

TWO WAYS OF SONG COMMUNICATION AMONG OUR NORTH AMERICAN CICADAS

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It has been stated that all our North American male cicadas can sing, and that they, as well as the females, possess a well-developed auditory apparatus, which is reduced in size in the female. The sound-producing organs of the males in most of the genera, are highly complicated mechanisms, while in other genera the insects click their wings and thus attract one another after the manner of some Orthoptera. This has been more or less a matter of observation for a considerable number of years, but additional interesting evidence can now be offered.

Platypedia areolata was described as *Cicada areolata* by P. R. Uhler in Proceedings of the Academy of Natural Sciences of Philadelphia, 1861, p. 285, and it is there stated that: "the drums and sonory apparatus are merely rudimental. Length 21 millims, Alar expanse 50 millims. Found east of Fort Colville in Washington Territory. This species is very remarkable from the abortive appearance of the drums, and it is highly probable that the species is without a note. In the specimens noticed and captured, no note was observed to be produced."

Cicada putnami Uhler, was described in Bull. U. S. Geological and Geographical Survey of the Territories, 1877, p. 455, from specimens collected near Clear Creek, Colorado, July 2, 1872, by J. Duncan Putnam, who, at the meeting of the Davenport Academy of Natural Sciences of January 31, 1879, stated that it occurred in considerable numbers on some small aspen trees growing close to the water. He added: "The male makes a very faint chirp, differing entirely from any other cicada I have ever heard."

In Entomologica Americana, vol. IV, p. 23, 1888, P. R. Uhler described the Genus *Platypedia*, with *areolata* as type, and mentioned *putnami* and *minor* (p. 88) as other members of the new genus. "Sonorous valves of the male rudimentary inconspicuous," is given as one of the characters of the genus.

Since 1888 a considerable number of cicadas belonging to the genus *Platypedia* and the related genus *Neoplatypedia*, have been described from the western portion of the United States and from Mexico. Some of the named forms may ultimately be considered geographic races or color forms. During the past 35 years or more, the writer has accumulated a considerable collection of *Platypedia*, and many of the collectors, who kindly sent the specimens, have noted the clicking sounds produced when the insects were active. It may be of value to refer to some of these observations by way of arousing an interest in a matter that should receive further attention.

On June 16, 1913, Prof. C. H. Kennedy, collected five *Platypedia areolata*, which he wrote were taken on alder sumach and balsam trees along Logy Creek, Yakima County, Washington. "Their call is not like the 17-year form, nor like the eastern harvest flies, but consists of just a few clicks. Until I stumbled onto one clicking it had not occurred to me that they were cicadas."

In his "Preliminary Review of the West Coast Cicadidae," JOURNAL, N. Y. ENT. SOC., March, 1915, Mr. E. P. Van Duzee refers to *Platypedia vanduzeei* Davis, identified by him at the time as *P. minor* Uhler, as follows: "This distinct little species seems to be confined to the southern portion of the state (California), where it is very abundant at times. It is found on grassy hillsides from the last of March to about the first of July, where it may generally be found resting on the stems of the sage brush. It has a short peeping note which is difficult to locate."

On June 15, 1918, Mr. Warren Knaus collected two male and five female *Platypedia mohavensis* Davis, 4 miles S.E. of Santa Fe, N. M., on the old Santa Fe Trail, 7,000 feet, on scrub pine and cedar. He stated that they: "did not attempt to fly, except an occasional short flight; did not sing, but made a snap, snap, snap, snap, snap noise."

Dr. Frank E. Lutz collected on June 13, 1919, thirteen males and nine females of *Platypedia putnami* at Starkville, Colorado, about 6,800 feet, and noted that their song was a: "clicking sound; about eight clicks, rapid at first but slowing."

Dr. B. B. Fulton wrote concerning *Platypedia areolata* Uhler, collected by him at Ashland, Oregon, June 11, 1922, that it:

"makes a very insignificant sound, a faint ticking sound repeated 6 or 7 times, and sounds very much like snapping the thumb nails one off the other. They were in the dense brush of Manzanita, etc., and very hard to get close to."

Mr. Douglas K. Duncan, writing of *Platypedia putnami* var. *lutea* Davis, that he collected along Horton Creek, 22 m. north of Payson, Arizona, 6,000 feet, June, 1927, stated that: "they did not sing but made a funny clicking noise, not very loud, but with thousands, there was a very noticeable noise." They were mostly taken on cedar trees although in the hot part of the day they appeared to be on most anything and hard to take. As the sun dropped and the chill of night came on, they came down and were in numbers on the small cedar trees or brush, sometimes five or six on a single tree clinging to the main trunk. They could then be picked off of the trunk, and if missed they would merely drop to the ground and make no attempt to fly.

Professor Sherman C. Bishop, writing of *Platypedia mohavensis* Davis, collected 5 m. west of Ojo Caliente, N. M., June 21, 1930, stated that the little fellows: "make a ticking sound—tick-tick-tick-tick, that can be closely imitated by tapping a dime on a nickel."

Mr. Alonzo C. Davis collected *Platypedia laticapitata* Davis, at Pasadena, Calif., June 22, 1930, and *Platypedia vanduzeei* at San Juan Capistrano, Calif., June 4, 1930, and stated: "The *Platypedia* I found very wary. They sound exactly like some one winding a watch."

