FAUNA OF THE CHILKA LAKE

CUMACEA.

By STANLEY KEMP, *B.A.*

(With 5 text-figures.)

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CUMACEA.

By STANLEY KEMP.

The Cumacea found in the Chilka Lake belong to two species both of which appear to be undescribed. They belong respectively to the genus *Iphinöe* of the family Bodotriidae and to *Paradiastylis* of the family Diastylidae. No species of either of these genera has hitherto been recorded from brackish water and the group as a whole is essentially marine in habitat.

The *Iphinöe* was found only in the main area of the lake. It occurred rarely in March in water of specific gravity 1·008, but was taken in abundance later in the year in water that was almost or quite fresh. Only females of this species were discovered.

The *Paradiastylis* was common in the main area of the lake at all times of the year and, in the freshwater season, was found in the outer channel. The species is evidently able to thrive in water varying in specific gravity from 1·000 to 1·015.

Family BODOTRIIDAE.

Genus **IPHINÖE**, Bate.

Iphinöe sanguinea, sp. nov.

Of this species females only were obtained.

The carapace, including the pseudorostral lobes, is about two-sevenths the total length, excluding uropods. The depth of the carapace is a little more than half its length. The pseudorostral lobes are scarcely upturned; they are apically pointed and the margin of each, below the apex, is obliquely truncate—slightly concave anteriorly and a little convex in advance of the exceedingly shallow antennal notch. The convexity bears a series of about five small forwardly-directed teeth and further back, behind the insertion of the antennae, there is a series of some twenty similar teeth on the anterior half of the lower margin of the carapace (text-fig. 2*a*). There is no antennal tooth. The carapace is feebly carinate in the median line for a short distance behind the eye, the carina bearing five (more rarely four) small forwardly-directed teeth. The teeth are situated well in advance of the middle point of the carapace, differing conspicuously in position from those found in the Atlantic *I. trispinosa*. The carapace is otherwise devoid of sculpture, but is closely covered with a very fine reticulation, only visible under high powers of the microscope.

The first pedigerous somite is well exposed both dorsally and laterally and is not, as in *I. trispinosa*, covered at the sides by a forward prolongation of the second somite. The second somite, measured dorsally, is about one and a half times the length

of the first; the third and fourth are about equal, intermediate in length between the first and second. Except for the first, the somites are a little puckered laterally, but are otherwise without sculpture. On either side of the last three somites, near the anterior margin, is a large forwardly-directed bristle which does not seem to occur in any other species of the genus (text-figs. 1 *a*, *b*).

The abdominal segments are without carinae. In lateral view each is strongly convex ventrally in its anterior half.

In the peduncle of the first antennae (text-fig. 2 *b*) the third segment is longer than the second. At the distal end of the third segment are a few simple hairs, while in a similar situation on the first and second segments are others of a more complex nature which are illustrated in detail in text-figs. 2 *c*, *d*. The inner flagel-

