the 2nd pair of maxillæ being modified to strongly hooked grasping organs, which are somewhat unequal on each side (comp. fig. 1 e and 1 g). The copulative apparatus is also normally constructed, consisting, as usual, of 2 symetrical halves (fig. 1 b) of chitinous consistency, and containing each the up-curled end of the efferent duct of the testes.

Observations. This peculiar form developed rather plentifully in one of my aquaria, and was successfully domesticated during 2 successive seasons. Male and female specimens occurred nearly in equal numbers, and were often seen in copulation. It is a very active animal, swimming about rather rapidly, though in some instances, as with other Cyprididæ, creeping slowly on the bottom or up the walls of the aquarium in search of food. In its powerfully developed caudal rami it has a very effective locomotory apparatus, being enabled, by suddenly extending them from the shell, to make extremely rapid jerks, so that it is only with great difficulty it can be caught by the aid of a dipping tnbe.

Gen.: ***Cypridopsis,*** Brady.

16. ***Cypridopsis viduella,*** G. O. Sars, n. sp.

(Pl. 6, fig. 2, a—b).

Specific Characters. Shell not very tumid, being scarcely wider than it is high: — seen laterally, rounded oval, dorsal margin strongly curved in the middle, ventral nearly straight, anterior extremity evenly rounded, posterior somewhat broader and blunted: — seen from above, regularly ovate, anterior extremity more pointed than the posterior. Valves but slightly unequal, smooth, clothed with delicate hairs, more crowded at each extremity. Colour whitish, variegated with bluish green irregular patches and dots, which do not form any distinct transversal bands. Length of adult female 0,58 mm.

Remarks. This small species is chiefly distinguished from those earlier known by the comparatively less tumid shell, and by its different colouring.

Description of the female.

Fully adult specimens but little exceed 1/2 mm. in length, and this form, accordingly, belongs to the smaller species of the genus.

The shell (comp. figs 2 a & 2 b) is comparatively less tumid than in most other species, the greatest width not exceeding the height.

Seen laterally (fig. 2 a), it exhibits a somewhat irregular, rounded oval form, with the greatest height a little in front of the middle. The dorsal margin exhibits, somewhat behind the ocular region, a strong, almost angular curve, from which it slopes, with an almost straight course, both anteriorly and posteriorly. The ventral margin is nearly straight, the median sinus being indistinct. The anterior extremity is evenly rounded.

and, as in most other species, flanked by a thin pellucid border. The posterior extremity appears somewhat broader and blunted.

Seen from above (fig. 2 b), the shell exhibits a regular ovate form, with the greatest width behind the middle. The anterior extremity tapers to an obtuse point, whereas the posterior appears obtusely rounded.

The valves are rather thin, semi-pellucid, and but little unequal, though, as in other species, the right one may be found to be slightly larger than the left. The surface of the shell is smooth, clothed with delicate hairs, which are more conspicuous at each extremity, forming, along their edges, a rather dense fringe.

The eye is large and very conspicuous both in the lateral and dorsal views of the animal.

The several appendages seem to be constructed much as in the other species of the genus.

The ground colour of the shell is whitish, with a faint yellowish tinge changing, on the posterior part, to a light orange. But, besides, the shell is variegated with a bluish green pigment arranged in irregular patches and dots, without forming, as in most other species, any pronounced transversal bands.

Observations. Some specimens of this little form, all of them females, were observed in one of my aquaria, and continued to live during the whole summer. They did not, however, multiply to any great extent, neither did this form reappear the succeeding seasons. In habits it closely agrees with the other species of the genus.

17. *Cypridopsis assimilis*, G. O. Sars, n. sp.

(Pl. 6, fig. 3, a—b).

Specific Characters. Shell rather tumid, being considerably wider than it is high: — seen laterally, of a somewhat semilunar form, with the greatest height about the middle, dorsal margin boldly curved, ventral slightly sinuated, both extremities rounded and nearly equal: — seen from above, broadly ovate, greatest width considerably behind the middle, anterior extremity obtusely pointed, posterior broadly rounded. Valves thin, semi-pellucid, and clothed with fine hairs, surface smooth. Colour whitish, with irregular dark-green patches forming 3, partly interrupted transversal bands. Length of adult female 0,68 mm.

Remarks. This form looks very like the European species *C. vidua* Müller, but seems to differ in a few points, so that it must rightly be regarded as a separate species.

Description of the female.

The length of adult specimens measures 0,68 mm., and this form accordingly grows to a somewhat larger size than the preceding one.

The shell is (comp. figs 3 a & 3 b) comparatively much more tumid than in that species, its greatest width considerably exceeding the height.

Seen laterally (fig. 3 a), it exhibits a somewhat semilunar form, with the greatest height about in the middle. The dorsal margin is boldly curved, sloping somewhat more steeply in front than behind. The ventral margin exhibits, in the middle, a distinct, though rather shallow, sinus. Both extremities are evenly rounded and nearly equal, the anterior one being, however, as usual, flanked by a narrow hyaline border.

Seen from above (fig. 3 b), the shell appears broadly ovate, with the greatest width considerably behind the middle. It tapers, anteriorly, to an obtuse point, whereas, posteriorly, it is broadly rounded.

The valves are slightly unequal, smooth, semipellucid, and clothed with delicate hairs, which, as usual, are more densely crowded at each extremity.

The shell is whitish or light straw-coloured, and provided with a number of well-defined dark green patches, which, as in most other species, form 3 interrupted transversal bands.

Observations. Only a few specimens of this form, all of them of female sex, were secured. They occurred in the same aquarium in which the preceding species was hatched.

Gen. ***Potamocypris,*** Brady.

18. *Potamocypris gregaria*, G. O. Sars, n. sp.

(Pl. 5, fig. 4, a—c).

Specific Characters. Shell somewhat compressed and everywhere densely hairy, but without any trace of spines: — seen laterally, of a rounded triangular form, the greatest height occurring in the middle, dorsal margin strongly arched, forming, in the middle, a nearly angular bend, ventral slightly sinuated, anterior extremity rounded, posterior blunted: — seen from above, oblong ovate, more pointed anteriorly than posteriorly. Valves nearly equal, flanked, anteriorly, by a narrow hyaline border, surface dull, granular. Colour dark green. Length of adult female 0,70 mm.

Remarks. This new species resembles, in shape, the European *P. aculeata* Lilljeborg, but is at once distinguished by the absolute want of

the curved spines found, in the latter species, distributed along the dorsal face of the shell.

Description of the female.

The length of adult specimens measures about 0.70 mm., and this form, accordingly, about equals, in size, the above-named European species.

The shell is rather short and stout, and somewhat compressed (comp. fig. 4 a & 4 b), the greatest width not nearly equalling the height.

Seen laterally (fig. 4 a), it exhibits a rounded triangular form, the greatest height exceeding ⅔ of the length, and occuring in the middle. The dorsal margin is boldly curved, forming, in the middle, an abrupt, almost angular bend, and sloping somewhat more steeply in front than behind. The ventral margin exhibits in the middle a distinct, though not very deep sinus. The anterior extremity is somewhat obliquely rounded, the posterior one obtusely blunted.

Seen from above (fig. 4 b), the shell appears rather narrow, and of an oblong ovate form, with the greatest width scarcely exceeding half the length, and occurring somewhat behind the middle. It tapers, anteriorly, to a sharp point, whereas, posteriorly, it is more obtuse.

The valves are less unequal than in some of the other species (ex. gr. *P. villosa*), though, on a closer examination, as in these, the right one is found to be the larger, slightly overlapping the left along the anterior extremity. The inner duplicatures are not particulary large.

The surface of the shell is distinctly granular, and of a dull appearance, exhibiting a somewhat squamous sculpturing. It is everywhere densely hairy; but no trace of the curved spines occurring in *P. aculeata* among the hairs dorsally, is to be detected. The muscular pits are easily observable in the centre of each valve, and exhibit the usual arrangement.

