

PSYCHE.

A LIST OF THE ORTHOPTERA OF ILLINOIS.—I.

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THE following list is an enumeration of all the species of Orthoptera known to me to occur within the State, as well as those species reported by others but not identified by the writer. Names of the last mentioned class are preceded by an asterisk and accompanied by the name of the person upon whose authority they are inserted. If the species is uncommon, one or more localities in which it has been or is reported to have been captured will be given. The earliest date, known to me, of the appearance of each species will be given and unless otherwise stated this date will be understood to be the recorded time of their appearance or capture at Rock Island, Ill.

GRYLLOIDAE.

1. *Tridactylus apicalis* Say. Urbana, July 7. Quincy, Sept. 6. Found in abundance on a sand bar in the river at the last mentioned place by Mr. C. A. Hart of Illinois University.

*2. *Tridactylus terminalis* Uhler. Southern Illinois (Thomas, Uhler).

3. *Tridactylus minutus* Scudder. Champaign, Aug. 20.

4. *Gryllotalpa columbia* Scudder.

This "long-winged" mole-cricket I have found in a single locality on Rock Island. This place is between Fort Armstrong and the Powder House on the southern side of the Island. Here the shore is flat and sandy and thickly strewn with fragments of bark and wood brought down by the river from the saw-mills at Moline and left on the low shores by the receding water. My attention was attracted the first time I had the good fortune to walk that way by observing that from many of these pieces of bark which were within a few feet of the water a number of little ridges radiated in crooked lines which, however, never seemed to intersect each other. An exploration of these tunnels revealed at the end of almost every one opened a cricket large or small. August.

5. *Gryllotalpa borealis* Burm. I have found this species as early as June 25 in eastern Indiana. Its first appearance about Moline is early in August. At this season of the year at least it is solitary as all the specimens I have captured have been the sole occupants of burrows. Mr. Scudder has compared its song to that of "the distant sound of frogs." I have been struck with the

resemblance of its note to that of *Oecanthus niveus*. To my ear the only discernable difference is that of pitch. This song is a simple chirp, very low in pitch for an orthopteron, repeated at intervals of about a second. This species can be made to eject from their cerci a grayish viscid substance and this substance can be thrown several inches. Of what use this faculty is to the insect I can only conjecture as I have seen the occurrence but twice. That it is protective in character is very probable as the phenomenon has only occurred in my experience when the insect has been very much maltreated. The ejected mass does not have any noticeably bad odor and if it is used to repel the attacks of enemies it is most probably efficient because it entangles the feet and perhaps covers the eyes of the unfriendly insect.

6. *Gryllus luctuosus* Serv. Very rare. I have captured a single specimen at the electric light and on one occasion I allowed a long winged black specimen which could not be referred to any other species, to escape me in the long grass. I have seen another specimen taken by Mr. C. A. Hart at the electric light in Urbana, June 17. All the specimens I have seen from Illinois are decidedly smaller than specimens from Florida and than those whose dimensions are given by Saussure.

7. *Gryllus pennsylvanicus* Burm. Moline, June 3. This species may be, as Mr. Saussure is inclined to believe, a short-winged form of the preceding species. Except for the shortened or

abortive wings it is scarcely different from *G. luctuosus*, which is abundant southward and very rare in the northern States and Canada. From Maryland to Massachusetts and Northern Illinois *G. pennsylvanicus* is common but it is not reported from Canada and is probably not found as far north as Maine. The species of the genus are so extremely variable and consequently so difficult to separate that the whole subject is in much doubt. This confusion has been so great that I am inclined to think that the habits of entirely different species have been confused so as to lead to serious misunderstanding and worse confusion. I advance my opinion on this point however with the greatest hesitation and I am free to acknowledge that I do not feel entirely sure in my own mind of my conclusions.

In speaking of the habits of these Orthoptera a late writer, Mr. Lawrence Bruner, says: "Usually most of our North American Grylli live singly or in pairs in burrows which they dig for themselves. These are used as retreats during the daytime and serve as shelter from ordinary inclemencies of weather. These burrows are generally forsaken about mid-summer for some sort of above-ground shelter. From this time on, until fall, they appear to be more social and live in colonies under various sorts of rubbish. Grain-shocks are a favorite haunt for them, and since twine has been used for binding, the crickets have been quite troublesome by cutting the bands. During late summer and fall the females commence preparations for

the continuance of their kind, by thrusting their long, slender ovipositors into the loose soil and dropping their eggs. These sometimes hatch the same year, but, as a rule, lie over until the following spring. The young generally live above ground, where they hide among fallen leaves, grasses, and other debris, though sometimes they also creep into chinks and crevices in the earth."

