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Contributions to the Freshwater Microfauna of Tasmania

Part 2—**Daphnidae, Bosminidae, Cytheridae, &c.**

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WITH 11 TEXT FIGURES

The second part of this treatise was to deal with the Cladocera and Ostracoda. Since supplementary material as well as some rather inaccessible literature should be first secured for the elucidation of some doubtful cases, the report will now comprise only the Daphnidae, Bosminidae, Cytheridae and the genus *Dunhevedia;* the Ostracoda and Cladocera are to follow later. Further two communications on larvae of Diptera may find room in this communication. The work on the few Hydracarinae, completed in the meantime by courtesy of Dr. Szalay, Budapest, may be inserted. Dr. Hunstedt is at present occupied with the survey of the Diatomeae.

CLADOCERA

Communications by Henry and Smith reveal the lack in Tasmania of the families of Sididae, Holopediidae, Leptodoridae and Polyphemidae. This cannot surprise, since they have also remained foreign to the Australian Continent, except for two Sidides—*Latonopsis australis* and *Diaphanosoma excisum*—which are advancing from their tropical homelands into Queensland.

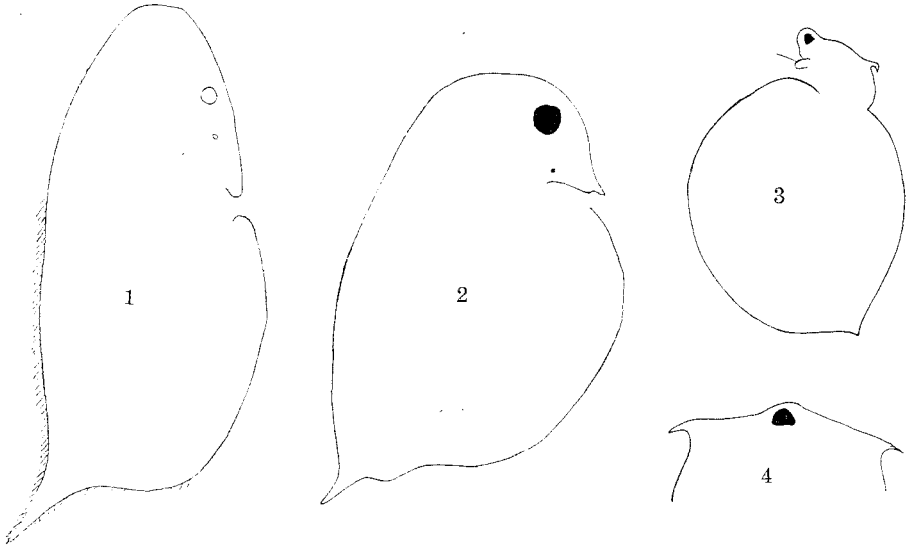
Daphnidae

Whereas Henry mentions 8 Daphnidae from the Australian fauna, Smith enumerates for Tasmania only the species *carinata*, the occurrence of which is designated " cart rut near Plenty ".

The many Daphnidae mentioned by Henry might all belong within the groups of forms of the variable *D. carinata,* with the exception of *D. lumholtzi*, cited from Queensland. For Wagler is right in saying in his paper " The systematic and geographical distribution of the genus Daphnia " (*Arch. f. Hydrobiol.* Vol. 30, 1936, page 525) : " Gegen die Einordnung der Formen *gravis, magniceps, expansa, lamellata* in die species *carinata* wird kaum Widerspruch erhoben werden."

Since for climatic reasons the occurrence of the almost tropical *lumholtzi* can hardly be expected in Tasmania, the Tasmanian fauna of Daphnids will be limited to the species *carinata*. This was contained in the following samples:—

15. Little Lake Waterhouse. The young animals present in this sample exhibited (cf. fig. 1) the formation of a helmet of the type described by me earlier in a colony from the Sunda Archipelago (Die Cladoceren der Deutschen Limnol. Sunda Expedition, page 659).
23. Roadside pond, Tunbridge; and
29. Rostrevor Dam. Besides specimens of normal habit of the head, this sample contained also specimens with which the head was flattened. By this they approach forms (mostly with specific names) of the warmer parts of the Australian Region, without, however, reaching such excessive shapes as *cephalata*, &c. Our fig. 2 represents one such female with an ephippium, possessing a spineless body 3500 μ long. The ephippium contains two obliquely set rows of eggs. The larger proximally situated part of the processus abdominalis is bare, the two smaller distal ones are haired. Since Haberer suspected earlier that the excessive formations of *cephalata* might be monstrosities caused by fungus infection, it should be noted that the present form revealed not even a trace of a fungus infection.



