NOTES ON THE GIANT WATER BUGS

(Lethocerus and Benacus—Belostomatidæ Hemiptera)

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Two papers have appeared recently on *Lethocerus americanus* Leidy. One by W. E. Hoffman¹ and the other by J. R. de la Torre-Bueno.² These remind me of some notes that were taken several years ago and may be of interest. In view of the rather wide popular interest in these huge "electric light bugs" it is strange that no one has given us a monograph of even the American forms. *Benacus griseus* Say and species of *Lethocerus* often attract attention as they fly about street lights and are sent to the entomologist for determination. A good key for the identification of these forms would be most acceptable.

These notes concern the flight of giant water bugs at Lawrence, Kansas, in May 1920, and some notes on the hatching process in one species. We had occasion to use a large number of these bugs in our studies and, therefore, made some effort to collect them. The notes on the collection of insects about the street lights in May 1920 show periods when the Giant Water Bugs were most abundant in flight.

Most of the collecting was done about two street lights. At 8th and Maine Streets 50 *Benacus griseus* Say were taken during the evening of May 5th. The bugs were brought to the laboratory alive in a cloth bag. They made a wheezing noise when disturbed and emitted a decidedly fishy odor. It will be noted below that *Benacus griseus* Say was much more abundant than *Lethocerus americanus* Leidy.

¹W. E. Hoffman, Biological Notes on *Lethocerus americanus*, Psyche XXXI, pp. 175-183, 1924.

²J. R. de la Torre-Bueno, The Last Moults in *Lethocerus americanus* Say Entom. News, Vol. XXXV, p. 369-370, 1924.

Collections of Belostomatidæ at street lights in Lawrence, Kansas, May 1920:

<i>Benacus griseus</i>			<i>Lethocerus americanus</i>	
Date	Male	Female	Male	Female
May 5th	44	57		
May 8th	9	7	1	
May 9th	22	29		
May 21st	9	12	5	
May 22nd	29	16	4	1
Total	113	121	10	1

Some of these bugs were paired and placed in aquaria and numerous egg batches secured. The number of eggs in a mass ranged from 8 to 17 and were placed on supports above the water. In one instance a female laid 17 eggs upon the back of the male. These were attached to the right wing cover near its tip and the male, when discovered, was resting high and dry above the water on the screening of the cage. Most of the egg masses were attacked and sucked dry by the bugs themselves. The eggs when protected from their forebearers have the appearance of those photographed by Dr. J. G. Needham.³ They undergo an astonishing increase in size as they develop. One egg, measured the day it was laid (May 10th), was 4.5 mm. long by 2.25 mm. in diameter. Shortly before it hatched (May 22nd) it measured 6.57 mm. long and 2.87 mm. in diameter. The newly deposited egg has the same color as I have noted for *Lethocerus uhleri* and, if left in the water, does not color up very well. If placed in the air, it becomes longitudinally striped with brown as described by Doctor Needham. The surface is irregularly hexagonally reticulate, the gray and brown being laid down as units. Each hexagonal figure is of a single color, reminding one of the mosaic of a tile floor.

The hatching process is very interesting. I was fortunate

³J. G. Needham, The Eggs of *Benacus* and Their Hatching, Entom. News, Vol. XVII, p. 113, 1907.

enough to be watching an egg through the binocular when the cap at the cephalic end of the egg popped loose and the nymph began its emergence.⁴ The cap was forced up by a bubble confined by a delicate transparent membrane. After the cap was raised by the bubble-like device the head of the bug slowly advanced into the space delimited by the membrane of the bubble which then burst and rumbled up about the opening of the egg shell. This was not the post-natal molt, for when the bug was nearly out of the shell it was still enshrouded by a delicate garment that embraced each limb separately and was shed as the last rite in the hatching process.

Mr. Hoffman, who studied *Lethocerus americanus* Leidy in Minnesota, failed to find the eggs in two seasons' search. On July 20, 1921, at Como Park, St. Paul, Minnesota, I found an egg mass on a dried cattail stalk. The stalk was inclined a few degrees from the perpendicular and on the lower side about six inches above the water surface was found the egg cluster. It consisted of 119 eggs arranged in 6 longitudinal rows and measured 2 inches long and $\frac{1}{2}$ inch wide. The cattail stalk was brought to the laboratory and placed in an aquarium jar. The following morning several eggs had hatched and some were in the process of hatching. At this stage the photograph submitted herewith was made. The nymphs had the groove in the anterior femora which is characteristic of the genus *Lethocerus* and in all probability they belonged to the species *L. americanus* Leidy.

⁴J. H. Fabre, Etudes sur l'instinct et les moeurs des insectes, *Souvenirs Entomologiques*, 18 serie, p. 99, 1903. Gives charming account of emerging of *Reduvius personatus*.

HUNGERFORD: EGGS OF BELOSTOMATIDAE

EXPLANATION OF PLATE II.

Eggs of Belostomatidæ.

- Fig. 1. Dorsal view of male of *Belostoma flumineum* Say bearing eggs.
- Fig. 2. Egg cluster of *Lethocerus americanus* Leidy a little enlarged. Note the hatching bug not yet out of its post-natal molt and the one that has completely emerged. There were 119 eggs in this cluster, arranged roughly in 6 rows. Each egg measured 4.5 mm. long and 2.25 mm. in diameter. The eggs are gray with the free or cephalic end blotched with brown, more especially on the exposed side of the egg which is on the ventral side of the embryo as it emerges. The micropylar area is elongate, light in color and surrounded by a brown band. Pale streaks radiate from this area arranging the irregular brown spots in more or less definite rows. Compare the markings of these eggs with that of the one on the right.
- Fig. 3. Hatching egg of *Benacus griseus* Say: (a) The micropylar area. (b) Indicates the space on the head between the eyes that pulsates sharply and at irregular intervals. Appears to have something to do with the inflation of the bubble which lifts the egg cap. (c) The eye. (d) The thin transparent membrane that confines the bubble. (e) The space not yet filled by the advancing embryo. Soon the bug occupies this space and disrupts the membrane (d) which crumples about the egg shell at (f). Copied by Miss Kathleen Doering from a pencil sketch by the writer.