My limited observation leads me to conclude that the description just quoted applies to no single species. The burrow making species is *G. pennsylvanicus* and, probably, *G. luctuosus*. The social crickets are *G. abbreviatus* and *G. neglectus*, which is probably a variety of the first. Briefly recounted, the life history of *G. abbreviatus* is as follows. The eggs hatch in this latitude in July, and the first adults appear as early as the second week in August. During every stage of life they are social, feeding together, seeking shelter in company and when egg laying time comes, in October, the females collect by hundreds in some suitable locality, an abandoned or little used roadway suits them well, and each lays several hundred eggs in an irregular mass. After this duty is performed their business on this planet seems to be finished and they succumb to the cold, none surviving the winter. The eggs do not hatch until the following July or if in rare cases they do they probably perish with cold.

In Florida, *Gryllus luctuosus* attains its growth in December. *G. pennsylvanicus*, which is probably merely the short winged form of the former, is not

found in the southern States and in the middle States it does not have time to complete its metamorphoses in the fall and consequently survives the winter in the larval and pupal stages. In the spring it soon completes its transformations and by the first of June its note is heard. They dig burrows which they occupy probably as long as they live. During the months of June and July the meadows and pastures and especially open woods pastures are filled with the music of their song. Ordinarily in favorite haunts every square rod will contain at least one burrow and these burrows are, of course, sometimes much more abundant. The males never seem to stray away from their houses in the daytime and are frequently found within the entrance, while singing. Where their eggs are laid or when I have never been able to discover, but I have never seen the young before September, so that the eggs are probably laid about the time the young of *G. abbreviatus* are hatching.

G. pennsylvanicus is so far as I have observed never a social species not even I think in the larval and pupal stages. *G. abbreviatus* on the other hand are always social and are never burrow inhabiting, although it is quite probable that on occasion they seek the burrows of their congeners for protection. Mr. Scudder says in his paper on The distribution of insects in New Hampshire, "At Jefferson in 1867 no chirp of a *Gryllus* was heard until August 12, although they often commence their song in Massachusetts in June." If I am right

this absence of the cricket serenade during the months of June and July and early August is accounted for by the fact that this locality is north of the range of *G. pennsylvanicus*. This species has not been, I think, reported from Canada and *G. luctuosus* as rare, so that if I have not erred there should not be heard anything more than an occasional cricket chirp there before the middle of August. The only invariable and easily recognized difference between *G. pennsylvanicus* and *G. abbreviatus* is that in the females of the former the ovipositor is decidedly shorter than the body, in the latter this organ is nearly or quite as long as the body.

8. *Gryllus abbreviatus* Serv. Moline, August 14. Very abundant.

9. *Gryllus domesticus* Linn. Moline and Urbana. Very rare, a single specimen having been taken at each place at the electric light.

10. *Nemobius fasciatus* De Geer. Abundant everywhere, especially in blue grass meadows. It is very common at the electric light about July 27. The wingless form *vittatus* Harr. is at least in the northern part of the State more abundant than *fasciatus*.

11. *Anaxipha pulicaria* Burm. Taken in a single locality on Rock River near Colona, Rock Island Co., about August 20.

12. *Phylloscirtus pulchellus* Uhler. A few specimens have been captured at Pine Hills, September 14, 1883.

13. *Oecanthus niveus* De Geer. Abundant throughout the State from the latter part of July to the late fall.

There are five species of *Oecanthus* in Illinois which are very widely distributed in North America. Two of these, *Oecanthus fasciatus* Fitch and *Oecanthus angustipennis* Fitch, have generally been considered varieties of *Oecanthus niveus* De Geer, but several years observation of this genus has led me to conclude that they are quite distinct in structure, habits, and song and they must therefore rank as species.

