COLORATION IN *POLISTES PALLIPES.*

By Phil Rau,

Kirkwood, Mo.

A careful examination of a half-dozen cedar trees revealed four small, partly disintegrated nests of *P. pallipes* and only one new nest which contained living adult wasps. This nest was well protected by the close foliage. The entire family was taken. All the cells of the nest were empty, showing, of course, that all of the occupants had emerged. Furthermore, there were no partly constructed cells, an indication that pulp gathering as well as egg laying stops long before the cold weather begins; at least in this nest the wasps had not gone on blindly making cells when the cold would have cut short the life of the young.

The nest was of the usual round type, and had 106 cells with 59 adult wasps upon it. All of the cells appeared to have been used but once. The population comprised 23 males, 28 workers and 8 females. The latter were larger in size and were therefore believed to be queens. That conviction was sufficintly strong to warrant the heading "Coloration in *Polistes*," for if these queens had not been present, I certainly should have identified all the others in the colony as *P. variatus;* the queens only were typical *P. pallipes.*

This entire colony of 59 wasps was taken just because it contained what I thought were two distinct species (according to the taxonomists). At first sight one would say this was a mixed colony, probably the result of its having been founded by two queens of the respective species, except for three reasons:

1. We already know the antagonism between these species.[1]

2. We often find the males of *P. pallipes* abundantly marked in yellow so that they resemble *variatus.*

[1]Paper in course of publication.

3. If I had found only the males marked in yellow, I could have accounted for it on the ground of the usual condition of the greater tendency of the males to vary (see Enteman), but here I found that the workers, 28 in number, actually showed the coloration which is characteristic of the male; in fact, the similarity was so strong that only by counting the abdominal segments could the sexes be distinguished. The male *pallipes* showed the conspicuous yellow bands about the segments, some of which extended around to the dorsal surface; precisely the same condition obtained in many of the workers, only the degree of marking varied in the individuals of both sexes. I submitted to an expert some of these workers so colored, and he identified them promptly as *P. variatus*. Hence this is in all probability a colony of *P. pallipes*, with the males showing variation toward *variatus* and the workers too resembling the males. Dr. C. H. Turner[2] has shown that the workers of *Vespa carolina* resemble the males in coloration.

Whether this perplexing condition is the result of the founding of the colony by two mothers of distinct species, which is improbable, or whether it is a case of pure variation within the colony, it shows one very important aspect of the study of variation, viz., that it is of supreme importance to make studies from a sufficiently large number of entire colonies taken directly from the nest near the end of the season, especially in the preparation of such works as Enteman's "Coloration in Polistes." There she states (p. 21); "*P. variatus* merges into *P. pallipes* as we pass eastward, and into *P. aurifer* as we cross the plains to the southwestward," and again (p. 37) "It is hardly probable that we have in *P. variatus* a primitive species which has differentiated in two directions, but as we shall see from a study of a geographical distribution of the species, *P. aurifer* and *P. pallipes* are two originally distinct species which, from the course of their migrations northward, have come together in the Mississippi Valley and by their co-mingling produced a species having in some measure the characteristics of both."

Yet I believe that the 59 insects taken from this nest were all of one species, and possibly the reader will agree

[2]Psyche, February 1908, page 1-3.

with me, relying on the evidence presented by Miss Enteman (p. 43) where she speaks of the development of the pattern of *P. pallipes;* "In the dark variety of *P. pallipes* characteristic of New England, the early developmental stages, as studied in a great many specimens, are identical with those described for *P. variatus*. The only difference between the two species is that the typical *P. variatus* stops, so to speak, at an earlier stage than does *P. pallipes*, which advances to the same melanic condition of *P. variatus*, and in most cases passes far beyond it."

If in this nest all are variations of one species, then we see that in the workers and males pigmentation stopped too soon and created the condition of *P. variatus*, while in the eight queens something queenly in their make-up "caused" advances to the extreme melanic condition which is taxonomically known as *P. pallipes*.