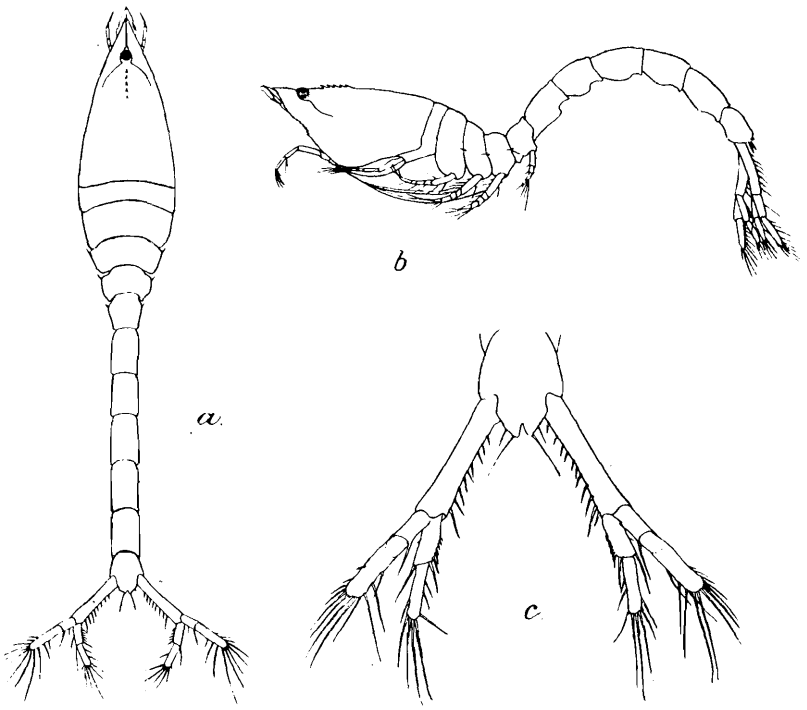

Fig. 1.—*Iphinöe sanguinea*, sp. nov. ♀

a. Female in dorsal view. *b*. Female in lateral view. *c*. Last abdominal segment and uropods.

lum is extremely small, but is two-segmented. The outer is also two-segmented and carries two long annulated filaments.

The second antennae (text-fig. 2 *b*) are very inconspicuous in the female and consist of two segments, the basal one subtriangular and the distal very slender and articulated with it at an acute angle. The distal segment bears a single long seta at its apex.

The form of the second maxillipedes is shown in text-fig. 2 *e*. In the third maxillipedes (text-fig. 2 *f*) the second segment is not much longer than the combined length of the segments distal to it. Externally the distal end of the second segment reaches a little beyond the articulation between the third and fourth; on its anterior margin is a series of six setae, the two outermost being of great length. The produced

end of the fourth segment reaches to the middle of the fifth and bears three setae externally.

In the first peraeopods (text-fig. 2 *g*) the second segment is a little shorter than the rest of the limb; its external margin is serrated near the base. The fifth segment is considerably longer than the sixth or seventh. The second peraeopods (text-fig. 2 *h*)