The eye is of moderate size, and located somewhat in front of the middle dorsally.

The several limbs agree in their structure with those in other species of the genus.

The candal rami (see fig. 4 c) exhibit the structure characteristic of the genus, and are very different from those in the genus *Cypridopsis*. They are extremely small, lamellar, and terminate each in a long seta, having, besides, another much shorter one at some distance from the tip dorsally.

The colour is a rather uniform and very dark green. In adult females the posterior part of the shell generally exhibits, on each side, a more or less distinct orange hue, caused by the translucent ovarial ova contained within the body.

Observations. This form developed in immense quantities in some of my aquaria, and in one of them has been domesticated until the present time. Among the numerous specimens examined, not even a single male could ever be detected, and I am therefore much inclined to believe, that this form is exclusively partenogenetical. In habits it agrees with the other species of the genus, being a rather active swimmer.

Gen. ***Candonocypris,*** G. O. Sars.

19. ***Candonocypris candonoides,*** (King).

Cypris candonoides, King, «On Australian Entomostracans». Papers & Proc. Roy. Soc. V. Diemens Land. Vol. III, Part 1, p. 66, Pl. X, F.

Herpetocypris stanleyana, G. O. Sars, On some Ostracoda and Copepoda raised from dried Australian mud, p. 35, Pl. II, figs 1--2, Pl. V, figs. 5—6. (not Brady)

Candonocypris candonoides, G. O. Sars, Contributions to the knowledge of the Fresh-water Entomostraca of New Zealand, p. 35, Pl. V, fig. 1, a—c.

This form, described and figured by the author in the 2 above quoted papers, developed in considerable numbers in 2 of my aquaria. The specimens agreed, in every detail, exactly with those formerly examined.

Distribution. Australia: at Sydney (King), and at Rockhampton (G. O. Sars); New Zealand (G. O. Sars).

Copepoda.

Fam.: ***Diaptomidæ.***

Gen.: ***Paradiaptomus,*** G. O. Sars, n.

Generic Characters. General form of body about as in the genus *Diaptomus*, though in female somewhat shorter and stouter. Tail of female composed of only 2 segments, and having the caudal rami unusually broad, lamelliform, with comparatively short setæ: that of male 5-articulate, with the caudal rami narrower and slightly assymetrical. Posterior antennæ with the outer ramus scarcely longer than the inner and 7-articu-

late. Posterior maxillipeds, with the terminal part, only composed of 3 articulations, and armed with scattered, rather strong claw-like spines. Fifth pair of legs not natatory, and of different structure in the two sexes, somewhat resembling those in the genus *Diaptomus*.

Remarks. This new genus is nearly allied to *Diaptomus*, though differing in some points rather markedly. Thus the tail is, in the female, composed of only 2 segments, a case very rarely met with in the Copepoda, and the caudal rami exhibit a very different appearance in the two sexes, being, in the female, highly distinguished by their large size and broad lamelliform shape, whereas, in the male, they are much narrower and somewhat assymetrical. Moreover, the posterior antennæ, and posterior maxillipeds, exhibit well marked differences in their structure from those parts in the genus *Diaptomus*.

20. *Paradiaptomus lamellatus*, G. O. Sars, n. sp. (Pl. 7 & 8).

Specific Characters. Body in female very robust, with the anterior division comparatively thick and convex above, front broadly rounded. Last segment of metasome produced on each side to a large triangular lamella. Tail, including the caudal rami, scarcely more than half as long as the anterior division of the body, 1st segment considerably expanded in its proximal part, 2nd segment gradually widening distally. Caudal rami exceeding half the length of the tail, oval lamelliform, with the marginal setæ comparatively short, and bulbously dilated at the base. Body, in male, more slender, with no lamellar expansions on the last segment of metasome. Tail rather slender, equalling in length $^2/_3$ of the anterior division, and of cylindric form. Candal rami but slightly widening distally, and having the marginal setæ more elongated, the outer one of the right ramus much stronger than that of the left one. Anterior antennæ of female scarcely exceeding in length the anterior division of the body, the right one, in the male, very distinctly geniculate. Last pair of legs, in female, with the inner ramus narrow cylindric, biarticulate, and terminating with 2 slender spines, outer ramus much larger, 3-articulate, 2nd joint produced, inside, to a strong denticulated claw, and having, outside, a spine, last joint well defined, clawlike, with a small seta inside. Those, in male, very unequally developed, right leg much the larger, and terminating in a long and slender claw, left leg with 3 strong spines on the proximal joint, the distal joint being very small, unarmed and incurved, inner ramus in both legs rudimentary, conical, though somewhat larger on the right one.

Colour more or less bluish, in the male generally with an orange tinge. Length of adult female 3,00 mm., of male 2,70 mm.

Remarks. This is the only as yet known species of the genus. Its specific name refers to the peculiar development of the caudal rami in the female.

Description of the female.

The length of adult specimens measures about 3 mm., and this form, accordingly grows to a rather large size as compared with other freshwater Copepoda.

The form of the body (see Pl. 7, figs. 1 & 2) is comparatively robust, with the 2 chief divisions sharply marked of from each other. The anterior division, comprising the cephalosome and metasome, is of oblong oval form, with the dorsal face evenly vaulted, and the greatest width somewhat in front of the middle. It is divided into 6 distinctly defined segments, the 1st of which, representing the cephalosome, is much the largest, though not attaining the length of the 3 succeeding ones combined. Seen dorsally (fig. 2), this segment is evenly rounded in front. In a lateral view (fig 1), it appears somewhat blunted anteriorly, and terminates, inferiorly, just in front of the insertion of the anterior antennæ, in a small, deflexed rostral projection, which does not exhibit any tentacular appendages. The last segment of the metasome is deeply emarginated in the middle, and projects on each side to a rather large, posteriorly pointing lamella of triangular shape. This lamella is quite entire, not, as in most species of the genus Diaptomus as well as of *Boeckella*, divided into 2 lobes.

The posterior division of the body, the urosome or tail, is much narrower than the anterior, and very movably connected with the same. Including the caudal rami, it scarcely exceeds half the length of the anterior division. In structure it differs considerably from that in most other Copepoda, being composed of only 2 segments, besides the caudal rami (see fig. 3). The 1st, or genital segment is considerably expanded in its proximal part, forming, on each side, an angular projection, and, below, a rounded prominence containing the genital orifice. The 2nd segment is shorter than the 1st, but gradually widens distally, with the outer part rather broad and flattened. At its end, dorsally, the anal orifice occurs in the form of a longitudinal fissure, partly obtected, in front, by a projecting curved edge.

The caudal rami (ibid) exhibit a rather peculiar appearance, being very large and lamelliform, whereas the marginal setæ are unusually short. The rami considerably exceed, in length, half the remaining part of the

tail, and are oblong oval in outline, being about twice as long as they are broad, with the tip obtusely rounded, and the inner edge quite smooth. The number of the marginal setæ is the usual one, viz. 5 on each ramus, 4 issuing from the tip, the 5th being secured to a slight ledge of the outer edge. Of these setæ the 2nd, reckoned from within, is the largest, though scarcely attaining the length of the ramus. All the 5 setæ are densely plumous, and, as it were, bulbously tumefied at the base, their outer part being very narrow and terminating in an extremely fine point. Moreover, a very small, simple bristle is seen to issue from each ramus, somewhat dorsally, between the 2 innermost of the marginal setæ.

The eye is small, but distinct, and of a structure similar to that in the genus *Diaptomus*, being located, somewhat ventrally, between the insertions of the anterior antennæ. The ocular pigment is dark red.

The anterior antennæ (see figs. 1 & 2) are not very much elongated, scarcely exceeding in length the anterior division of the body. They are composed of the usual number of articulations (25), and are provided, anteriorly, with short bristles, the outmost articulations being also setiferous at the posterior edge. In the living animal these antennæ are generally extended to each side, with the proximal part forming a slight curve (see fig. 2).