1. Helmeted young form of *Daphnia carinata* King.
2. Ephippial female of *Daphnia carinata*. Form approaching *D. cephalata*.
3. *Ceriodaphnia quadrangula*, described as *C. hakea*.
4. Dorsal view of head of "*Ceriodaphnia hakea*".

Since Nicholls was recently able to refer to a representative of the *tibetana* group of Daphnid species (earlier known as *Daphniopsis*), in Western Australia, it was to be watched whether a form belonging here did not occur in Tasmania too. But none was present. However, a sample from Western Australia contained a colony of *carinata*, the samples of which—partheno females throughout—exhibited a length of 3400 μ, of which the spina measured 700 μ. The abreptor of these animals exhibited conspicuously strong spinules in transverse rows.

Ceriodaphnia

Henry notes the following species of this genus from Australia: *rotunda, cornuta, spinata, sublaevis*. Smith mentions none of these species from Tasmania, but describes two new ones under the names *planifrons* and *hakea*, the first from Lake Sorell, the second from Lake St. Clair.

However, this apparent great abundance of *Ceriodaphnia* in the Australian Region has been recognised as incorrect by investigations carried out since Wagler has shown for the European fauna that the species *hamata, connectens, intermedia, affinis* and *pulchella* are nothing else but forms of the cosmopolitan species *quadrangula*. It will probably be similar with most Australian " species ". There is one more thing. The species *hakea* was, as we shall see presently, set up by Smith as the result of a misunderstanding. Dr. Nicholls also procured for me a sample of plankton from Lake St. Clair, which showed that Smith's allegation: " The head bears dorsally a remarkable recurved hook, a character not known in any other member of this genus ", must be a result of the fact, that Smith considered as an outgrowth of the head the points of the fornix, which in a lateral position of the animal present themselves as Smith depicted them (fig. 3). Had he seen a specimen of this *Ceriodaphnia* in a dorsal, or ventral view, he could not have missed the fact, that the alleged outgrowth is present twice and belongs to the two fornices (fig. 4). *Ceriodaphnia lakea* is nothing else but a form of *quadrangula*. Concerning the species *planifrons* I again suspect that it is not a new species, but, having no material from Lake Sorell at my disposal, I wish to leave this question open. That *planifrons* is no new species, is made even more probable by the fact that all *Ceriodaphnia* in Nicholls's material belonged to the species *quadrangula*. This species was present from the following localities:—

4. Lake Dobson.
8. Brock's Dam. These animals have a short spina set in the median.
19. Pond, Waverley Road, Launceston. The spina of this colony is set more dorsally (fig. 5).
30. Lake Leake near weir. This colony differs from all others by the excessively large main eye (fig. 6). Maybe the rows of setules on the proximal part of the abreptor are better formed than with other colonies. These differences, however, are not sufficient for a specific separation of the mentioned *Ceriodaphnia* colonies of Tasmania.

Simocephalus

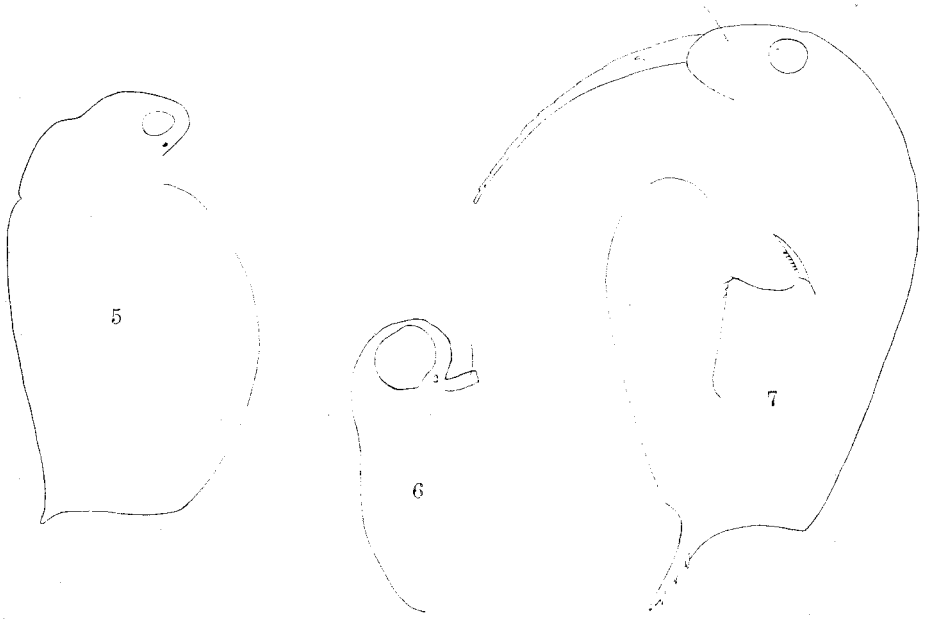
Of the five species of this genus, which Henry described from Australia, Smith mentions but one from Tasmania: *australiensis*; he further described a new species from Lake Dulverton, *S. dulvertonensis*. Before we turn to the species found by Nicholls, I must return once more to Smith's *Simocephalus dulvertonensis*, which has already been the object of two treatises, namely:—