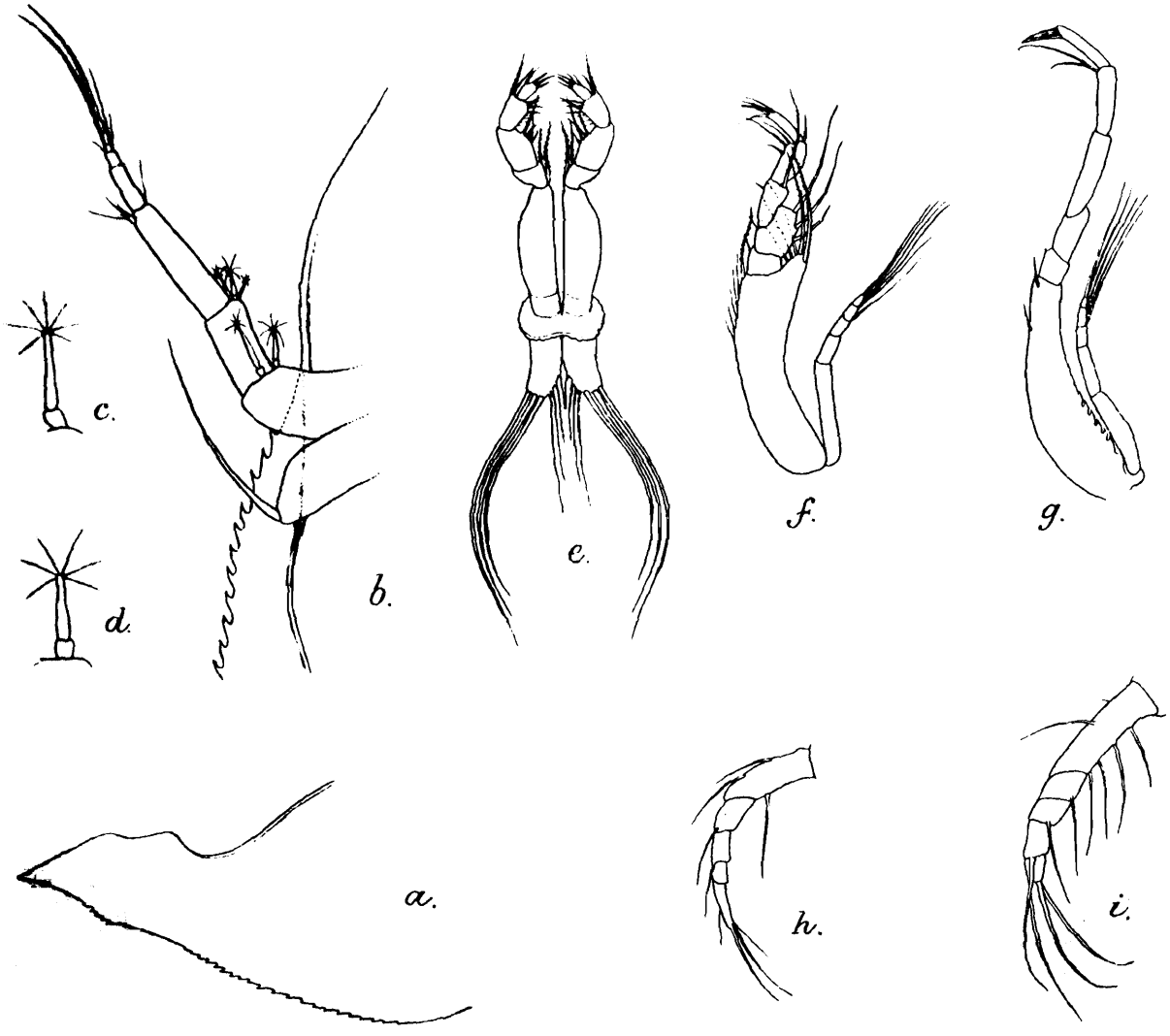

FIG. 2.—*Iphinöe sanguinea*, sp. nov. ♀.

a. Left pseudorostral lobe and adjacent part of carapace.
b. Antennule and antenna.
c, *d*. Hairs from peduncle of antennule.
e. Second maxillipedes.
f. Third maxillipede.
g. First peraeopod.
h. Second peraeopod.
i. Third peraepod.

are a little shorter than the third (text fig. 2 *i*); the ultimate segment of the former is slender and about as long as the two preceding combined.

The peduncle of the uropods (text-fig. 1 *c*) is about one quarter longer than the exopod or endopod, the two latter being subequal. On the inner margin of the peduncle there is a series of from 8 to 11 long spines. The exopod is composed of two segments. In dorsal view the ultimate is about twice the length of the penulti-

mate; the latter, however, is much produced inferiorly at its distal end and the two segments when seen from below are almost equal in length. The basal segment bears one or two setae internally and the distal some 11 or 12 distributed round its apex. Of the two segments that compose the endopod, the first is a little shorter than the second and is provided internally with a series of six or seven spines which are closely set and increase in size distally. There is also a single slender spine at the end of the outer margin. The ultimate segment bears five or six slender spines at its apex and one or two on the inner edge.

Large specimens reach a length of about 5 mm.