The posterior antennæ (Pl. 8, fig. 1), as in other Calanids, consist each of a biarticulate basal part and 2 diverging rami, the inner of which more properly represents the immediate continuation of the basal part. This ramus is composed of 2 somewhat compressed joints, the outer of which is slightly lamellar and bilobed, carrying, at the tip, a dense brush of slender ciliated setæ. The outer ramus is very movably connected with the basal part at some distance from its end, and appears less fully developed than in the genus *Diaptomus*, being scarcely longer than the inner one. It is of a cylindric, or somewhat subfusiform shape, and is divided into 7 well defined joints, the 2nd of which is the largest and carries 3 setæ, whereas each of the 4 succeeding joints, as well as the 1st one, is provided with a single seta only. The last joint is comparatively much smaller than in the genus *Diaptomus*, scarcely attaining the length of the 3 preceding ones combined. It is provided at the tip with 3 long setæ, and has, moreover, a much smaller one at about the middle of the inner edge.

The labrum (fig. 2) is rather large, flap-shaped, and somewhat incised on the tip.

The mandibles (fig. 3) are very strong and of a structure similar to that in the genus *Diaptomus*. The palp does not attain the length of the mandible, but otherwise exhibits the usual structure.

This is also the case with the maxillæ (fig. 4) and the anterior maxillipeds (fig. 5), which therefore need not to be described in detail.

The posterior maxillipeds (fig. 6), on the other hand, differ very markedly from those in the genus *Diaptomus*, their terminal part being much more strongly built, and only composed of 3 joints, whereas this part in the said genus is constantly 5-articulate. Moreover, the bristles issuing from this part are fewer in number, and partly transformed to claw-like spines, one of which, issuing from the tip, is particulary strong and denticulated inside.

The 4 anterior pairs of legs (figs. 7—9) agree, on the whole, in their structure with those in the genus *Diaptomus*, though they are perhaps, somewhat shorter and stouter. As in that genus, the 1st pair (fig. 7) are the smallest, and have the inner ramus only composed of 2 joints, whereas in the 3 succeeding pairs this ramus is, like the outer one, 3-articulate. As to the number of spines and natatory setæ issuing from these legs, it likewise agrees with that found in the genus *Diaptomus*, except, that on the 1st pair (fig. 7), there is an additional spine outside the terminal joint of the outer ramus. The outmost spine in all the legs is much the largest, though scarcely as elongated as in the species of the genus *Diaptomus*.

The last pair of legs (Pl. 7, fig. 4) are very unlike the preceding ones, and not natatory. In structure they somewhat resemble those in the genus *Diaptomus*, though exhibiting some points of divergence. They consist, as the preceding pairs, each of a biarticulate basal part and 2 rami, which latter, however, are peculiarly modified. The outer ramus is much the larger, and composed of 3 articulations, the 1st of which is the largest, and without any spine or seta. The 2nd joint carries, outside, a spine, and is produced at the end, inside, to a strong claw-like process, denticulated on the inner edge. The 3rd joint is well defined, and, likewise, claw-like, extending almost to the tip of the above named process, and having, inside, a slender spine. The inner ramus, which extends nearly to the tip of the 1st joint of the outer, is narrow cylindric, and is composed of 2 well defined joints, the outer of which has 2 unequal, slender, apical spines.

The egg-bag, which is carried beneath the tail, attached to the genital protuberance of the 1st segment (see fig. 2), is rather large, flattened, and almost circular in outline. It contains numerous eggs generally arranged in 2 layers, and of a dark brown colour.

Of inner organs, several may be more or less distinctly traced in the living animal through the semi-pellucid integuments (see Pl. 7, figs. 1

& 2). Especially are the ovaria very conspicuous by their dark greenish colour. The alimentary tube is best seen in a lateral view of the animal (fig. 1), and, as usual, is rather wide in its anterior part, where it is filled with a light yellowish substance, becoming gradually narrower posteriorly. The heart is also very conspicuous in the living animal by its rapid pulsations, occurring, as usual, dorsally, at the limit between the 2 first segments of the metasome.

The colour is, generally, a light yellowish green, more or less tinged with indigo blue, especially on the sides, and along the posterior edges of the segments. A narrow, somewhat arcuate band of the same colour, may often also be found to extend across the anterior part of the cephalosome, giving it the appearance of being divided into 2 segments, which, however, in reality, do not exist. The genital protuberance of the 1st segment of the tail is tinged with brownish orange, and the caudal lamellæ are generally deep blue at the tips.

The adult male (Pl. 7, fig. 5) is somewhat smaller than the female, scarcely exceeding in length 2,70 mm., and, as usual, exhibits a more slender form of the body. It is, moreover, distinguished by the last segment of the metasome wanting the lamellar projections present in the female, and by the rather different appearance of the tail. The latter (fig. 6) is much more elongated and slender, about equalling in length $^2/_3$ of the anterior division. It is divided into 5 well-defined segments, the 1st of which is somewhat thicker, but scarcely longer than the others, which are almost alike.

The caudal rami (see fig. 6) differ considerably in their appearance from those in the female, being much narrower, and very slightly expanded distally. They are, moreover, somewhat assymetrical, the left ramus being larger than the right, which is turned obliquely outwards. The marginal setæ are comparatively more elongated, and do not exhibit any distinct bulbous dilatation at the base. The seta of the exterior edge is, on the right ramus, much coarser than on the left, almost spiniform, and only ciliated on one of the edges. The ledge to which this seta is secured, appears, also, much more strongly marked than on the left side.

The anterior antennæ, as in other male Diaptomidæ, are unequally developed, the right antenna (see Pl. 7, fig 5, Pl. 8, fig. 10) being modified to a strong grasping organ, by the aid of which the male gets hold of the female during copulation. While the left antennæ exhibits the normal number of articulations, the right one is only composed of 23 joints, some of the joints being, apparently, fused together. The 4 outer joints (see Pl. 8, fig. 10) form together a very movable terminal part,

which admits of being doubled upon the adjacent, greatly tumefied portion of the antenna. Of its joints, the 1st is the largest, and is armed, anteriorly with an appressed spiniform projection. The succeeding joint somewhat exceeds in length the outer 2 combined, and has, posteriorly, 2 bristles. The tumefied portion of the antenna comprises 6 joints, the 1st of which is the smallest, and carries, anteriorly, a strong curved spine. The penultimate joint of this portion has, anteriorly, a comb-like lamella, and the last joint a similar lamellar projection, which, however, has the edge undivided, and terminates in a sharp point. Within this tumefied part of the antenna, extends a very strong muscle, which is, apparently, composed of 2 juxtaposed muscular bands, both being distinctly striated transversally, and joining the base of the movable terminal part. The proximal part of the antenna is, at the junction with the tumefied portion, as it were, instricted; and the joints are, here, connected by very oblique articulations.

The posterior antennæ, oral parts, and natatory legs, exactly agree with those parts in the female.

The last pair of legs (Pl. 7, fig 7), on the other hand, are very different, and modified in a similar manner to that found in male *Diaptomi*, the legs being very unequally developed. In both legs, as in the female, a biarticulate basal part, and 2 rami can be distinguished, the inner of which, however, is quite rudimentary, especially on the left leg. The outer ramus in each leg is biarticulate, but in the right leg this ramus is exceedingly large, and the basal part of the leg is, likewise, much coarser. The 2nd joint of the ramus is oblong oval, and somewhat incurved, carrying, outside, near the end, a strong spine. To the tip of the joint is connected, by a very movable articulation, a long, and slender claw, terminating in an acute point. In the left leg, the outer ramus is scarcely half as long as in the right. Its 1st joint is slightly dilated in its outer part, and carries 3 spines, one of which, issuing from the outer edge, is particularly strong. The terminal joint is very small, abruptly incurved, and without any claw or spines.

The testes are combined into a single, somewhat cordiform mass, which is located, dorsally, within the 1st segment of the metasome. Immediately behind this mass is traced a strongly twisted duct, the outer part of which extends assymetrically through the left side of the metasome, and often contains a long bottle-shaped body, the spermatophore, to be fastened, by the aid of the last pair of legs, to the genital protuberance of the female.

