

common than either *niveus* or *fasciatus*. A fully developed male was taken from a leaf of an iron weed, *Vernonia fasciculata* Michx., on August 11th.



This completes the list of *Gryllidæ* so far known to have been taken in the state. Other species undoubtedly occur, and it was a desire to awaken an interest in the family and so lead, if possible, to their discovery, which, in the main, prompted the preparation of the present paper.

The species most likely to occur, but which have not, as yet, been noted are: *Tridactylus terminalis*, Uhler; *Tridactylus minutus*, Scudder; *Ecanthus latipennis*, Riley; *Ecanthus bipunctatus*, De Geer, and one or two species of *Myrmecophila*, which are the smallest crickets known. They resemble closely the young of cockroaches and inhabit the nests of ants. The writer will be pleased to receive specimens of *Gryllidæ* and other *Orthoptera* from any part of the state, and will return the names of those sent to all who may so desire.

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ENTOMOLOGIZING IN MEXICO. By W. S. BLATCHLEY.

THE OUTLOOK IN THE WARFARE AGAINST INFECTION. By THEODORE POTTER.

OUR PRESENT KNOWLEDGE CONCERNING THE GREEN TRITON, *DIEMYCTYLUS VIRIDESCENS*. By O. P. HAY.

The green triton, or newt, *Diemyctylus viridescens*, has been before this academy for discussion at a previous meeting. Since that time there have been some accessions to our knowledge regarding it. This pretty and harmless newt probably inhabits all parts of the state, but I have not found it abundant anywhere, though no doubt it is plentiful in suitable localities.

It is quite common in the Eastern States, and has been studied a good deal by the naturalists there, to whom it has presented some interesting problems. It is interesting because of its position near the top of the order Urolela. *Salamandrina perspicillata*, of Europe, is very closely related to it; but since the digits of the hinder foot of that species are reduced to four, it must be regarded as standing higher than ours, which has five digits.

The newt has given the systematists a good deal of trouble, a fact resulting, as in so many other cases, from a lack of knowledge regarding its life-history. Formerly there were believed to be two entirely distinct species, the one living on the land and being of a red color, the other living entirely in the water and being of a general greenish color. Rafinesque, who first described these animals, placed the two forms under different subgenera. Baird saw that they must be included under the same genus, but regarded them as distinct species. Dr. Hallowell seems to have been the first to regard them as belonging to the same species. For a long time, in fact until very recently, they have been regarded as being varieties of the same species. A few observers have, within a few years, claimed to have seen the red land form transform into the aquatic stage, and some have thought that they saw indications of a change of the aquatic animal into the terrestrial form. Hence, it was supposed that the differences were due to seasonal changes. It was supposed that the animal went into the water to deposit its eggs, took on the characters peculiar to that state, and afterwards, when the breeding season was over, again sought the land and became red again.

At the 1891 meeting of the American Association for the Advancement of Science, at Washington, Prof. Gage, of Cornell University, read a paper which gave the results of his studies on this animal for some years. His conclusions, in brief, are that all the modifications that the animal undergoes belong simply to different stages in the development of one and the same individual. The eggs are laid in the water and hatched in due time. For some time the young have gills, like any other well regulated Urodele. When a length of about an inch and a half has been attained, they leave the water, having lost their gills, and betake themselves to the land. They then assume a red color, varying from orange to blood-red, the tail becomes round and the skin usually rough. Here they appear to remain until they are about three years old, hiding under rocks and logs, and appearing after rains. When the season of sexual maturity arrives, they go again into the water, and, according to Gage's opinion, remain there the remainder of their lives, unless the pools dry up or food becomes scarce. Prof. Gage's

paper has appeared in the American Naturalist for December, 1891, illustrated with a colored plate.

During the past summer, before I knew of Prof. Gage's work on the newt, I attempted to solve the question about the two forms of the animal by a study of the specimens in the National Museum, about two hundred and fifty in number, and from all parts of the country. I reasoned that if there were two varieties of the animal we ought in a large collection to find them both in all stages of growth; if the red form was only the young stage of the animal then the green aquatic specimens ought to be all larger than the red ones. One of the first things that I discovered was that there was not a single character on which I could depend as a means of distinguishing the two forms. Neither redness, nor roughness, nor lack of tail-fin, belonged to the land form alone. Of some it seemed to be impossible to say with any certainty to which form they ought to be assigned.

Nevertheless it was apparent that the red or *miniatus* form reached a maximum length of a little over three inches, while the undoubted viridescent form ranged from a little less than three inches up to four or more. Yet a breeding male of the viridescent form was found to be only two and three-fourths inches long. On the whole, it seemed clear that at a certain stage the red, land form must enter the water and assume characters to some extent different from those possessed while on land.

As to the color of the aquatic form, olive is the prevailing tint. Yet many have more or less red mingled with it, and not a few are decidedly red. It is probable that none of those which have betaken themselves to the water are as scarlet as those living on the land, yet they must come pretty near it. As to the purpose of the coloration assumed in the water, it is not difficult to see that it will be highly protective to an animal that dwells amid green vegetation; but why the land-dwellers should be so conspicuously red is not so easily decided. No concealment seems to be sought here. It is possible that the land form is a distasteful morsel to such animals as it comes in contact with, and the color is developed as a warning signal. Those who have the opportunity to experiment with them ought to endeavor to settle the question. The salamanders are given to eating all such animals, and the red young of the newt might be offered to *Ambystoma tigrinum*, for instance, in order to determine whether or not the latter would eat the young newt.

There are some interesting matters connected with the size of the larvae at the time of the transformation. Prof. Gage states that he has never seen

a larva at this period less than three centimeters long or more than four, while some of the bright red ones are only five centimeters long, that is, two inches. Now in the national collection I found larvæ yet with remains of gills, and some of these larvæ were two and three-fourths inches long. These were from Jersey City, N. J. Not long ago Prof. Gage sent me a specimen for examination, which he had taken at Wood's Holl, and this one is fully as large as those I have mentioned. The smallest red specimens mentioned by Prof. Gage are two inches long. Some of the red specimens seen by me at Washington were only an inch and a half, an inch and three-quarters, and one only an inch and five-sixteenths long. Here we have evidence of very great variation in the size of the larvæ at the time of transformation. I believe also that there is, during the transformation, a considerable shrinkage in the size of the whole body. Such shrinkage occurs during the transformation of *Ambystoma microstomum*, and probably of most salamanders.

Thus, while we are gradually getting at a correct knowledge of this interesting animal, the green triton, or newt, it is a good subject for further study.

THE PROPER SYSTEMATIC NAME OF THE PRAIRIE RATTLESNAKE. By O. P. HAY.

THE BLIND CRAYFISHES OF INDIANA. By W. P. HAY.

THE CRUSTACEA OF INDIANA. By W. P. HAY, M. S.

The following list of the crustaceans of Indiana is to be regarded as a first contribution to the knowledge of this interesting group. Although it represents the labor of quite an extended period, the labor was confined mostly to the central part of the state, and to the larger forms; and there still remains the great multitude of microscopic forms only a few of which are here numbered. It is for the purpose of directing the attention of the