BREHM, V.—Cladocern aus Neu-Seeland. *Arch. f. Hydrobiol.* Vol. 23, 1931; and

BREHM, V.—Uber *Simocephalus dulvertonensis* Smith. *Zool. Anz. Vol.* 140, 1942.

In the former treatise I pointed to the flaws in Smith's description, of which he himself claims that it " does not offer any marked characters ".

I further mentioned that a form, which I obtained from New Zealand, might be identical with Smith's, if that latter also possessed the geniculate anal setae which are characteristic for the New Zealand animals. I expected the decision from a subsequent investigation with animals from Lake Dulverton. In the second above-mentioned treatise I pointed out that the shape of the anal setae, which I intend to use as a characteristic feature for the species *dulvertonensis*, is also characteristic for *Simocephalus corniger* from South Africa, described by Methuen (Methuen, P. A.: On a collection of Freshwater Crustacea from the Transvaal. *Proc. Zool.*



5. *Ceriodaphnia quadrangula* from Waverley Road Pond.
6. *Ceriodaphnia quadrangula* from Lake Leake.
7. *Bosmina hagmanni* from Lake St. Clair.
Young forms with dorsal incisions on the mucro.
Abreptor of a mature animal is drawn into the interior.

Soc. London 1910). Unfortunately the description given by Methuen is also so incomplete, that no decision can be made. This, however, would be necessary in order to fix the correct names for the species, for Methuen's designation *corniger* should have priority.

Since the forms in question, *dulvertonensis* and *corniger* as well as the mentioned form from New Zealand hardly correspond to a "good" species, but presumably fall into the frame of the rather polymorphous species *Simocephalus vetula**, I would not have come back to the problem broached here, if material from Lake Dulverton had not been made available to me, which would be expected to allow of a solution of the problem set above.

Unfortunately, the discrepancy discussed already in our report on Copepoda between Smith's and my own investigations of the material from the same lake, again arises. Nicholls's sample, very abundant in Crustacea, did not contain any specimens of *Simocephalus* and so the *pium desideratum* from the year 1931 still remains. Moreover, the opinion expressed already in the report on Copepoda, that the composition of the fauna of Lake Dulverton might have changed since the time of Smith, becomes more likely. We must therefore limit ourselves to the characterization of the species found.

Simocephalus australiensis Dana

In this species—provided it should not be classified as *exspinosus*—I propose to put the animals from sample 31† since they exhibited on the terminal claw of the abreptor a strong side comb, possessed a point-shaped side-eye and also coincided in the contour of the shell and the shape of the head with the picture given for our form by Henry. Our form, however, differs from Smith's representation, for his statement concerning the shape of the head (he speaks of a "distinct projection on the underside of the head") does not correspond to our colony.

Simocephalus vetula O.F.M.

The specimens from sample 28 (Lagoon of Islands) resembled *australiensis* in the shape of the head and the contour of the shell, but must be placed in the species *vetula* on account of the line-shaped side-eye and the fact that the terminal claw lacked a side comb. Females bearing embryos were 2600 μ long.

Simocephalus sp.

The animals from sample 23 (Roadside pond South of Tunbridge) resembled again *australis* in the shape of the body, but the terminal claw possessed no side comb and the side-eye was point-shaped. Abreptor with 12 anal spines. It is obviously a colony of *vetula*, deviating from the type by the side-eye.

