

## BRANCHED HAIRS OF HYMENOPTERA.

By A. N. CAUDELL.

Several years ago, in an attempt to determine which of our Hymenoptera possess branched hairs, I examined almost two hundred species, including representatives of all the families. Of these species twenty-three only possessed branched hairs, the others having only simple ones, which, in some cases, were spirally twisted. Without exception the twenty-three species bearing branched hairs proved to belong to the group Anthophila, or pollen-gatherers, and no representative of this group was found without such hairs. Thus the possession of branched hairs seems a good character for the separation of the Anthophila from the remainder of the Hymenoptera. This character has indeed been used by some writers.

Of the Anthophila somewhat critical studies of the hairs from various portions of the body were made for the purpose of learning the distribution of the various forms, and at which portion of the body they were the most often found. Characters among the hairs for the subdivision of the group were also sought for.

It has generally been stated that branched hairs are found especially on those portions of the insect's body that are used in gathering pollen. In my investigations I examined hairs from the head, dorsal surface of the thorax, dorsal and ventral surfaces of the abdomen, posterior tibiæ and basal segment of the posterior tarsus. I found that of these six regions the dorsal surface of the thorax alone possesses branched hairs as a constant character. The thorax must, therefore, be considered the typical branched-hair bearing region, as it is the only place where such hairs are found to be always present. If exceptions should be found to occur here also upon further investigation, is not known.

The invariable presence of branched hairs on the top of the thorax seems a wise providence of nature for facilitating the cross fertilization of plants.

In regard to finding hair characters for the subdivision of the Anthophila I met with no success. While the forms of hairs vary from one- to many-barbed and from short serrations to long branches, the various kinds are distributed among the genera in such a manner as to be, apparently, of no systematic importance. The hairs of closely related genera, as *Bombus* and *Psithyrus*, present no characters for their separation or for the separation of such genera from ones remotely related. Nor do the hairs of the Andrenidæ seem to differ from those of the Apidæ any more than they do as between different genera.

This subject seems to have received less study than its interest

appears to warrant. The main, and almost the only article of any length, based upon original research, so far as I can find, is by Edward Saunders in the Transactions Entomological Society of London for 1878. This author examined the hairs of one or more species of almost all the genera of British Aculeate Hymenoptera, but none of the Terebrantia. He found that, without exception, members of the Anthophila alone possessed branched or plumose hairs, and he later used that character in classification.

As to the use of these branched hairs there seems to be considerable doubt. Mr. Saunders suggests that they are of use in gathering pollen. As they are characteristic of pollen-gathering groups they are, doubtless, of use in that connection, but that their only use is for gathering pollen is not proved. If such were the case we would scarcely expect to find branched hairs present on parasitic species, such as those of the genus *Nomada*, or absent from the special pollen-collecting portions of the body of some pollenizing species, such as the posterior tarsus of the honey bee. But Coburn states that the explanation of these hairs being pollen-collecting hairs is so plausible as to exclude all other hypotheses. The same author mentions the members of the genera *Ceratina* and *Prosopis* as being without hairs. This is disputed by Saunders, who claims that they do possess a few hairs which retain the character of being branched.

Besides Saunders and Coburn the presence of branched or plumose hairs in the Hymenoptera has been mentioned by Reaumur, Smith, Dimmock and others, but the article by Saunders seems to be the only one of considerable length or importance. Dimmock has given an interesting discussion of the scales of Coleoptera in *Psyche* for 1883. He found, as previously pointed out by Fisher, that branched scales or hairs occur only in the Scarabæidæ.

---

Mr. Benton said that the branched and twisted hairs on the thorax of bees are necessary for collecting pollen, as the bees twist and turn; whereas the hairs on the legs are used only for combing and brushing that pollen off.

—Dr. Dyar called attention to the different dates of hatching of hibernated mosquito eggs according to the species. Eggs of *Culex canadensis* and *Culex atropalpus* had hatched in March, while those of *Culex triseriatus* were just hatching then (middle of May). These eggs had been deposited at various dates during the summer of 1902.