The colour of the male is, generally, somewhat lighter than in the female, with a more or less distinct orange tinge, which, especially on the right prehensile anterior antenna is very pronounced.

Observations. Of this interesting Calanid, some specimens developed in 2 of my aquaria. They continued to live during the whole summer, and all the females became at last laden with their egg-bags. But no increase of the specimens took place, and, though in all probability a considerable number of ova were deposited in the mud at the close of the season, this form did not reappear the succeeding years.

In habits it agrees with the species of *Diaptomus*, and moves in a very similar manner, but the movements are still more abrupt and rapid. Indeed, the broad, fanlike tail in the female, constitutes a most powerful propelling organ, and by a sudden flexion of this part it is enabled to start away so rapidly as to be hardly got sight of. It is, therefore, a matter of no little difficulty to catch the specimens by the usual means, a small dipping tube, and, from this cause, only a small number of specimens were secured for closer examination.

Explanation of the Plates.

Pl. I.

Daphnia dolichocephala, G. O. Sars.

Fig. 1. Adult female of the earlier generations, viewed from the ventral face (outer part of the antennæ omitted). × 34.
— 2. Same, seen from left side.
— 3. Rostral part of the head, with the antennulæ, more highly magnified.
— 4. Terminal part of the tail, without the caudal setæ, lateral view.
— 5. Tip of same, with the terminal claws, still more strongly magnified.
— 6. Recently hatched young, seen from right side. × 46.
— 7. Adult male, viewed from right side. × 52.
— 8. Same. Inferior part of head, together with the anterior corners of the valves, more highly magnified.
— 9. Same. Outer part of tail.
— 10. Female with ephippium, seen from left side. × 34.

Pl. II.

Daphnia propinqva, G. O. Sars.

Fig. 1. Adult, oviferous female, seen from left side. × 46.
— 2. Same, viewed from the dorsal face.
— 3. Inferior part of the head, more highly magnified.
— 4. Terminal part of the tail, without the caudal setæ: lateral view.
— 5. Tip of same, with the terminal claws, still more highly magnified.
— 6. Dorsal part of carapace of a female with ephippium, seen from left side.

— 7. Adult male, seen from right side. × 52.
— 8. Antennula of same, more highly magnified.

Ceriodophnia Rigaudi, Richard.

Fig. 9. Adult, oviferous female, seen from the dorsal face (rami of left antennæ omitted). × 104.
— 10. Same, viewed from left side.
— 11. Head with the anterior part of the valves (antennæ omitted), more highly magnified.
— 12. Tail, seen from left side.
— 13. Part of the shell, showing the reticulated sculpture, highly magnified.
— 24. Adult male, seen from left side. × 104.
— 15. Antennula of same, more highly magnified.

Pl. III.

Simocephalus capensis, G. O. Sars.

Fig. 1. Adult, oviferous female, seen from left side. × 38.
— 2. Same, viewed from the ventral face.
— 3. Inferior part of head, with the labrum, more highly magnified.
— 4. Terminal part of tail, lateral view.
— 5. One of the caudal claws, more highly magnified.
— 6. Ephippium, seen from left side.
— 7. Adult male, viewed from left side. × 104.

Pl. IV.

Leydigia acanthocercoides, Fischer.

Fig. 1. Adult, oviferous female, seen from left side. × 80.
— 2. Tail of same, more highly magnified; lateral view.
— 3. Adult male, viewed from left side. × 104.
— 4. Tail of same, lateral view.

Alonopsis Colletti, G. O. Sars.

Fig. 5. Adult female, with winter-egg, seen from left side. × 68.
— 6. Same, viewed from the ventral face.
— 7. Tail of same, more highly magnified; lateral view.
— 8. Adult male, seen from left side. × 68.

Chydorus Barroisi, (Richard).

Fig. 9. Adult, oviferous female, seen from left side. × 132.
— 10. Same, viewed from the dorsal face.

Fig. 11. Tail of same, more highly magnified; lateral view.
— 12. Adult male, seen from right side. × 132.
— 13. Tail of same, more highly magnified; lateral view.

Pl. V.

Cypria capensis, G. O. Sars.

Fig. 1 a. Adult female, seen from right side. × 64.
— 1 b. Same viewed from the dorsal face.
— 1 c. Adult male, seen from left side. × 64.

Cypris corpulenta, G. O. Sars.

Fig. 2 a. Adult female, seen from left side. × 34.
— 2 b. Same, viewed from the dorsal face.
— 2 c. Caudal ramus, more highly magnified.

Cypris trigona, G. O. Sars.

Fig. 3 a. Adult female, seen from left side. × 36.
— 3 b. Same, viewed from the dorsal face.
— 3 c. One of the caudal rami, more highly magnified.

Cypris aurea, G. O. Sars.

Fig. 4 a. Adult female, seen from right side. × 38.
— 4 b. Same, viewed from the dorsal face.
— 4 c. One of the caudal rami, more highly magnified.
— 4 d. Adult male, seen from right side. × 38.

Cyclocypris pusilla, G. O. Sars.

Fig. 5 a. Adult female, seen from left side. × 66.
— 5 b. Same, viewed from the dorsal face.

Pl. VI.

Cypricercus cuneatus, G. O. Sars.

Fig. 1 a. Adult female, seen from right side. × 38.
— 1 b. Same, viewed from the dorsal face.
— 1 c. Adult male, seen from right side. × 38.
— 1 d. One of the caudal rami, more highly magnified.
— 1 e. Adult male, seen from left side, left valve removed so as to show the animal. × 56.
— 1 f. Masticatory part of 1st maxilla, more highly magnified.
— 1 g. Right 2nd maxilla of male.
— 1 h. One of the outer copulative organs, lateral view.

Cypridopsis viduella, G. O. Sars.

Fig. 2 a. Adult female, seen from right side. × 70.
— 2 b. Same, viewed from the dorsal face.

Cypridopsis assimilis, G. O. Sars.

Fig. 3 c. Adult female, seen from right side. × 63.
— 3 b. Same, viewed from the dorsal face.

Potamocypris gregaria, G. O. Sars.

Fig. 4 a. Adult female, seen from left side. × 63.
— 4 b. Same, viewed from the dorsal face.
— 4 c. Posterior extremity of body, with the caudal rami; lateral view.

Pl. VII.

Paradiaptomus lamellatus, G. O. Sars.