The last named species can be distinguished from the two former by its broader wing covers, the width of the dorsal field compared with the length being about one to two in *latipennis* and *niveus*, one to three in *angustipennis* and two to five in *fasciatus*. The average of these dimensions is in the first mentioned species .30 by .62 inches; in the second .26 by .54 inches; in the third .16 by .44 inches; and in the last .18 by .46 inches. *Niveus* can usually be distinguished from all the other species by its color, which is ivory white with almost no perceptible infusion of green in the male but the elytra of the female may be quite decidedly green. In *angustipennis* the male as well as the female, probably, is deeply suffused with green. In *fasciatus* the greenish tint is also predominant in the wings and elytra but the other parts of the body vary in color from deep black to ivory white varied with fuscous. In typically colored specimens however the head and pronotum are whitish with three distinct fuscous or black stripes, extending one over the top of the head and pronotum and the other two on the lateral

lobes of the pronotum and upon the sides of the head. *Latipennis* differs in coloration distinctly from the two last mentioned species but only slightly from *niveus*. Like the latter its general color is ivory white with the elytra perfectly transparent but it is distinct from *niveus* and the other two species in having the head and basal half of the antennae suffused with pink or light brown. It also lacks very generally if not always the small fuscous spots which are to be found always in the other species, except in the case of the black variety of *fasciatus*, on the lower face of the two basal joints of the antennae.

Niveus is also distinguished from all other species by its proportionally longer maxillary palpi. This disproportion is most apparent in the ultimate joint, which is not only relatively but actually longer than the same joint in *latipennis*, a decidedly larger insect. These dimensions are for the two species respectively : fifth joint 1.5 mm and 1.4 mm; fourth joint 1.3 mm and 1.3 mm; third joint 1.6 mm and 1.7 mm. Finally in *niveus* the outer or fourth curved oblique nerve at the base of the elytra is more angular than in any of the other species and consequently the distance between the third and fourth nerves which in the other species is about equal to that between the first and second, and the second and third nerves, is in *niveus* much greater.

In addition to the distinctions already mentioned *fasciatus* has longer antennae than the other species have, since these organs are rather more than two and one half times the total length of the body,

and the larger spines at the tip of the posterior tibiae are unusually strong and acute. The ovipositor of the female is also plainly distinct from the perfectly straight ovipositor of *niveus* in being distinctly turned up at the tip. The maxillary palpi also offer distinct specific characters in the proportionally short fourth joint and in the subclavate fifth joint which in the other species is fusiform. *Angustipennis* differs from the other species in its small head and slender pronotum, which in the female especially is decidedly narrowed anteriorly instead of being of equal width throughout as in the females of *niveus* and *latipennis*. The hind legs are proportionally longer and more slender than they are in the allied species and the post-tibial apical spines are so weak as to be somewhat difficult to count with the unaided eye.

These species differ from one another as markedly in song as in structure. That of *niveus* is the well known *t-r-r-r-e-e: t-r-r-r-e-e*, repeated without pause or variation about seventy times in a minute. In the vicinity of Davenport, Iowa, this song is heard as early as the twenty-third of July and it continues until the persistent little songsters are killed by the heavy frosts of the late fall. This song is heard only at night and occasionally on cloudy days but in the latter case it is only an isolated song and never the full chorus of the night song produced by many wings whose vibrations in exact unison produce that characteristic "rhythmic beat"—as Burroughs has happily phrased it. It

is this effect of many united songs that has led the same author to speak of "purring" crickets. Thoreau calls it the "slumbrous breathing" and the "intenser dream" of crickets, but Hawthorne has given it a more spiritual interpretation than either Burroughs or Thoreau. He describes it as "audible stillness" and declares that "if moonlight could be heard it would sound like that." Prof. C. V. Riley says of the song of *latipennis* that it "is continuous and recalls the trilling of a high pitched dog whistle in the distance." He also says "The commingled shrill of this species recalls also the distant croaking of frogs in the spring." The song of *fasciatus* is also a high trill continuing usually for several minutes with the intervals between the trills of very irregular length. It sings all day as well as all night apparently in the bright sunshine as well as on-cloudy days and in the dusk of evening. *Angustipennis* has a song which resembles that of *fasciatus* in some degree, but it is very much fainter and lasts for about five seconds with an equal interval between the trills.

