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periodical Cicada





Compliments of
C. V. Riley.

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THE SONG NOTES OF THE PERIODICAL CICADA. By Prof. C. V. RILEY, U. S. Entomologist, Washington, D. C. ✓

[ABSTRACT.]

THERE are few more interesting subjects of study than the notes of insects and the different mechanisms by which they are produced. From the day when Aristotle discoursed upon them they have interested every observant entomologist. It is difficult to record them in musical symbols that can be reproduced on musical instruments, some of the more successful and interesting attempts in this direction having been made by Mr. S. H. Scudder. I have studied closely the notes of a number of species and have published some of the observations.¹

In the notes of the true stridulators, more particularly, as the common tree crickets and katydids, I have been impressed with the variation both in the pitch and in the character of the note, dependent on the age of the specimen and the condition of the atmosphere, whether as to moisture, density or temperature. Yet with similarity in these conditions the note of the same species will be constant and easily recognizable.

A few remarks upon *Cicada septendecim* will doubtless prove of interest since the species has this year occupied so much attention. I do not find that the notes have been anywhere very carefully described in detail; nor would I pretend to put them to musical scale. Writing seventeen years ago I described the notes in a general way as follows: "The general noise on approaching the infested woods, is a compromise between that of a distant threshing machine and a distant frog pond. That which they make when disturbed mimics a nest of young snakes or young birds under similar circumstances—a sort of scream. They can also produce a chirp somewhat like that of a cricket, and a very loud shrill screech, prolonged for fifteen or twenty seconds, and gradually increasing in force and then decreasing."²

There are three prevalent noises which, in their blending, go to make the general noise as described above. These are:—

(1). That ordinarily known as *Phar-r-r-r-ah* note. This is the note most often heard during the early maturity of the males and especially from isolated males or from limited numbers. It

¹3rd Rep. Ins. Mo. pp. 14, 153, 154; 4th do. p. 139; 6th do. pp. 150-169.

²1st Rept. Ins. Mo. 1868, p. 24.



is variable in pitch and volume according to the condition just mentioned as generally affecting insect melodists. Its duration averages from two to three seconds and the *aoh* termination is a rather mournful lowering of the general pitch and is also somewhat variable in pitch, distinctness and duration. In a very clear atmosphere and at certain distances an individual note has often recalled that produced by the steam whistle on a fast train especially when about to pass under a tunnel. But when heard in sufficient proximity the rolling nature of the note will undoubtedly remind most persons more of the croaking of certain frogs than of anything else. I have heard it so soft and low and so void of the *aoh* termination that it was the counterpart of that made by *Oecanthus latipennis* Riley late in autumn and when shortened from age and debility of the stridulator.

(2). The loudest note and the one which is undoubtedly most identified with the species in the popular mind, is what may be called the screech. This is the note described by Fitch as: "represented by the letters tsh-e-e-E-E-E-E-e-on, uttered continuously, and prolonged to a quarter or half a minute in length, loud and piercing to the ear, and its termination gradually lowered till the sound expires." Dr. Fitch errs as to the length of its duration and I have also erred in the same direction unless indeed there is a still greater range than my subsequent observations would indicate.³ It is more probable, however, that our memories were at fault, for, as I have verified this year, this *shrill* ordinarily lasts from two to three seconds—though occasionally longer—and is repeated at intervals of every five seconds. This note is rarely made by solitary males or when but few are gathered together, but it is the prevailing note in the height of the season and is made in unison, *i. e.*, the assembled males on a given tree or within a given grove are prompted to it simultaneously, so that its intensity becomes almost deafening at times. It is of the same nature as that made by the dog-day cicada (*Cicada pruniosa* Say) and in its higher and louder soundings is not unlike the commoner shrill of that species, though by no means so continuous. It is what in the distance gives the threshing machine sound and it has often recalled that which I have heard in a saw-mill when a log is being cut crosswise by a circular saw.

³ Since this was written I have heard on two occasions this note prolonged to 20 seconds, but this is very abnormal and I have no other evidence than the season (June 20th) that it belonged to *C. septendecim*.

(3). There is what may be called the intermittent, chirping sound, which consists of a series of fifteen to thirty, but usually about twenty-two, sharp notes sometimes double, lasting in the aggregate about five seconds. This sound is so much like that produced by the barn or chimney swallow (*Hirundo erythrogastra*) that a description of one would answer fairly well for both. It resembles also, though clearer and of higher pitch, the note of *Microcentrus retinervis* (Burm.) which I have likened to the slow turning of a child's wooden rattle highly pitched.