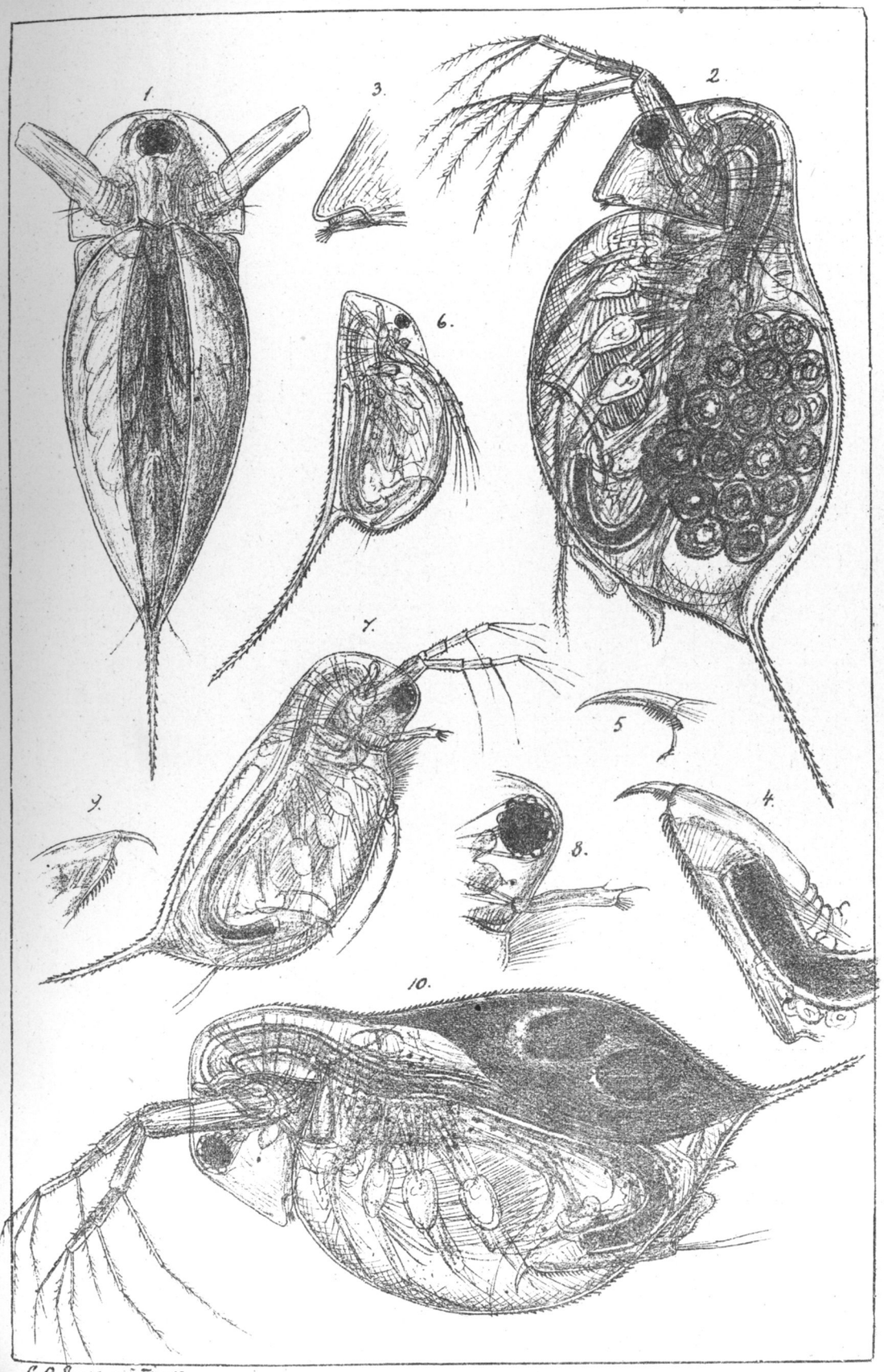
Fig. 1. Adult female, seen from right side. × 32.
— 2. Another, oviferous female, viewed from the dorsal face (right anterior antenna not fully delineated).
— 3. Tail of female, seen from the dorsal face, more highly magnified.
— 4. Left female leg of last pair.
— 5. Adult male, seen from the dorsal face (left anterior antenna not fully delineated). × 32.
— 6. Tail of same, more highly magnified; dorsal view.
— 7. Last pair of legs of same, seen from the posterior face.

Pl. VIII.

Paradiaptomus lamellatus, G. O. Sars.
(continued).

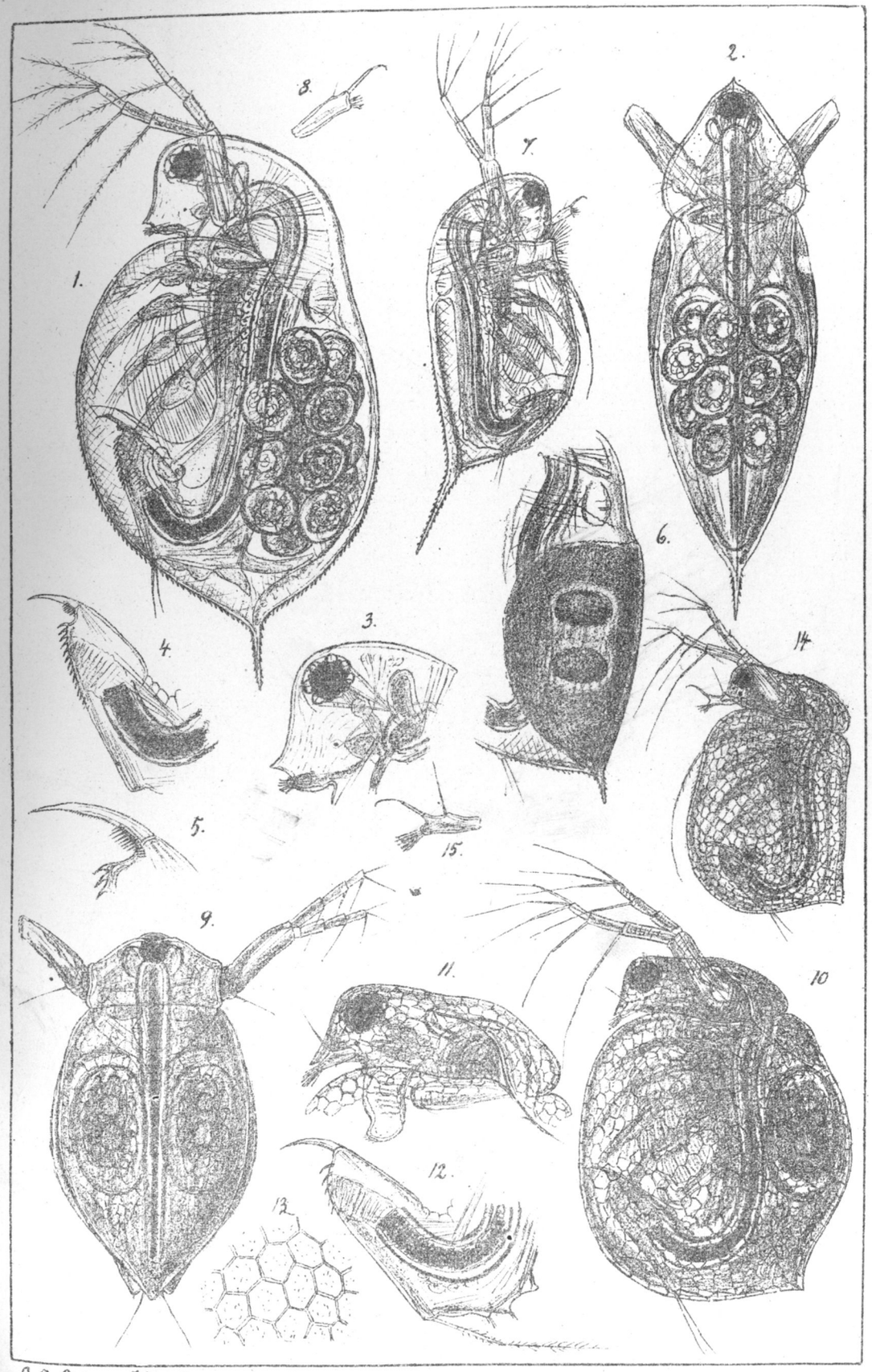
Fig. 1. Antenna of 2nd pair.
— 2. Labrum.
— 3. Mandible with palp.
— 4. Maxilla.
— 5. Anterior maxilliped.
— 6. Posterior maxilliped.
— 7. Leg of 1st pair.
— 8. Leg of 2nd pair.
— 9. Leg of 4th pair.
— 10. Right anterior antenna of male.

Pl. 1.



