

THE SONGS OF OUR GRASSHOPPERS AND CRICKETS.

BY SAMUEL H. SCUDDER.

Everyone is familiar in a general way with the songs of our common meadow grasshoppers and of our crickets. But not everyone is aware that much as with birds each different species may ordinarily be distinguished by its peculiar note or call, if sufficiently close attention is paid to it. Moreover, just as one may recognize in a strange song the general group to which a bird belongs, so in many cases one may tell the group to which a given insect belongs whose note is heard for the first time. Indeed every vocal family of animals utters its distinctive cry. In general the crickets have the highest pitched notes and the short-horned grasshoppers or Acridians the lowest, the long-horned grasshoppers or Locustarians falling between them.

Thus each large family group of the Saltatorial or stridulating Orthoptera* may be recognized by the peculiar pitch of its note. This is perhaps due to the extent of the delicate vibrating membrane of the wings which is brought into action, since this is largest in the crickets and smallest and much broken in the Acridians.

But there is not infrequently some difficulty in distinguishing the song. Indeed in some cases the notes are too shrill to be heard by some ears; they are beyond their limits of audition. "Crossing the Wengern Alp with a friend," writes Tyndall in his work on Sound, "the grass on each side of the path swarmed with insects, which, to me, rent the air with their shrill chirruping. My friend heard nothing of this, the insect world lying beyond his limit of audition." So when I first went to Europe and heard the song of an Orthopteran new to me, I asked a distinguished student of Orthoptera, walking with me by the bush from whence a volume of strident song burst forth, what genus it was; but he could hear no sound whatever.

Or, again, the notes may be very feeble and be overwhelmed by the volume of other shrilling in the neighborhood. To distinguish them clearly, one must bring his ear to within a few feet, or even inches, of the insect during its stridulation—a process which requires great caution lest the shyness of the little violinist should overcome his egotistic love of song. The observer must walk quietly toward the sound until it ceases, and wait motionless for its renewal; the direction of the chirping can then easily be determined, although its distance is deceptive. After drawing an imaginary line towards the spot from whence the sound proceeds, cautious steps must be taken around the arc of a wide circle until another line is fixed at about a right angle to the first, and the location of the songster approximately determined. Then walking quickly but quietly to within five or six feet of the insect, the observer will fall upon his hands and knees, and produce a quill edge and file, which, on being rubbed together imitate, with great exactness, the note he has just heard. He will begin his mock stridulation after a short delay; at first the sounds must be subdued and separated by considerable intervals, then loud and repeated in quick succession; usually a response is heard before a minute has elapsed, and sometimes it comes at once. When the insect has forgotten his fears and begins to stridulate violently, the observer may cease operations and carefully approach him. In this way one can place himself within a few inches of any species living in the grass.

Orthoptera stridulate in four different ways: first, by rubbing the base of one wing-cover upon the other, using for that purpose the veins running through the middle of the wing; second, by a similar method, but using the veins of the inner part of the wing; third, by rubbing the inner surface of the hind femora against the outer surface of the wing covers; and fourth, by rubbing together the upper surface of the front edge of the wings and the under surface of the wing covers.† The insects which employ the

* Very few other Orthoptera stridulate at all.

† A modification of this is given below under *Dictyophorus reticulatus*.

fourth method belong the crickets of Acridians. may say:

Crickets

Locustarians

Acridians

In the following species in this order. It is clearer by the notation in the time limits always at one (flute), there is, the bird, and a second of time note ♪, or a c sixteenth rest. I have introduced a new formula as a measure.

Gryllotalpa usually begins actively at about three o'clock; and the more so in its burrow. A cricket (*Gryllotalpa*) (*plerumque* sub air in chanting tone, as if produced by two hundred surface, is easily could be heard, sound, like grü

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three minutes, and the notes are usually many are singing; it gives a single character of the chirp. When most active its full swell, and steadily gains its