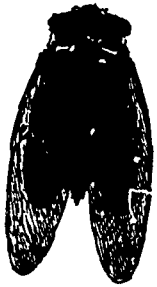


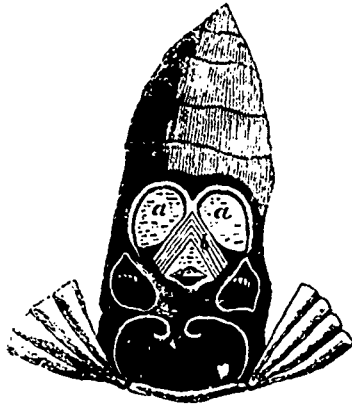
are agreeably forced upon one during a sojourn in another and a distant land. My insect collecting days are not likely to be resumed in this country, and with a view to preserve the records of my early labors, the great bulk of my collection is now deposited in the Museum of the Literary and Philosophical Society of St. Andrew's, in Fifeshire, the country from whence my paternal ancestors came.

Of the Canadian insects which emit sounds, unquestionably the most remarkable is the *Cicada* or Tree-hopper, which sings loudly during the hot months of summer, and in some localities, especially in large gardens, and groves of bushes, exists in great numbers. Its shrill chirping may be heard during the greater part of the day, when the sun is shining, and the insect may be found sitting on the leaves or small branches of trees, occasionally on the fences, in all of which situations I have captured them.



Tree-hopper (1).

(*Cicada canicularis*).
Natural size.



Drums of Tree-hopper.

a a the outer drums; b the muscular strings; c c the inner drums.

This insect is not a grass-hopper, as its name is erroneously translated from the writings of Pliny and others, but belongs to the first family of the Homopterous Hemiptera. It has a pair of transparent wings and wing covers, and a shining black body; the largest Montreal specimens measure 3 inches and 3 lines with extended wings, and the body 9 lines and a-half. Their general expansion is from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches, and the veins of the wings are of a green and orange colour. They are not found in such large numbers in Canada as in the United States, where it is said such immense numbers are sometimes congregated, as to "bend and even break down the limbs of trees by their weight, and the woods resound with the din of their discordant drums from morn to eve." On the most careful comparison between the Canadian and European species of this insect, I find there is not the slightest appreciable difference in the formation of the musical instrument or particular organ, which is present in the males only on each side of the base of the abdomen, by means of which is produced a sort of monotonous and noisy music, which has led to their being termed by many authors "chanteuses" or singers.

It consists of 2 pairs of large plates fixed to the trunk between the abdomen and hind legs, these form a large exterior moveable cartilaginous curtain or membrane, which, when raised, exposes a cavity, part of which seems to extend into the abdomen, and part to be covered with a second thin and pellucid membrane, much more delicate than the exterior one, and tensely stretched, plicated and iridescent. In the middle there is a horny plate running horizontally across the bottom. It is this iridescent membrane which is acted upon internally by a bundle of muscular strings which throw into rapid vibration, and thus gives rise to the sound. The minute muscular strings are attached by one extremity to another membrane in the interior, which is presumed to be the true drum, from the fact, that when Reaumur, (2) who is describing the mechanism of the sound produced, compares it to that issuing through an opening like that of the larynx of quadrupeds, or the sound-hole of a violin.

(1) Several species of *Cicada* inhabit the United States and Canada. The larvae live under ground on the roots of trees to which they are occasionally injurious. Dr. Harris in his treatise "On insects injurious to Vegetation," gives an interesting history of the above and several other species.—Eds.

(2) See Cuvier's Animal Kingdom 1849, page 569 for a more minute and strictly anatomical account.

This most curious apparatus has attracted the attention of many of the most celebrated physiologists, and a desire is manifested on the part of some of them to know whether any actual difference exists in its construction in *Cicada*, existing in other parts of the world besides Europe. As Greece and Italy are the two countries in which it abounds, the familiarity with its history evinced by Anacreon, Aristotle, Virgil, and some other ancient authors is fully explained. There can be no doubt that Aristotle refers to the *Cicada*, when he speaks of the voices of insects, especially of "a shrill, long-drawn note, like the grass-hopper." Pliny speaks of the *Cicada*, but there is no doubt that he, as well as Aristotle has confounded grass and tree-hoppers together.

Whether the sound is pleasing to the ear is a question; assuredly when it proceeds from a number, its shrillness and frequent repetition becomes fatiguing. I cannot say that it was displeasing to myself, perhaps because my curiosity was amply repaid by its capture and examination of the insect, and because I wondered, in common with others, that such a shrill and loud sound should proceed from such a small creature: its music being more audible than that of many birds. In the forest of South America at certain periods of the day nothing is heard but a loud and uninterrupted ringing or humming noise, produced by various insects, in which the notes of the *Cicada* predominate. Kirby and Spence mention on the authority of Captain Hancock, that the Brazilian *Cicada*, sing so loud as to be heard at the distance of a mile, which is as if a man of ordinary stature possessed a voice that could be heard all over the world. That its voice is very much louder than our Canadian species, may very well be understood, when it is remembered that the Brazilian *Cicada* is a much larger species, and I am informed that its drum is similar to the one which has been described. The use of the music as in crickets, and other insects, conclusively shows that if the precise organ of hearing has not been definitely recognized in them, it at any rate is most assuredly not absent. Newman has observed, "to what purpose would the merry cricket sing his evening song, if there were none of his kind to listen to and admire it?"

Any one who has walked across a Canadian meadow or pasture land, in the summer time, or over a hay field, particularly after the hay has been cut and removed, must have observed the countless numbers of grass-hoppers, locusts, crickets, and other insects, which hop across his path, and produce with their united voices a chirping noise not easily forgotten. Some of the locusts possess yellow wings with a black border, and as they fly, produce a sort of loud snapping noise, which is very peculiar. (1) This is produced by the attrition of the anterior pairs of wings against each other, one of the nervures being furnished with a rough file-like edge, which is made to pass over the nervures of the opposite wing; and the sound is augmented by the resonance of a certain part of the wing, that is surrounded by peculiarly strong nervures, between which the thin membrane is tightly stretched, so that it acts as a tympanum or drum. In other species of Canadian locusts there exists on each side of the body near the base of the abdomen, a large cavity, closed on the inside by a very thin pellicle, which has some influence in the production of chirping, or possibly as has been supposed in flight. It is in this respect analogous to the tree-hoppers, and may be compared to a kind of tambour or drum. The opening left by the pellicle, which answers the purpose of a lid, is crescentic in shape, and at the bottom of the cavity may be seen a white membrane shining like a mirror and tensely stretched. The apparatus as described by De Geer, may be seen in the second volume of the Pictorial Museum of Animated Nature, page 340. Fig. 3389.

Many varieties of the grass-hopper and locust may be captured in the gardens and fields, and of a considerable size; some of them are destitute of wings, but all are capable of making their own peculiar noises. In a case of South American insects once in my possession there is an immense brown bodied locust, whose extended wings measure 7 inches, the length of the body being 4 inches. It is an example of *Acrydium Latreillei*, the upper wings are green and the lower deep red, bordered with brown, the legs green. (2)

The noise of the flight of an immense swarm of these locusts in South America has been compared by Mr. Darwin to a strong breeze passing through the rigging of a ship. The noise occa-

(1) This insect is called the Rattling Locust *Edipoda sulphurea*, and possesses dusky elitræ. I have noticed the wings vary in colour, but the yellow are the commonest with a black border.

(2) This magnificent case, containing about 250 specimens of exotic and other insects, many of great rarity and beauty, I presented to the Literary and Philosophical Society of St. Andrew's.