The above notes are, so far as I have observed them, of higher pitch though of less volume in the smaller *cassinii* form.

The other notes, viz., that made when the insect is disturbed and a not infrequent short cry that may be likened to that of a chick, are comparatively unimportant; but no one could do justice to the notes of this insect without describing the three peculiar sounds which I have attempted to describe above and which are commingled in the woods where the species is at all common, though the undulatory screech is by far the most intense and most likely to be remembered.

[The paper concludes with a description of the mechanism by which these various notes are produced, and after referring to the writings on this mechanism of Reaumur, Roesel, Solier, Landois and others, agrees with the earlier authors in considering the notes stridulatory rather than vocal. Riley believes that Landois, one of the last writers, who reversed the previous conclusions and asserted the notes to be vocal and due to the metathoracic spiracles, was essentially wrong. The noise produced is not made as is the buzzing Diptera as Landois concluded, for while the air passages act their part in modulating the vibrations, the source of the noises is found to be in the parchment-like and ribbed drums, a portion of which is made to vibrate with great rapidity by the strong V-shaped muscles located in the abdomen and which have great muscular power so that even after separation from the insect and when pressed with a point held in the hand, they produce such intense vibration that it may be likened to a galvanic shock.]

ON THE PARASITES OF THE HESSIAN FLY. By Prof. C. V. RILEY,
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[ABSTRACT.]

THE paper consists of a digest of a communication on the same

subject now in press in the Proceedings of the U. S. National Museum. It gives the synonymy of *Merisus destructor* (Say), showing the difficulty that has been encountered in the past in properly locating the species generically. It then reviews what was known of the habits of the species by earlier authors and, on account of the insufficiency of previous descriptions, gives a full and detailed description. The descriptions of Herrick, Fitch and Packard are shown to refer to this species rather than to any other so far known. The species never occurs in the apterous condition.

Merisus (Homoporus) subapterus n. sp. is then described and separated from *destructor*, the wingless specimens referred to by Say and Herrick under this last species being considered as belonging to *subapterus*. *Subapterus* is, exceptionally, winged. *Destructor* is, on an average, of smaller size, more uniformly metallic in color; has a flatter abdomen with yellowish spot at base; has the antennæ similar in both sexes and either pale brown or blackish-brown; has the coxæ metallic black, the femora brown or black except towards tip, the paler parts of the legs whiter than in *subapterus*, and does not, so far as we now know, occur in the apterous condition.

Subapterus is, on the average, larger; of darker color and less metallic, with the flagellum of the antennæ pale in the male and black in the female; the abdomen much more rounded and without the pale spot; the coxæ, trochanters, femora and basal part of tibiæ honey-yellow. It occurs mostly in the wingless condition.

The paper next treats of *Eupelmus allynii* French, showing that it is parasitic on both *Isosoma hordei* and *I. tritici* as well as on the Hessian fly. The phytophagic habit of this genus is then shown and the experience of the author is given in breeding species from Lepidopterous eggs, from Orthopterous eggs, from Hemipterous eggs, from Cynipid galls, from Lepidopterous larvæ, from Coleopterous larvæ and from free Cecidomyid larvæ.

Tetrastichus productus n. sp. is described and the inference drawn from the habits of the genus that it may be a secondary parasite.

Platygaster herrickii Packard is then treated of with the conclusion that *P. error* Fitch is parasitic on some other insect and not on the Hessian fly. The statements of both Herrick and Prof. A. J. Cook are then considered in reference to the oviposition of this species in the eggs of the Hessian fly. The author, while disinclined to oppose direct observations when asserted, even when

such conflict with all that has before been known or with universal rule, still feels that the observations need verification and that it is probable that both Herrick and Cook mistook the young Hessian fly larvæ for the eggs.

Another species of *Tetrastichus*, to which Prof. S. A. Forbes has given the MS. name of *carinatus*, is briefly referred to as being in all probability a secondary parasite, and a single *Microgaster* is mentioned which is not described, as some doubt exists as to whether it is parasitic on the Hessian fly, although bred from straw infested by this last. •

SOME POPULAR FALLACIES AND SOME NEW FACTS REGARDING *CICADA*
SEPTENDECIM L. By Prof. C. V. RILEY, U. S. Entomologist,
Washington, D. C.

[ABSTRACT.]

AMONG erroneous notions, the author mentioned the prevalent ones that the variety *cassinii* Fisher represents the race *tredecim* Riley, and that the twigs to which eggs are consigned must necessarily break off or die to insure the hatching of the larva.

The author then gave a number of exact facts from recent observations in the life history of the species, both below and above ground



