

III.—RATE OF CHIRPING.

In producing the sound the wings are raised nearly at a right angle with the body, and then scraped firmly across each other. The sound is either a single chirp, or much more commonly a succession of chirps, which follow one another at regular intervals, and vary in number, in the cases observed by me, from 5 or 6 to 2,640. Six hundred to a thousand is the more usual number. The term "chirp," as used in the following pages, refers to a single element of such a series. If the rate of chirping is 120 per minute, the chirps occur at intervals of half a second. I have estimated that one-third of this time, or one-sixth of a second, is occupied in producing the sound, while the remainder is the period of silence between chirps. If the rate is only 60 per minute, the time occupied by the sound is one-third of a second. The rate of sound vibration in this case is much slower, and the pitch is correspondingly lower.

a.—EFFECT OF TEMPERATURE ON RATE.

From the hundreds of observations made, a representative group is shown in Table I. The temperatures are those at an elevation of six feet, the average elevation of the insects. The temperature at two feet elevation was generally about half a degree lower, that at ten feet half a degree higher than that at six feet elevation. The temperatures computed from Dolbear's and Bessey's formulas are added for comparison.

Table I.—Showing rates of chirping of various individuals of *Cecanthus niveus* at different temperatures and elevations :

Date.	Number of chirps per minute, individuals of <i>Cecanthus niveus</i> .	Elevation of individual above ground, in feet.	Temperature in degrees Fahrenheit.		
			Computed from Dolbear's formula.	Observed at elevation of six feet.	Computed from Bessey's formula.
Aug. 22...	144	—	76.0	75.8	71.06
Aug. 23...	156	6	79.0	74.9	73.62
Aug. 24...	174	6	83.5	78.8	77.45
Aug. 27...	93	6	63.25	60.4	60.21
Aug. 28...	82	4	60.5	61.5	57.87
	93	2	63.25		60.21
	96	2	64.0		60.85
Sept 7....	100	3	65.0	69.9	61.70
	102	8	65.5		62.13
	110	10	67.5		63.83