

genus *Strongylium*, but stated that some doubt as to this reference arises from the fact that all the species of *Strongylium* are much too large for any of the larvæ so far found. Mr. Schwarz also called attention to the frequent confusion by collectors of *Serropalpus* and *Lymexylon*, describing the distribution of the two genera, the first being confined to the northern and the second to the more distinctively southern States in range. Specimens of the two genera were also exhibited.

Dr. Riley was greatly interested in the burrow of the *Agrilus* exhibited by Mr. Hopkins, which had become filled up with a growth of *liber* so as to make the burrow a raised ridge, and, from its serpentine course, gave it somewhat the appearance of a lignified snake. In connection with this he referred to the very curious so-called lignified snake from Brazil, which was exhibited in Europe some years ago, and which was so natural in appearance as to deceive several European writers, but which was really but another example of the burrow of an insect afterwards filled up by a woody growth like the one exhibited. Mr. Hopkins stated, in connection with the work of this insect, that the tree in which the specimen was obtained was in a dying condition, but was evidently being killed by the attacks of the *Agrilus*, which affects living and growing trees rather than those already injured or in a dying condition, as is sometimes thought.

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NOVEMBER 2, 1893.

President Riley in the chair, and twelve members present. Mr. Heidemann presented designs for a seal for the Society. One of the designs was adopted, and Mr. Heidemann was urged to engrave it upon wood. Upon motion, a vote of thanks was extended to Mr. Heidemann for his voluntary services in this matter.

—Prof. Riley read the following :

#### NOTES UPON *BELOSTOMA* AND *BENACUS*.

BY C. V. RILEY.

It is well known that for many years the commoner species of our so-called "electric light bug" was generally referred to

*Belostoma grande*, and, further, that of late years it has come to be known that this was not the true *grande*, and that the commonest species we have belongs to Stal's genus *Benacus* and is Say's *griseus*. This is undoubtedly the common species in this section and throughout the larger portion of the United States, and has received a number of different names, as *haldemanus* Leidy, *harpax* Stal, *ruficeps* Dufour, *distinctum* Dufour, *angustatum* Guer. The *Belostoma* is a relatively rare form, judging from the material in the National Museum, and has also received various names, as *impressum* Haldeman, *litigiosum* Dufour, and *obscurum* Dufour, all of these being synonyms given in Uhler's list. Stal established the genus *Benacus* in 1861 in "Oversigt Vetenskaps-akademiens Forhandlingar," XVIII, Stockholm, upon *Belostoma haldemanum* Leidy, which was described in 1847 (Journal Acad. Phil., New Series I, page 59). Stal's diagnosis is as follows:

*Belostoma* Latr. "Femoribus anticis subtus sulcatis. Articulo basali tarsorum anticorum secundo multo brevior." "

*Benacus* Stal. "Femoribus anticis pro receptione tibiarum haud sulcatis; tarsis anticis articulis aequilongis."

Both characters are obvious upon careful examination, but I may add that the front femora of *Belostoma* are bisulcate their whole length, and that the front tibiae are deeply unisulcate. The two sharp edges of the tibiae fit into the two furrows of the femur when folded together. *Benacus* has, on the contrary, both femora and tibiae rounded. The two genera, as exemplified by these two common species, are otherwise very similar and easily mistaken for each other. *Benacus* on the average is somewhat larger in size and with the body more distinctly widened at the basal third. The paler coloring of the side margins of the thorax and the median vitta are, as a rule, more distinctly relieved and more or less ferruginous. Ventrally there are usually two sub-lateral black stripes. The legs are usually unicolorous and the hind tibiae and tarsi are more expanded than in *Belostoma*. I notice also that in *Belostoma*, in all the species represented in the National Museum collection, the middle and hind tibiae are usually spotted or banded. All the mere colorational characters, however, vary considerably, and realizing the great variation and especially the great sexual differences that occur in many of the aquatic Heteroptera, which is particularly exemplified in *Rheumatobates rileyi*, it occurred to me that the supposed generic differences might possibly be sexual. This suspicion appeared to me all the more plausible from the fact that, in looking over the literature at hand, I could not find that the sexual differences had been pointed out. I was, therefore, quite interested in ascer-

taining what the sexual differences in these large Belostomatidæ were, and have recently had specimens of *Benacus* softened and dissected with a view of ascertaining. These examinations show conclusively that both sexes occur in *Benacus* proper, and that the differences between the two genera are, therefore, not sexual. The only external indication of the sexes is that the tip of the abdomen in the male is whole, while in the female it is slightly notched, and with a small thorn on either end of the notch. There is no difference in the length of the long appendages nor in their shape, but the genital hooks and the cerci of the male are well pronounced and are replaced in the female by mere plates. Specimens illustrating these structures are herewith exhibited. Seven species of *Belostoma* are recognized by Uhler from the United States and the West Indies, while in the genus *Benacus* we have but the one species. Say describes his *Belostoma grisea* as "beneath with three blackish vittæ." This points to *Benacus*, and Uhler has so included it in his check list. Otherwise Say's description would not indicate which of the two insects he had reference to. Stal took Say's species to be the northern species of *Belostoma* (*sensu stricto*) and therefore kept Leidy's name *haldemanus* for *Benacus*. I once sent