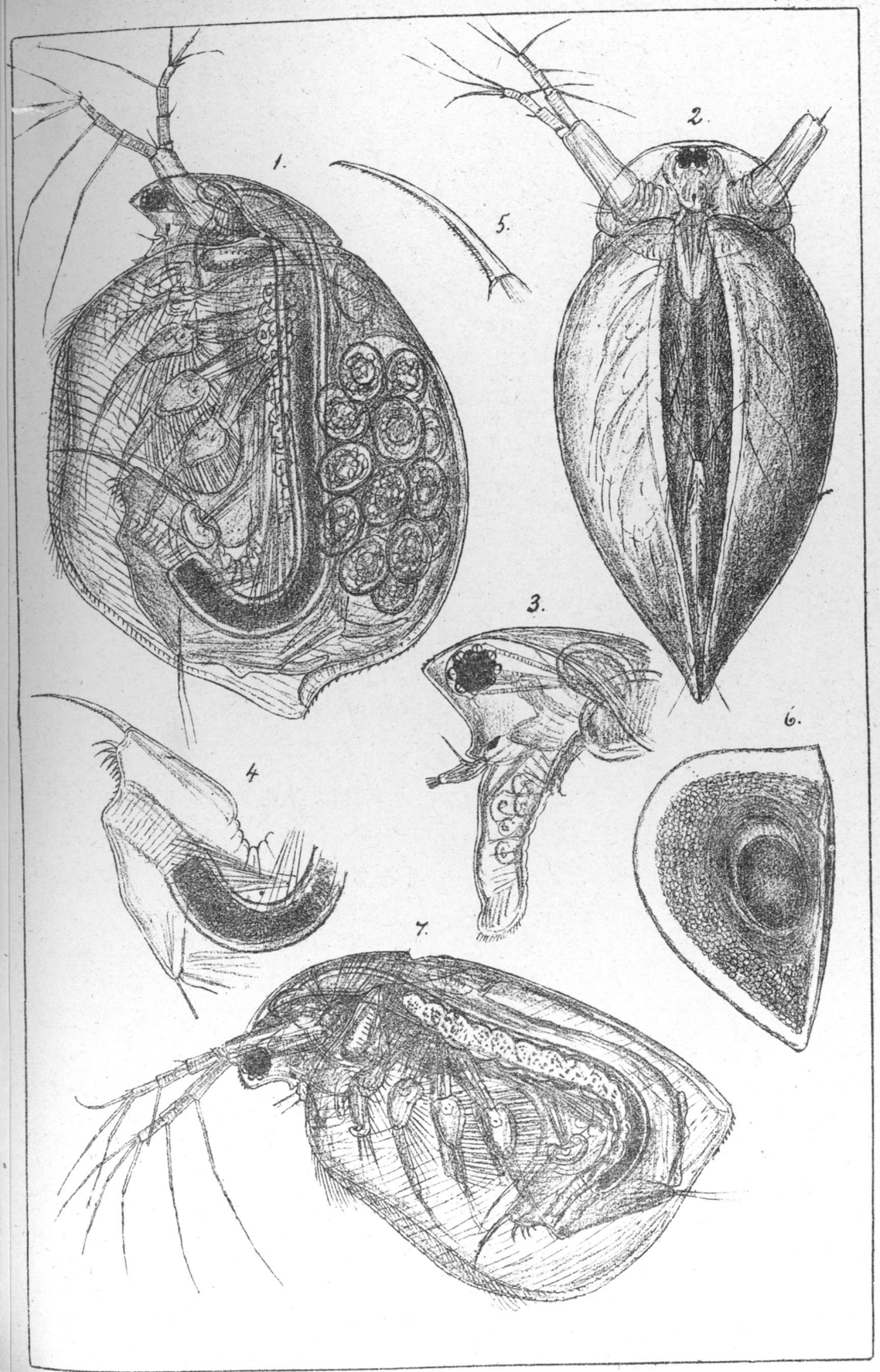
G.O. Sars autogr.

Daphnia dolichocephala, G.O. Sars.



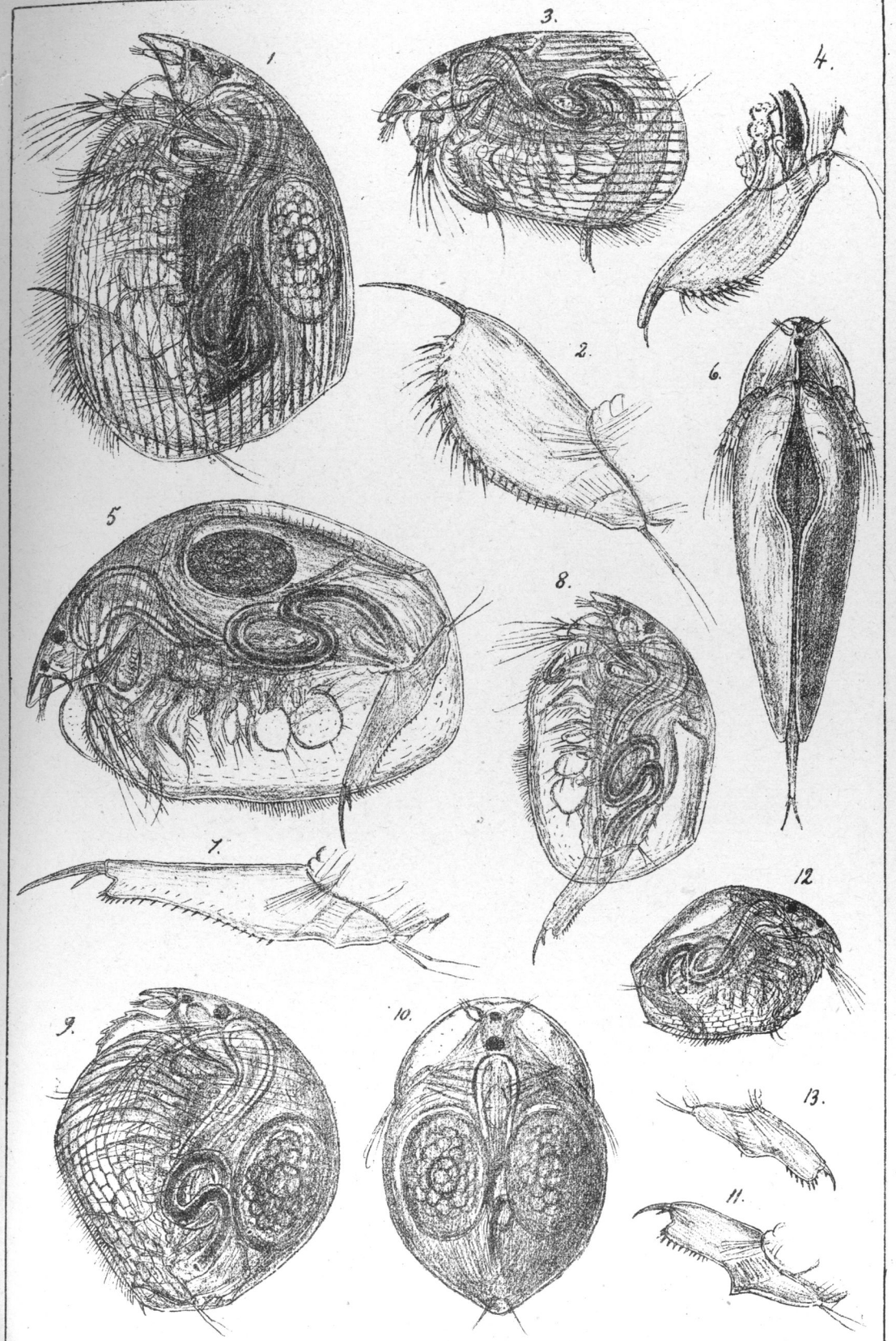
G.O. Sars autogr.

1-8. Daphnia propinqua, G.O. Sars.
9-15 Ceriodaphnia Rigaudi, Richard.