Stebbing in his monograph of the Cumacea[1] recognises eight species of *Iphinöe*. Of these the species from Lake Chilka is evidently most nearly allied to *I trispinosa* (Goodsir), a species found in the N. E. Atlantic from an area ranging from the Bay of Biscay to the Shetland Is. and Norway. So far as females are concerned *I. sanguinea* is easily distinguished from this species by the number and disposition of the teeth in the mid-dorsal line of the carapace, by the teeth on the lower margin of the carapace, by the form of the second pedigerous somite which does not overlap the first, by the bristles on the last three of these somites and by a great number of details in the appendages.

Iphinöe sanguinea is, when living, of a deep blood-red colour, a feature to which allusion is made in the specific name. The species was only found twice in the Chilka Lake, firstly in March, when a few specimens were obtained in the vicinity of Kalidai in water of specific gravity 1·008 (corrected), and secondly in September, much further to the north, in water that was practically fresh. On the latter occasion large numbers of specimens were collected, all of them, however, females.

The absence of males is doubtless to be attributed to differences in habits between the two sexes. The examples obtained were all caught in nets fished on soft mud at depths of between 6 and 8 ft. The males are perhaps to be found at some distance above the bottom, but I have searched our townet gatherings for them without success. There can be little doubt that the species is a permanent inhabitant of the main area of the lake: there are embryos in the brood-pouches of some of the females caught in September.