Mr. Scudder says* of the song of *niveus*: "The day song of this insect is exceedingly shrill and may be represented by the following figure [which represents a trill] though the notes vary in rapidity. When slowest they are about sixteen a second. The song is of varied length, sometimes lasting but two or three seconds, sometimes continuing a minute or two uninterruptedly; it is a nearly uniform, equally sustained trill,

but the insect often commences its note at a different pitch from the normal one as if it required a little practice to attain it. When singing the tegmina are raised at fully a right angle to the body. The night song consists of 'thrrr' repeated incessantly, three parts of song and one of rest in every three seconds." The "day song" described by Mr. Scudder seems to be the song of *fasciatus*, while the "night song" certainly resembles that of *angustipennis* more than the song of *niveus*. Walker's *Oecanthus nigricornis* is, I think, nothing but a long-winged *fasciatus*. Specimens of the last-mentioned species with wings extending beyond the elytra as much as .16 of an inch are not uncommon.

Finally, *latipennis*, according to Prof. Riley, generally chooses the tender shoots of the grape in which to lay its eggs, while *niveus* prefers the raspberry and blackberry, but is less particular than the first-mentioned species and lays its eggs in many other shrubs and trees. Both of these species with *angustipennis* prefer cultivated ground, but *fasciatus* is comparatively rare in such localities and is abundant along weedy roadsides and hedges and in weedy meadows. The females are abundant in late summer and early fall on the various species of *Helianthus* and *Solidago*.

14. *Oecanthus angustipennis* Fitch. Much less common in the northern part of the State than either *niveus* or *fasciatus*; it has been taken at Malone Sept. 29.

15. *Oecanthus fasciatus* Fitch. Its

range seems to be coextensive with that of *niveus* and it is even more abundant. The earliest recorded date of its capture at Moline is August 23.

16. *Oecanthus latipennis* Riley. It is doubtful if this species is found as far north as Moline. There is a specimen in the Museum of the University of Illinois labelled Carmi, Ill., Oct. 6, '82. Its song has been described as "a continuous, high-keyed trill continued for fifteen minutes or more." This is exactly the song of *fasciatus*. Since there has been so much confusion in the species of this genus, there is a chance that the song described above is mistakenly referred to *latipennis*.

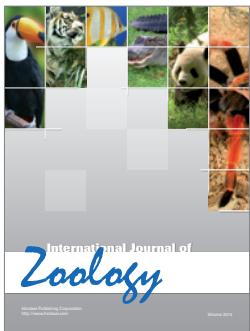
17. *Oecanthus bipunctatus* De Geer. Apparently an uncommon species in Illinois. I have seen but two specimens captured at Rock Island in August.

18. *Orocharis uhleri*, n. sp. A single specimen in the Museum of the University of Illinois seems so distinct from described species that it deserves a name. It may be described as follows:

Female. Length, .40 in.; post. fem., .36 in.; elytra, .32 in.; ovipositor, .32 in.

Dull brownish yellow with the head, pronotum and posterior femora very obscurely spotted with fuscous. The body and limbs are pubescent with soft hairs, the color of the body. The pronotum is short, with the anterior margin sinuate and the posterior convex. The elytra do not exceed the abdomen. The venation of the dorsal field is not prominent and the reticulation is not lozenge-shaped. The vein which separates the dorsal from the lateral field is unusually prominent, however, and as a consequence the angle formed by the two fields is very distinct. The mediastinal vein, the uppermost vein of the lateral field, is two-branched. Both fields are triangular, so that the elytra are acute at the apex. The wings are scarcely more than half the length of the elytra. The posterior femora are very long, exceeding the ovipositor and almost equaling the body in length. The posterior tibiae are as long as the femora. They are very moderately pilose and are furnished with strong, spreading, acute, brown-tipped spines, seven on the inner and six on the outer margin of the lower face, besides the three at the apex on either side. The lower face of the metatarsus of the posterior legs is armed with similar spines, four on the outer and two on the inner margin. These spines increase regularly in size posteriorly, and the pair at the apex equal fully half the length of this, the metatarsal joint. The ovipositor is straight with the apex very acute and armed with distinct though minute teeth.

This species can be distinguished at a glance from *O. saltatrix* Uhler by its smaller size, much longer posterior legs, acutely tipped antennae and short wings. In addition to these distinctions, the spines of the posterior legs of *uhleri* are conspicuously large and strong, while those of *saltatrix* are weak and inconspicuous. The posterior tibiae are quite densely pilose in the latter species and only very moderately pilose in the former.



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