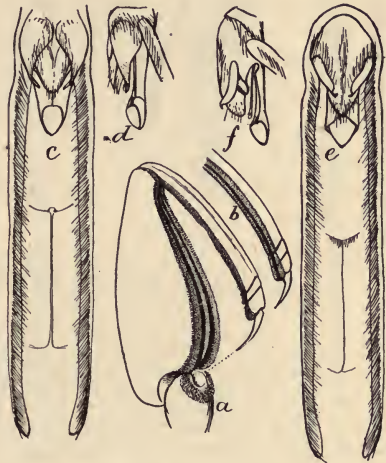


FIG. 4.—*BELOSTOMA AMERICANUM*: *a*, front leg; *b*, front tibia and tarsus; *c*, tip of abdomen of female, dorsal view, with wings and dorsal membrane removed; *d*, genitalia of same, lateral view; *e*, *f*, same parts of male.

specimens of *Benacus griseus* to Prof. Montandon, who corrected the name to *Benacus haldemanus*, evidently accepting Stal's determination. Packard in his "Guide to the Study of Insects," page 537, mentions the two species as follows: "*Belostoma haldemanum* Leidy is not uncommon in our waters. It is  $3\frac{1}{2}$  inches in length and has black patches on the under side of the body, while in *B. grisea* Say the under side is unspotted." The first reference is undoubtedly to *Benacus griseus*, and the second to *Belostoma americanum*. I refer to Packard because his statement indicates how very generally the two insects were confounded by entomologists, so that even in our leading *Guide*

the structural differences were overlooked. It is evident that the insect figured by me in the *American Entomologist* (Vol. I, Fig. 106) and in the Ninth Report on the Insects of Missouri

(Fig. 33) as *Belostoma grandis* was really *Benacus griseus*, and the eggs figured (Fig. 32) in connection with the former species, as probably belonging to it, evidently belong to the latter, judging from dissections recently made.

In figures 4 and 5 the differences in the femora and tibiae between the two genera are illustrated, as also the genitalia of both sexes. The femoral grooves of *Belostoma* seem to vary somewhat in intensity with different individuals, and moreover the two grooves in the same individual vary somewhat in width. An important feature in this species

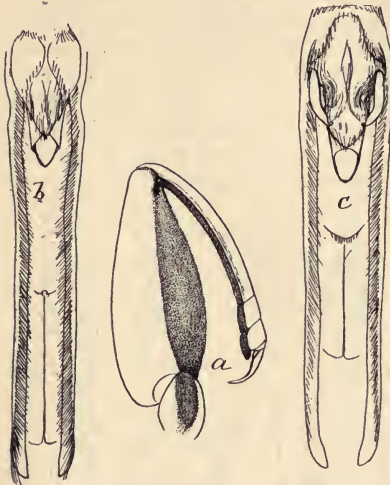


FIG. 5.—*BENACUS GRISEUS*: *a*, front leg; *b*, tip of abdomen of female, dorsal view, the wings and dorsal membrane removed; *c*, do. of male.

not previously mentioned is the smooth cavity or pit on the inner border of the coxa where it articulates with the femur, as shown in figure 4, *a*. It is against this surface that the tarsal claw impinges when the tibia is closed upon the femur. With *Benacus* there is no sign of this articulating facet, the inferior surface of the coxa remaining convex and roughened as shown in figure 5. The outer and upper end of the clypeus in *Benacus* is velvety and dark-colored. In the majority of specimens of *Belostoma* this spot is lighter in color, and only occasionally velvety in appearance. The genitalia of the two forms, when a large series is examined, are very close in structure, as shown in the figures. After examination, however, of a large number of specimens, the distinctions indicated in the drawings 4, *c* and 5, *e* seem to be reasonably constant in the male sex, while the differences shown between 4, *c* and 5, *b* are largely caused by the protrusion of the central organ. The figures represent a dorsal view, after the wings and the dorsal plates of the abdomen have been removed, while the lines between the appendages indicate the tip of the abdomen, and of the lateral expansions, beneath.