The species of *Iphinöe* hitherto described are recorded from the Mediterranean and N. E. Atlantic, from the Gulf of Guinea and from S. Africa. One species is also known from the Gulf of Manaar.

Family DIASTYLIDAE.

Genus **PARADIASTYLIS**, Calman.

Paradiastylis culicoides, sp. nov.

This species is remarkable for the great differences that exist between the sexes in the form of the apex of the telson. In the female there are two minute terminal

[1] *Das Tierreich: Cumacea*, p. 42 (1913).

spines, whereas in the male the apex is drawn out to a long, sharp, spine-like process, in this respect disagreeing with the diagnosis of the Diastylidae in Stebbing's synopsis of the families of Cumacea.[1] The peculiar structure of the telson of the male may also be proper to some other species of the genus, for the sex is unknown in two out of the three species that have been described.

Female.—The carapace (text-figs. 3 *a*, *b*) is considerably inflated and its breadth is little less than one-third the total length, uropods excluded. The surface is rather

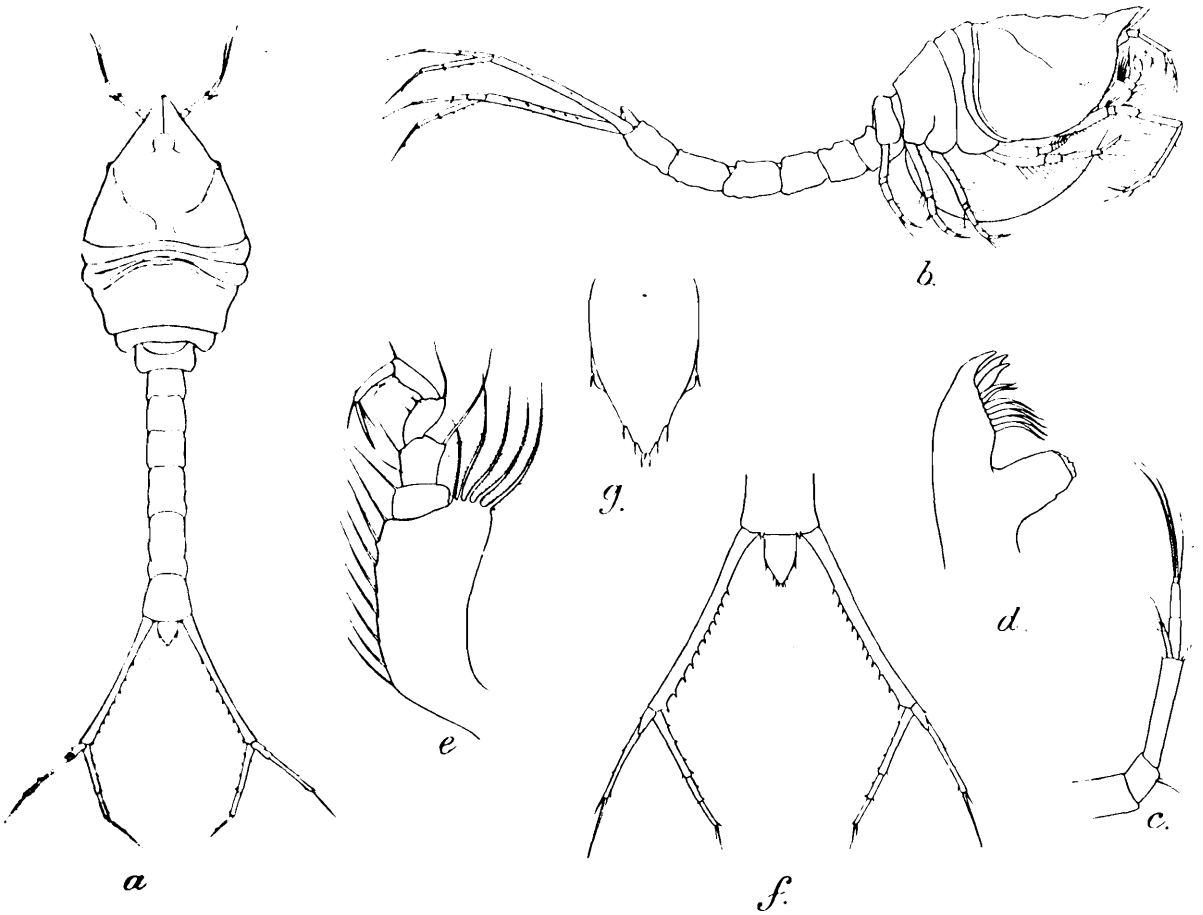

FIG. 3.—*Paradiastylis culicoides*, sp. nov. ♀.