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* Even the most recent literature uses time and again *vetulus*. I wish, therefore, to stress, that the name of the species is *vetula*. Vetula = old woman is substantive.

† Roadside pond near Mathinna.

Bosminidae

Bosmina

It is very surprising that Henry mentions this genus from New South Wales only, whereas Smith noted as many as three species from Tasmania, all of which were described as new. They are *B. rotunda* from Lake St. Clair, *B. brevirostris* Great Lake and *B. sorelli* from Lake Sorell. These three alleged new species have already been the object of criticism by Rühe, who says in his paper: " Bosmina coregoni " (*Zoologica,* Vol. 63, 1912, page 14) : Beschreibung und Zeichnung dieser Arten sind völlig unbrauchbar und nichtssagend, so dass mit denselben absolut nichts anzufangen ist ". How right Rühe was, follows from a subsequent investigation of a sample of plankton from Lake St. Clair, which, according to Smith, was to contain *B. rotunda.* Of this as well as of the two others also described by him as new species, he says: " they are closely related to the common northern *B. longirostris* ". This would be quite possible with respect to the occurrence of this species in New South Wales, claimed by Henry. The present plankton from Lake St. Clair, however, shows that the *Bosmina* of this lake has nothing to do with the species *longirostris,* but belongs to the groups of forms *Bosmina hagmanni,* so frequent in the Southern Hemisphere. The determination was rendered difficult—as with many colonies of this species in the lakes of the Andes in South America—by the fact, that not only with older animals, but also with young animals the mucro bore no incisions. Only after a survey of numerous very young specimens we succeeded in finding two pieces which exhibited so distinctly the shift of the incisions of the dorsal part of the mucro, so characteristic for *hagmanni* (cf. fig. 7).

I suspect that the two other species described by Smith are nothing else but *B. hagmanni.* This conjecture is rendered even more probable by the fact that the plankton from sample 21 (Cleveland Lagoon) contained a *Bosmina* too, which certainly did not belong to the species *longirostris.* The distal position of the seta on the forehead, the erect posture of the antennule and the armature of the terminal claw of the abreptor tally with the conditions in *Bosmina* from Lake St. Clair. On account of these facts, I propose to relate this form to *hagmanni.* Unfortunately, the certain proof through the dorsal incision of the mucro could not be obtained, for lack of young animals. Neither here nor in Lake St. Clair was it possible to find males, or females with permanent eggs.

Chydoridae

Dunhevedia crassa King

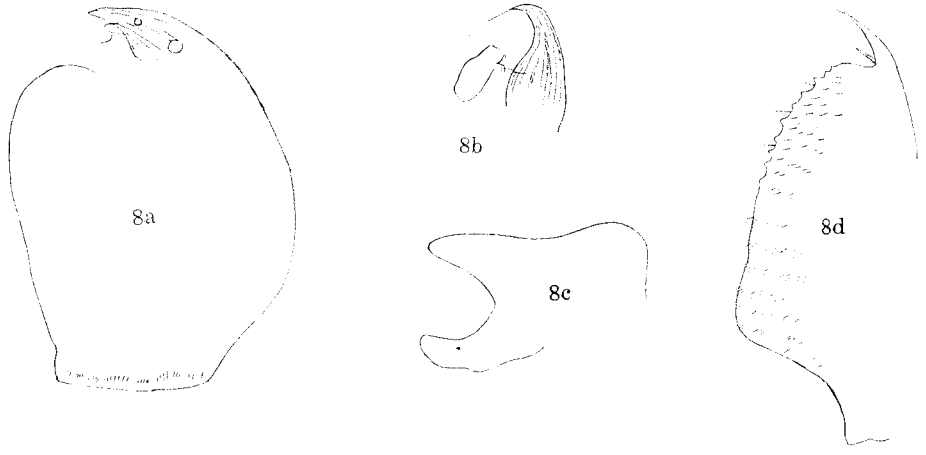
Whereas Henry mentions two species of this genus from the Australian Continent* of which the one, *podagra* King, is very problematic, Smith does not mention any occurrence in Tasmania of this ill-described Cladoceran. As a result, it is new for Tasmania, and seems to be rather infrequent there, for it was detected in but one sample, in T. 19 (= Pond, Waverley Road, Launceston).