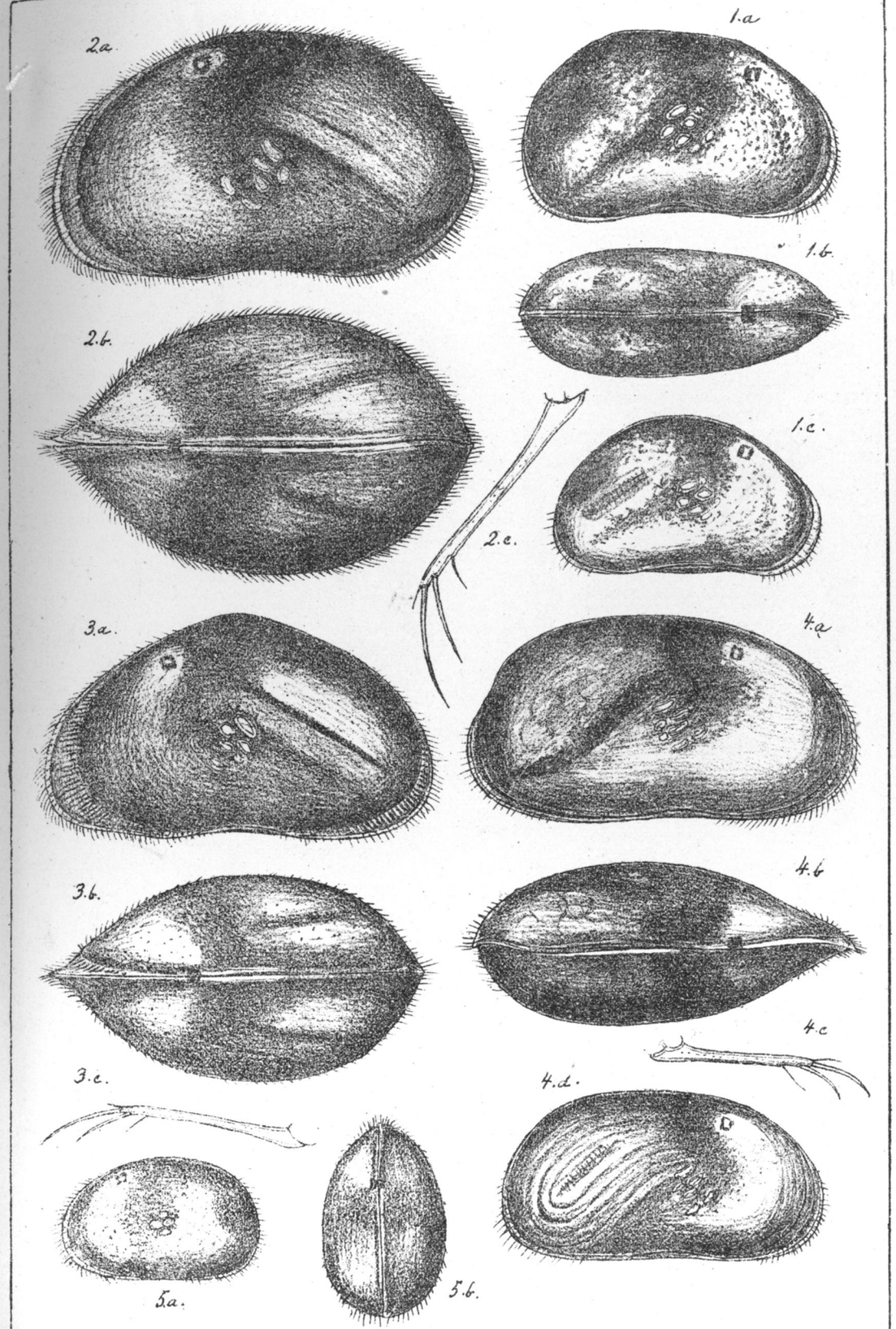
G.O.Sars autogr.

Simocephalus capensis, G.O.Sars.



G. O. Sars autogr.

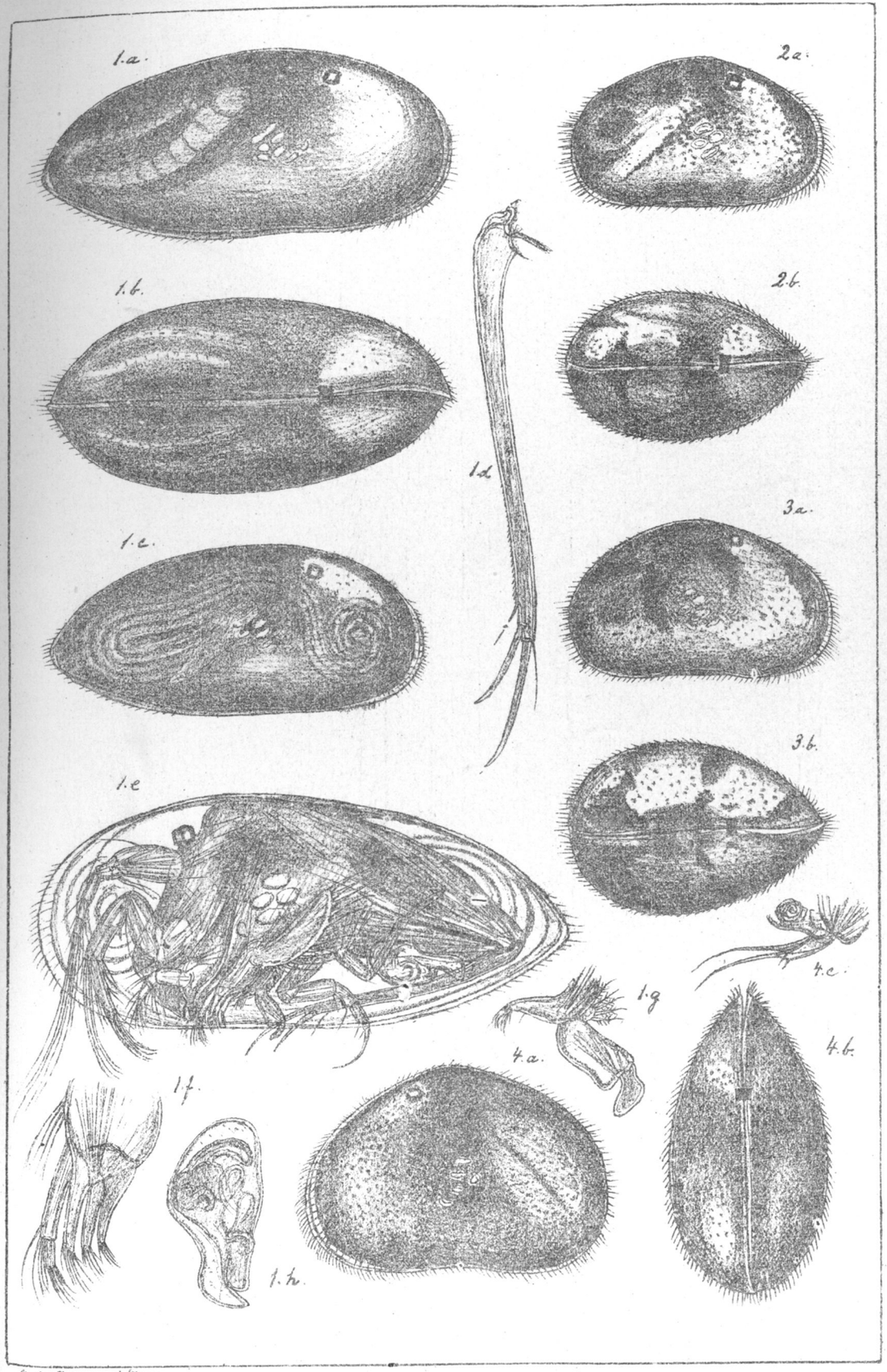
1-4. Leydigia acanthocercoides, (Fischer).
5-8. Alonopsis Colletti, G. O. Sars.



G.O. Sars autogr.