a. Female in dorsal view.
b. Female in lateral view.
c. First antenna.
d. Mandible.
e. Third maxillipede.
f. Telson and uropods.
g. Telson further enlarged.

coarsely reticulate and bears only one oblique lateral ridge in place of the three or four which exist in other known species of the genus. The single ridge, which corresponds to the foremost of those found in allied forms, is very strong anteriorly with its edge microscopically spinulose. Posteriorly each ridge approaches, but does not reach, the median line of the carapace; it is then continued backwards and outwards, becoming very indistinct in this part of its course. Anteriorly the carapace

[1] *Das Tierreich: Cumacea*, p. 7 (1913).

is slightly elevated in the median line and the dorsal margin is rather uneven in lateral view; on either side of this elevation there is an obscure longitudinal ridge. The pseudorostral lobes are not upturned. Close to the apex the inferior margin of each is serrated and the lower margin of the carapace, behind the exceedingly shallow antennal notch, is armed with a series of coarse teeth, some twenty-five in number.

The third and fourth leg-bearing somites appear to be fused dorsally, as in Calman's *P. longipes*.

The abdominal somites are without lateral serrations. The sixth somite bears a pair of small spinules distally, one on either side of the telson.

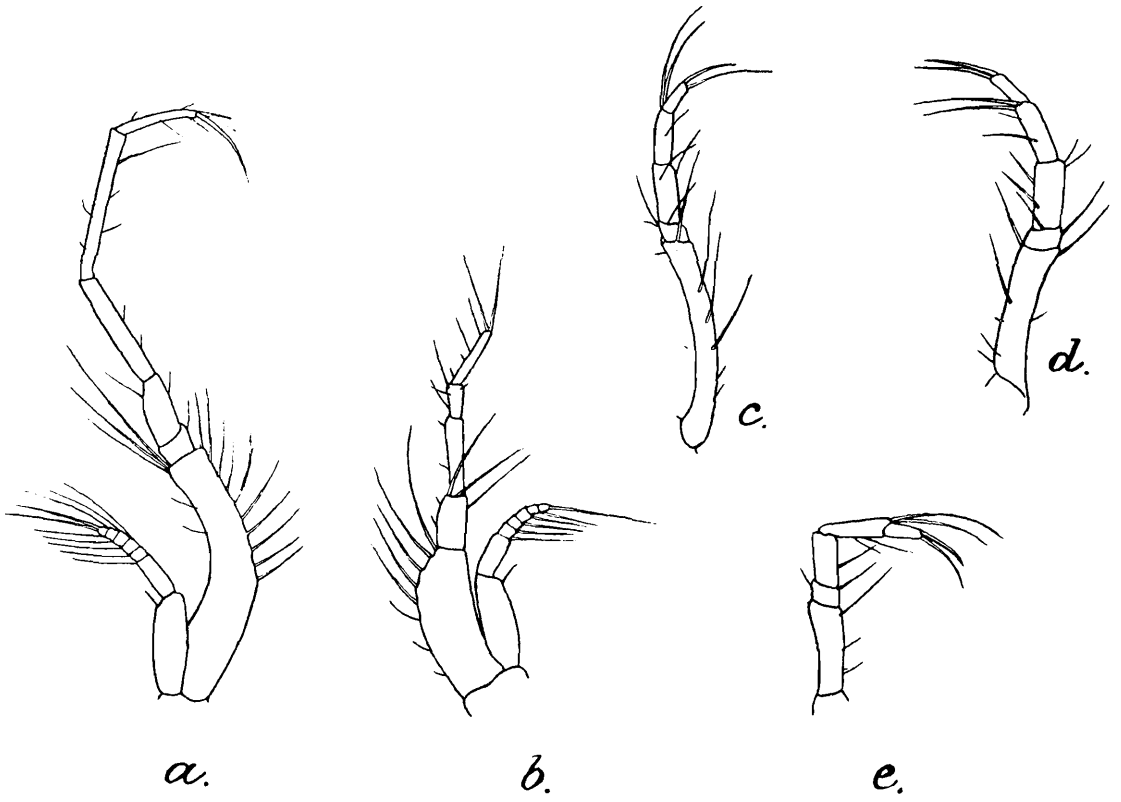

FIG. 4.—*Paradiastylis culicoides*, sp. nov. ♀

a. First leg.
b. Second leg.
c. Third leg.
d. Fourth leg.
e. Fifth leg.

The telson (text-fig. 3 *g*) is smaller than that of the allied species, being little more than half the length of the last abdominal segment. The apex bears a pair of small spinules flanked on either side by two setae.

The form of the mandible is shown in text-fig. 3 *d*.

The antennules (text-fig. 3 *c*) are apparently much as in *P. longipes*, the third segment of the peduncle being slender and about as long as the first two taken together. The larger flagellum terminates in two annulated filaments.

The third maxillipedes (text-fig. 3 *e*) are without exopods; the basis is exceptionally broad.

The first and second pairs of peraeopods (text-figs. 4 *a*, *b*) bear exopods. The former reach beyond the tip of the pseudorostrum by about half their length, the exopod, though longer than in *P. longipes*, being shorter than the basis. In their proportional lengths the segments of the endopod in this limb agree closely with Calman's figure of *P. longipes*. The remaining peraeopods (text-figs. 4 *c–e*) are slender.

The uropods (text-fig. 3 *f*) are long and slender ; the peduncle is very nearly three times the length of the sixth somite and bears from 8 to 12 spines on its inner margin. The exopod (excluding the terminal seta) is as long as the first two segments of the endopod and is half the length of the peduncle. Of the three segments composing the endopod the first is longer than the two following combined. The first segment bears four short spines on its inner margin and the second two.