* King mentions *D. podagra* from Parramatta. Henry found *D. crassa* in Queensland and in New South Wales at Nyngan

At first I thought it was a new species, for the tooth (accepted even in the diagnosis of the genus) on the margins of the ventral shells was lacking. Furthermore, the present specimens differ in the following points from the descriptions and figures available to me:

1. The lip is here bulging forth (like a semicircle) in the proximal part.
2. The rostrum and the portion of the head adjacent to the rostrum exhibit a delicate, narrow structure of lines.
3. The lateral seta of the antennule is inserted far more distally than drawn for instance by Stingelin in south-asiatic animals (cf. Zoologische Ergebnisse einer Reise in Ostasien. *Zool. Jahrb. Abt. Syst.* 1904).

Whether these differences are present throughout and suffice for a specific separation, seems doubtful to me, for the feature that, at first. made me think I had a new form before me, proved unreliable, namely the tooth on the margin of the shell. On scanning numerous specimens I happened to come across one in which this tooth was quite normally developed. In any case it is remarkable, that in all other instances the margin of the shell exhibited at the critical spot not a trace of the formation of a tooth. Here a colony is present, in which the tooth, considered up to the present as a characteristic feature of the genus, is quite normally absent, and is exhibited only in very rare specimens, but then quite normally developed. No intermediate forms with for instance stunted tooth formation were seen. Figures 8, a-d.



8. *Dunhevedia crassa* King. a. Lateral View. b. Terminal part of rostrum with antennula. c. Lip. d. Abreptor.

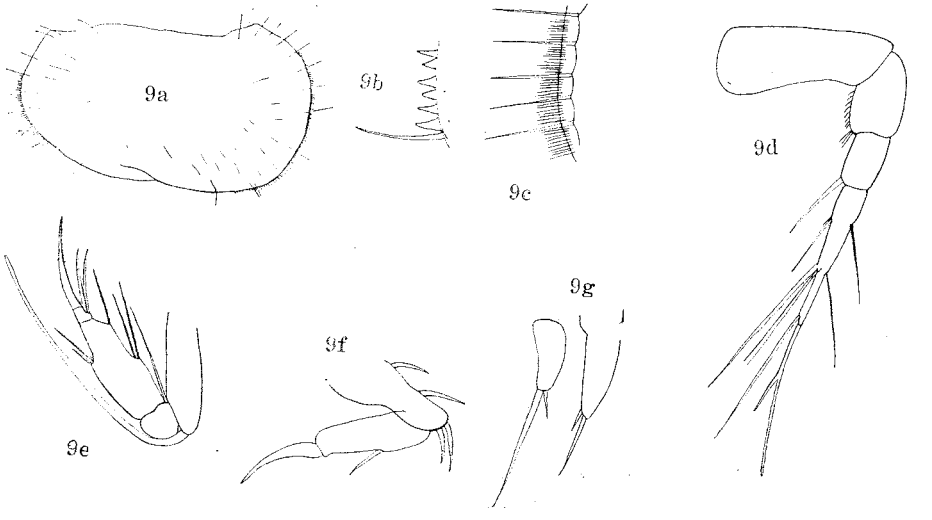
OSTRACODA

While Smith included in his investigations besides Copepoda and Cladocera also Amphipoda and Isopoda, he did not tackle the Ostracoda at all, so that the species mentioned below constitute new ones for the Tasmanian fauna, provided no papers on Tasmanian Ostracoda remain unknown to me. The yield of Ostracoda in Nicholls's collection is low, and it is therefore somewhat premature to attempt to give as yet a general characteristic of the Tasmanian Ostracod fauna. However, even the little material seems to reveal that it consists predominantly of Cypridae and possibly Cytheridae, that Ilyocyprídae are infrequent, as well as Notodromatidae (I saw no *Newnhamia!*), Darwinulidae, Candoninae, and Cyclocypridae, for I could detect no representative of these families.

Cytheridae

Limnocythere conifera n. sp.

A *Limnocythere* was found rather frequently in sample 21 from the Cleveland Lagoon. Its shell was unfortunately (as a result of the preservation?) so limp and deformed that I am unable to give more than approximate data on the size and shape of the shell of this species. The length varied about 500 μ. The upper rim of the shell runs about in a straight line, but exhibits on both anterior and posterior ends a bent contour, which was with some specimens much more marked that is shown in figure 9a. The shell did not exhibit any formation of a tooth, which is characteristic for so many *Limnocythere* species. On the surface the shell bore extensive fields, densely set with conical, hyaline outgrowths. These



9. *Limnocythere conifera* n. sp.: a. Lateral view. b. Cross section through shells with conical protuberances. c. Rim of shell. d. Antennule. e. Antenna. f. First leg. g. Furca.

formations were best visible in fragments of the shell, cf. figure 9b. The rim of the shell is conspicuous with long setae, which, for that matter, are dispersed over the whole surface of the shell, and a fringe of densely set short hairs, figure 9c. The antennule carries at its end the forked sensory seta characteristic for the genus, figure 9d.