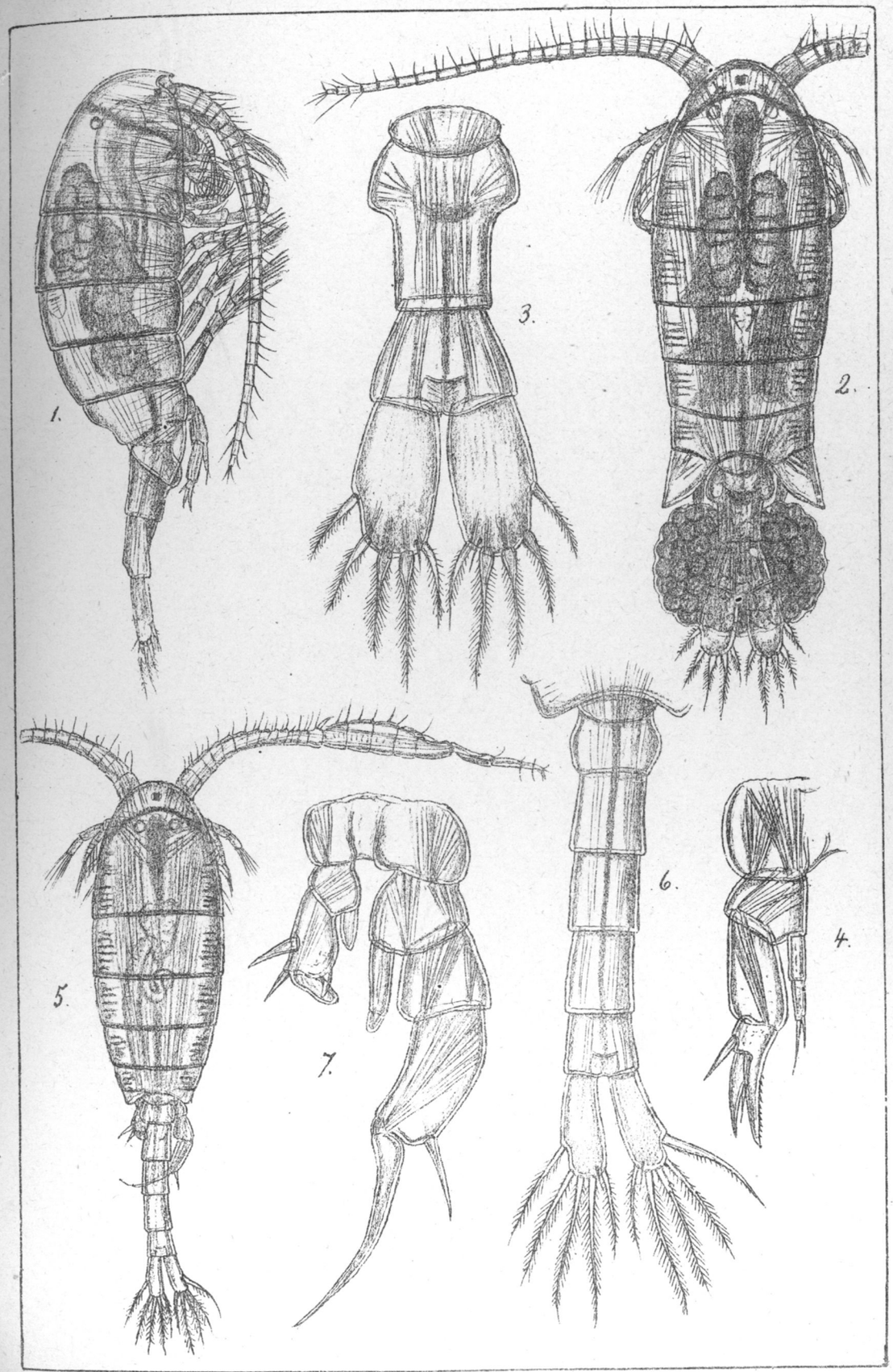
1. Cypria capensis, G.O. Sars. – 2. Cypris corpulenta, G.O. Sars. – 3. Cypris triguna, G.O. Sars.

4. Cypris aurea, G.O. Sars. – 5 Cyclocypris pusilla, G.O. Sars.



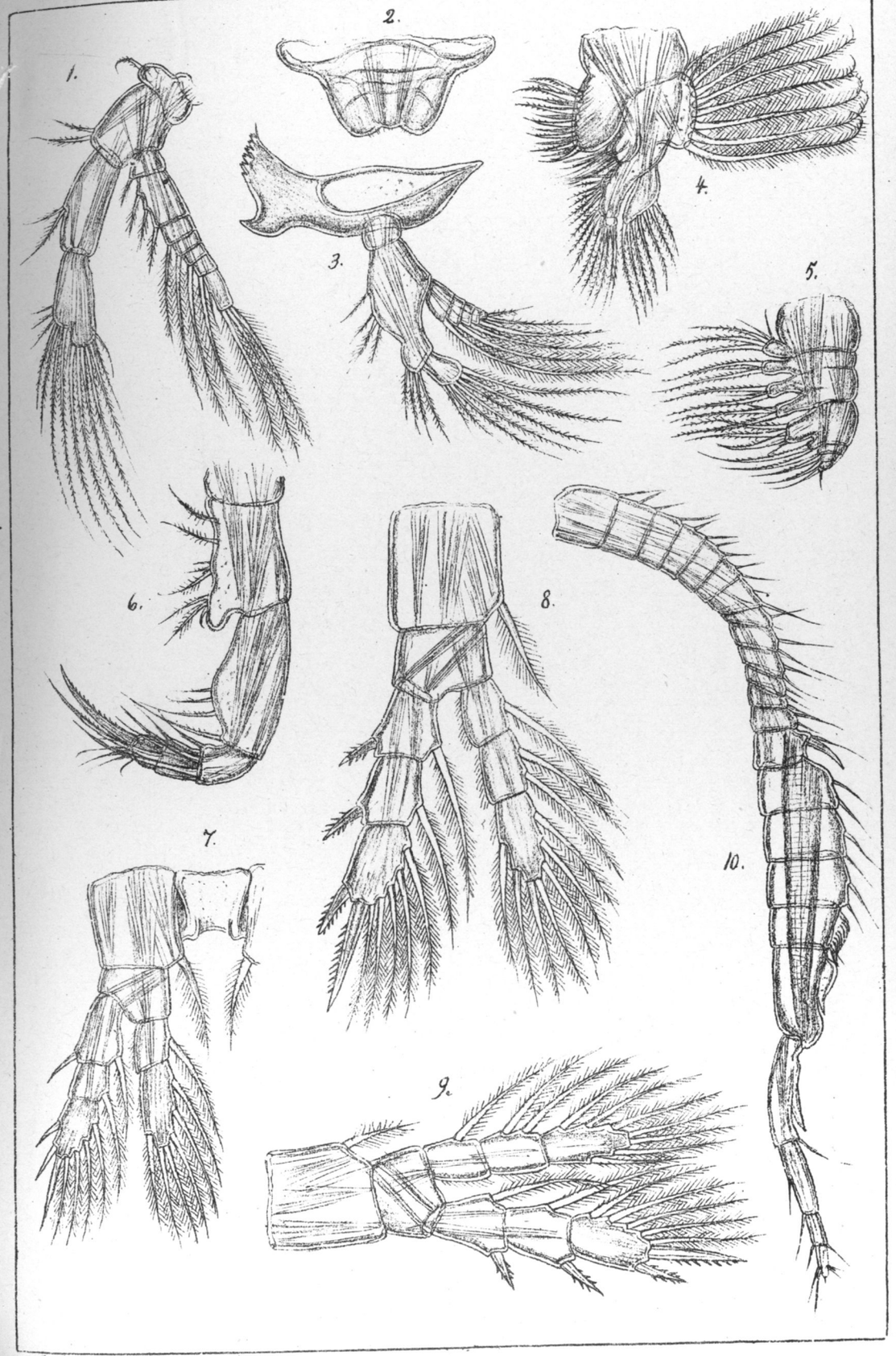
G.O. Sars ad nat. gr.

1. Cypricercus cuneatus, G.O. Sars. – 2. Cypridopsis vidua, G.O. Sars.
3. Cypridopsis assimilis, G.O. Sars. – 4. Potamocypris gregaria, G.O. Sars.



G. O. Sars autogr.

Paradiaptomus lamellatus, G. O. Sars.



G.O. Sars autogr.

Paradiaptomus lamellatus, G.O. Sars.
(contin.)