Dr. Raymond H. Beamer, who has kindly sent many cicadas for examination, wrote of the *Platypedia putnami* found along Poudre River, 35 miles from Fort Collins, Colorado, in June, 1931, that he found many nests freshly made in green twigs. Mating pairs were seen. Females predominated five or six to one. Sang from five-thirty A.M. to eight P.M. in all kinds of trees about camp. "Song is even in pitch—just clicking sound. Both sexes easily taken with fingers by approaching limb slowly." Later *putnami* was taken on sagebrush-covered hillside instead of by the river.

Mr. R. T. Kellogg sent 9 males and 22 females of *Platypedia putnami*, taken at Indian Creek, north end of Animas Mountains,

N. M., June 5, 1935, Alt. 6,000 feet. They were feeding on Mountain Mahogany, Oak and other cañon vegetation. The only sound he could detect: "was a faint click-click."

Mr. Franklin T. Scott, collected 8 males and 2 females of *Platypedia scotti* Davis, at Kaweah, Tulare County, Calif., May 25, 1937, and wrote that they were hard to catch as they were in thick brush and made only: "a small clicking sound."

Dr. John W. Sugden on July 2, 1931, wrote concerning *Platypedia mohavensis*, collected at Mt. Carmel, Utah, June 5, 1931, that they were in large numbers, and that: "Both sexes would make a clicking sound by flicking the wings."

In his interesting observations on "Characteristics of Certain Western Cicadas, JOURNAL, N. Y. ENT. SOC., June 1940, Dr. Sugden again states that both sexes of *Platypedia mohavensis* make: "a clicking sound by flicking the wings, and because of the large number, the sound resembled a shower of hail or shot dropped on wrapping paper. These insects were not singing."

On page 125, he also records that: "Both *Platypedia putnami lutea* and *Neoplatypedia constricta* were collected in South Willow Creek Canyon, Tooele County, Utah. On May 24, 1931, only the former had emerged, and the next month (June 14, 1931) both were present. The songs were similar, not loud, and: "both sexes of both species were making the wing-clicking sounds."

On June 27, 1919, Dr. F. E. Lutz collected 15 males and 22 females of *Neoplatypedia constricta* at Bondad, Colorado, and noted at the time that the song was a zip, zip, zip, continued for a long time. (JOURNAL, N. Y. ENT. SOC., June, 1920, p. 124, and March, 1921, p. 55.)

In the March, 1943, number of the JOURNAL N. Y. ENTOMOLOGICAL SOCIETY, Dr. Kan-Fan Chen, in writing of Chinese Cicadas, adds: "In the more primitive genera *Platypedia* and *Neoplatypedia* of the Nearctic Region, the tympanum is absent, the metepimeron is not prolonged posteriorly to form the operculum, the abdomen is attenuated and the genital plate of the male is lengthened."

It will be noted from the foregoing that Uhler in 1861, thought it probable from the rudimentary character of the drums, that his

Cicada areolata, placed by him in 1888 in his genus *Platypedia*, was unable to sing.

Over the years we have evidence that both the males and females of the Genera *Platypedia* and *Neoplatypedia* flit or crackle their wings, and several of the observers cited above definitely state that they do not sing in the same way as do other cicadas, but that their method of communicating one with the other, resembles that of many species of Orthoptera, and some insects of other orders.

In: "Insect Singers—A Natural History of the Cicadas," p. 79, Dr. J. G. Myers states, that the sound-organs usual in cicadas are confined to the males, but that in *Melampsalta cingulata* of New Zealand, and *M. strepitans*: "there is a wing-clicking produced by both sexes and additional to the males' song. It results from a rapid lateral movement of the wings from the roof-like resting position to one at an acute angle with the body; but the movement is so quick that one cannot be sure whether the noise is produced by friction between tegmina and hind-wings on each side or between one or both pairs and the body. If the latter, then the development of the stridulating areas on the mesonotum of the Tettigadinæ is only a further step in the same direction." On page 213 Dr. Myers continues: "We have seen that *Melampsalta cingulata* and *M. strepitans* females are able to make a wing-clicking sound like that of the males, while the members of the sub-family Tettigadinæ possess a special accessory stridulating organ common to both sexes. There is some evidence that the male is attracted by the female's wing-clicking in the two above New Zealand species."

In the eastern United States it is not an uncommon observation to note the uneasy flutter of the wings when any of our cicadas approach each other, often while singing, as on a limb for instance, and among western species the habit appears to be even more pronounced.

On January 9, 1936, Dr. R. H. Beamer wrote of the *Clidophleps* taken in California the previous summer, when what was later described as *Clidophleps beameri* Davis, was found on Cuyama Ranch along the river of that name. The party collected several species of *Clidophleps*, and referring to their experience

with one of them, Dr. Beamer stated that it had what they took to be two songs. "For a long time it had us fooled into thinking there were two species. They start with a clicking, and then run into a rattle or whir, which is made by the drumming of the wings." His son Jack was able to observe this, until he was satisfied that the apparently two songs were made by the same individual.

In *Clidophleps* the sound-organs are well developed and they can sing after the manner of most of our male cicadas, but the presence of tymbals in *Clidophleps* need not preclude the wing-clicking habit, for we have seen that in *Melampsalta cingulata* there is a wing-clicking produced by both sexes in addition to the males' song.

If the end of the abdomen is missing from a *Platypedia*, it is not always easy to determine the sex of the specimen. If the abdomen is cut off at about the third segment, an interior view of the auditory capsule and accompanying membrane may be had in both sexes. The capsules, as described and figured by Dr. Myers, are on either side of the abdomen in both sexes. Both male and female cicadas can certainly hear, and it is quite an easy matter to note the effect of the music on the insects. However, additional observations on their manner of singing is desirable, especially in the genera *Clidophleps* and *Platypedia*.