Figures 9e and 9f reveal the habit and armature of the second antenna as well as the habit of the thoracic extremities, which offer nothing particular. The furca possesses a slightly curved cylindrical stem, quite twice as long as it is wide. It is tapering towards its end and bears terminally one long and one very short seta. As our figure 9 reveals, the longer terminal seta seems to be considerably longer in the female than in the male. This difference might, however, be but accidental, caused by individual variation, since I happened to come across only one male.

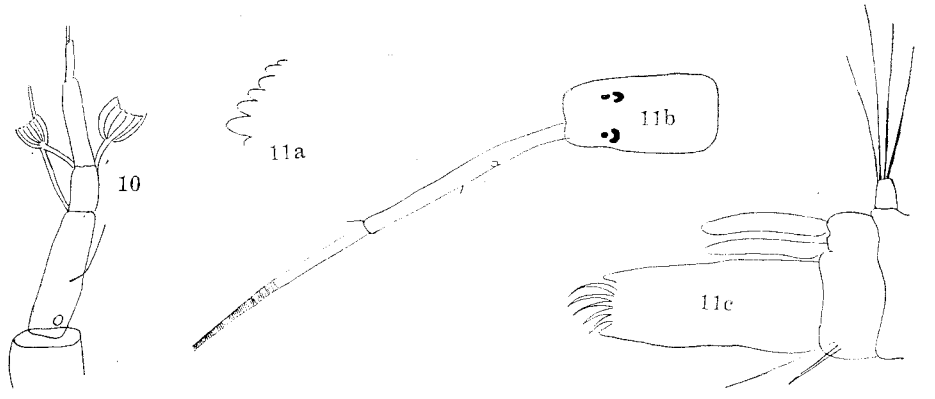
According to earlier communications on Australian Cytheridae it seems that, besides *Gomphocythere problematica* described from New Zealand, there are but two *Limnocythere* known: *aspera* Henry from the continent and the subfossil *L. percivali* from New Zealand.

INSECTA.—DIPTERA

Chironomidae

Many samples contained larvae of Chironomids. These could not be considered, for as is generally known, the determination of Chironomids requires the knowledge of larva, pupa and imago. Only two cases can be discussed here, for they might possibly be new forms.

1. *A larva of a Tanytarsid of the type "Attersee-tanytarsids"*. Sample 21 (from Cleveland Lagoon) contained a greenish larva, 3500 μ long. According to the tables for determination given by *Thienemann* (Chironomiden—Metamorphosen. *Arch. f. Hydrobiol.* Vol. 20, 1929) this had to be classified with Atterseetanytarsus. However, it differs from the latter in the following points: 1. The basal segment of the antenna is but



10. Antenna of a Tanytarsid-larva from the group of "Attersee-tanytarsids".
11. a. Labium. b. Head with antenna; and c. Terminal part of body of a presumably new Corynoneurid.

little shorter than the remaining segments. 2. The remaining segments, too, display different conditions concerning length, as our figure 10 reveals. The latter also reveals that Lauterborn's organs, which are set on stems of about the length of the organs, are not lemon-shaped, but rather calyx or bell-shaped. It would be necessary to reinvestigate with fresh material from the same location, whether this shape of Lauterborn's organ is not an effect of the species.

A presumably new Corynoneurid. Fig. 11. Sample 21 also contained a Corynoneurid larva 3200 μ long, the antenna of which was more than double the length of the head. The ring organ was situated in the proximal third of the antenna and somewhat distally from it there was a small bristle. The basal segment of the antenna as well as the following segment were yellow, the third brown-yellow, which is different from other larvae of *Corynoneura*. Each preanal-papilla bears four bristles. There are four anal gills. The spine at the base of the posterior proleg has a common base with accessory spine, the length of which is about one-third that of the larger spine. The labium possesses a small central tooth, flanked on each side by four even smaller teeth. It could not be determined whether a tiny fifth tooth was present.