THE TEGMINAL POSITION IN GRYLLUS.

BY FRANK E. LUTZ, COLD SPRING HARBOUR, LONG ISLAND, N. Y.

In Chap. X of the Descent of Man, Darwin says that when the male of *Gryllus campestris* is chirping, "first one wing is rubbed over the other, and then the movement is reversed." I have carefully observed several hundred males of our native Gryllus, and it seems to me that one tegmen ("wing") is always uppermost. This is, at first sight, a very minor point, but it leads to some rather interesting thoughts.

Among crickets one tegmen when at rest overlaps the other along the median dorsal line. Among the males, as shown below, it is usually the right tegmen that is placed over the left, while among the females there is a much nearer approach to equality of the two conditions. Thus :

LOCALITY.	♀.				♂.			
	Right Uppermost.		Left Uppermost.		Right Uppermost.		Left Uppermost.	
	No.	%	No.	%	No.	%	No.	%
Perkins Cove, Me., Fall 1904. . .	106	67.5	51	32.5	135	97.8	3	2.2
New Fane, Ver., Fall 1904	14	43.8	18	56.2				
Cold Spring Harbour, N.Y., Fall '04	450	65.9	233	34.1	433	98.4	7	1.6
Gotha, Fla., Fall 1903	53	72.6	20	27.4	34	100.	0	0.0
Gotha, Fla., Spring 1904	119	71.3	48	28.7	83	98.8	1	1.2

During the season of 1905 I had under observation in the laboratory about 100 each of males and females of our native Gryllus. Of these males, when left to themselves, every one kept for the rest of his life the tegminal position he had when he became mature. The females, however, frequently changed theirs. Thus, to take two successive records, which are typical :

No. 190. Matured Aug. 7, **L** ; Aug. 19, **R** ; Aug. 23, **L** ; Sept. 5, **R** ; died Sept. 14, **R**.

No. 191. Matured Aug. 5, **R** ; Aug. 19, **L** ; Aug. 23, **L** ; Sept. 5, **R** ; died Sept. 9, **R**.

If we take a male after the chitin of the tegmina has hardened, and reverse the tegminal position—say, change **R** to **L**—he will almost immediately show signs of uneasiness, raise his tegmina, and move them

June, 1906

back and forth until he has succeeded in changing them to their original position. If, however, we make the change as soon as he has moulted, and while the tegmina are still soft, the new position will be retained after they are hardened. If we now attempt to change them back to the natural position the cricket will return them to the unnatural one. As far as I could tell, such a cricket could chirp just as well as one whose tegmina had not been tampered with, although he was using the sound-producing organ which would naturally not have been used at all. As indicated above, this organ—the “file” on the under side of the left tegmen—is unused in about 98% of our native *Gryllus*, and yet it is, to all appearance, as well developed as the other. I have counted and measured the “teeth,” studied the venation of the “drum,” and, in short, have failed to discover any significant difference between the sound organs of the two tegmina.

In the Locustidæ we find a very different condition. Here there is no file on the right tegmen, and this is *always*—as far as I have seen—carried under the left. However that may be, we have in this very closely-related family, which is really scarcely distinct from the Gryllidæ,* a specialization which is just hinted at (but in the reverse way, *i. e.*, right uppermost) in *Gryllus*. The constant position of the tegmina is here nearly reached, but the unused sound organ is still intact.

The condition of the females is also interesting. It is easy to see a possible reason why the female should change the tegminal position more often than the male. The tegmina do not overlap so far. But why is it that in spite of this, with the exception of the New Fane, Ver., collection, about twice as many have the right tegmen uppermost as otherwise? Is it a lagging behind the males in specialization and an inheritance from them?

The mention of inheritance brings me to the final and most important point. Is the abnormal left-tegmen-uppermost condition inherited? I am trying to test this, but “left-winged” material is very scarce. If it is inherited, and if isolation is a true biologic factor, there ought to be localities where the “left-winged” condition is common, perhaps even prevalent. I made the unfortunate mistake of asking Mr. C. D. Howe, who kindly sent me what I have from New Fane, Ver., for only females, as at that time I was interested chiefly in females, and so I have not, now, any males from that place. Thirty-two is rather a small

*There seem to me to be more fundamental differences between *Gryllotalpa*, *Grylloides* and *Gryllus* than between *Gryllus* and the Locustidæ.

number, but as it gives quite a preponderance of left-tegmen-uppermost, I would not be surprised if we have here an isolated colony where "left-wingedness" in the male is common—a survival of a more generalized state, perhaps. I hope to get more material from there. Meanwhile, I would like to ask those all over the country who have opportunity, to examine the male crickets with this simple point in mind. I would be extremely grateful for any such material or information regarding it. It has a bearing on several very important questions.

A FOSSIL WATER-BUG.

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Among the fossil insects collected at Florissant, Colo., by Judge J. Henderson and Dr. F. Ramaley, of the University of Colorado, is a species of Corixidæ, represented by numerous individuals. It occurred, as Judge Henderson informs me, in the first railroad cutting east of Florissant, a little above the middle of the section there exposed. The shale containing the specimens is very much lighter than that in which the other Florissant fossil insects seen by me are imbedded, and it is believed to belong near the top of the series. It may represent a later period than that in which most of the numerous species described by Scudder lived, and it is certain that the insects now described differ from the three species of Corixidæ described from Florissant.

Corixa Florissantella, n. sp.

Length, $6\frac{1}{3}$ mm.; breadth, $2\frac{1}{4}$ mm.; corium and membrane minutely reticulated, not at all striated; face convex; scutellum concealed by pronotum, except posterior angle; pronotum without visible markings; corium with the margins of the posterior (apical) part rather broadly pallid, and with a broad, more or less distinct transverse dark band just above the beginning of the membrane; just before the dark band is a suffused light band, and in front (basal) of this the corium is dark; membrane black; abdomen ending in a pair of large subtriangular plates, not asymmetrical; swimming (posterior) legs well developed, hairy as usual, extending about $\frac{3}{4}$ mm. beyond end of abdomen. Length of tegmina, $4\frac{1}{2}$ mm.; breadth about 1 mm.; middle legs projecting about 4 mm. beyond body. Florissant. Following Kirkaldy's table (Entomologist, 1905, p. 234) this would seem to be a genuine *Corixa*, but it lacks pale lines on the pronotum. In Scudder's table of the Florissant species, it falls with *C. Vanduzeei*, Scudd., but that differs entirely in the markings, and probably belongs to the genus *Callicorixa*.

June, 1906