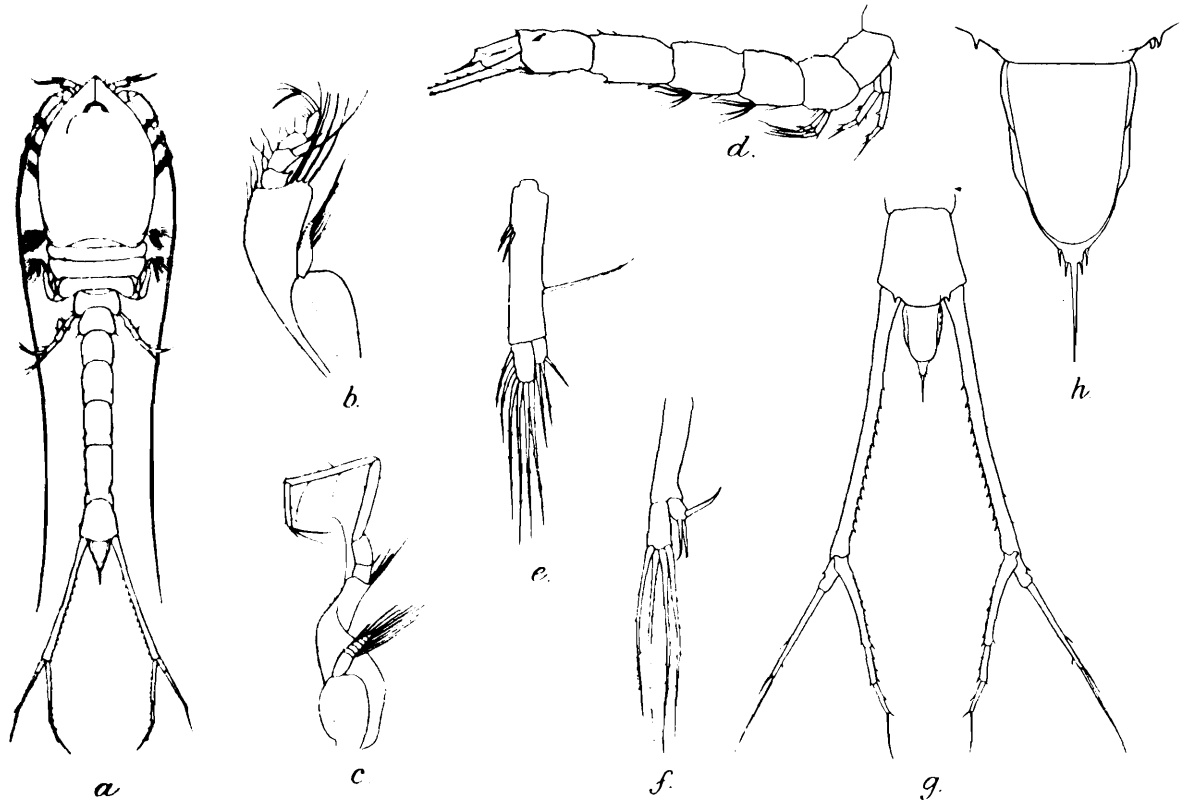

FIG. 5.— *Paradiastylis culicoides*, sp. nov. ♂.

a. Male in dorsal view.
b. Third maxillipede.
c. First leg.
d. Abdominal segments and telson in lateral view.
e. First pleopod.
f. Second pleopod.
g. Telson and uropods.
h. Telson further enlarged.

Male.—The male (text-fig. 5 *a*) is more slender than the female and shows merely the faintest trace[1] of the oblique ridge on the carapace. The pseudorostrum is also noticeably shorter and there are fewer teeth (only about ten) on the margin of the carapace behind the insertion of the antennae. The ocular lobe appears to be pro-

[1] Not shown in text-fig. 5 *a*.

vided with four corneal lenses, one on each side and a pair, partially fused in the middle. The third and fourth leg-bearing somites are quite distinct and there may be a pair of spines on the last abdominal somite on either side of the telson.

The telson (text-fig. 5*h*) is longer than in the female and is totally different in form. The upper surface is flattened and U-shaped in outline and posteriorly slopes sharply downwards to a long drawn-out apex resembling a large spine. There are two setae on either side at the base of this spine, but there is no trace of the pair of terminal spinules found in the female.

The ultimate peduncular segment of the antennule is enlarged and bears sensory setae. As in *P. longipes* both inner and outer flagella are composed of four segments. The terminal segment of the antennal peduncle is provided with eleven transverse rows of setae.

The third maxillipedes (text-fig. 5*b*) have a well-formed exopod and the basal segments of the first four legs are greatly expanded and their exopods very strongly developed.

The pleopods on the first and second abdominal segments are illustrated in text-figs. 5*e*, *f*. On the third and fourth segments (text-fig. 5*d*) they are replaced by two pairs of long setae, on the fifth by a pair of backwardly directed teeth, each bearing a small setae behind the apex. On the sixth there is a single pair of setae.

The uropods (text-fig. 5*g*) are more slender than those of the female, but do not differ markedly in structure.

Large females of *P. culicoides* reach a total length of about 4 mm.; males are a trifle smaller, rarely exceeding $3\frac{1}{2}$ mm.

The species differs conspicuously from all others of the same genus in the presence of only a single oblique ridge on the carapace.

Living females in their form and movements bore a curious resemblance to pupae of mosquitoes. Both sexes were of a pale brown colour.

We obtained females in abundance in all parts of the main area of the lake in nets drawn over the surface of the mud at depths of from 6 to 12 ft. Males were found in company with the females, but were much scarcer. A few females were found at the inner end of the outer channel in September in water that was almost or quite fresh. Earlier in the year, when the water in this locality was as salt as that of the sea in the vicinity of the lake, we failed to find any specimens. The species is evidently a permanent inhabitant of the main area of the lake, living in water that varies in specific gravity from 1·000 to 1·015.

The three species of the genus hitherto known are recorded from Japan, the Gulf of Manaar, the Sulu Archipelago and the Gulf of Siam.