

MARCH 16.

MR. CHARLES MORRIS in the Chair.

Forty-seven persons present.

The Publication Committee reported the reception of papers under the following titles:

"Fixation of single type (Lectotypic) specimens of species of American Orthoptera. Division III." By Albert P. Morse and Morgan Hebard (February 27).

"Notes on hematognathus fishes." By Henry W. Fowler (March 1).

"Cold-blooded vertebrates from Florida, the West Indies, Costa Rica, and Eastern Brazil." By Henry W. Fowler (March 1).

The deaths of Thomas Biddle, M.D., a member, February 19, 1915, and of James Geikie, a correspondent, March 2, 1915, were announced.

DR. CLARENCE E. McCLUNG made a communication on parallel differences in germ cell organization and characters of the body, illustrated by representatives of groups or families of Orthoptera.

The Recording Secretary read the following communication from ADELE M. FIELDE:

A new hypothesis concerning butterflies.—It is known that a virgin female moth or butterfly of the Great Peacock, the Oak Egger, and some other species attracts males of her kind from afar.

No naturalist has written of this matter more charmingly than has Jean Henri Fabre.¹ Having sequestered such a female under a wire-gauze cover, scores of males came from woodsy distances to seek her. Putting her in an air-tight cell, whether of paper, wood, glass, metal or cotton batting prevented the escape of her effluvium and therefore prevented the arrival of her suitors. If placed under a bell glass, where she was plainly visible to the oncoming swarm of males, they ignored her and settled upon a twig, a chair-bottom, a bit of flannel, or a few dry leaves where she had reposed and affixed her subtile aroma. Even smooth, clean surfaces retained her emanation after contact with her and lured the male in her absence.

Neither strong stench made by naphthaline, tobacco, or sul-

¹ Social Life in the Insect World, 1912, pp. 179-216.

phuretted hydrogen, nor penetrating perfumes exhaled by spike-lavender, diffused through the laboratory, prevented the flocking of males to the wire-gauze cage of the female.

The removal of the antennæ of the males did not settle the question whether these organs were noses. A sick and sore insect cannot be depended upon for the solution of problems. None of the maimed males lived more than a day or two after the surgical operation. Their natural span of life was too short for the recovery of normal health necessary to physiological experimentation.

In my work upon the antenna of the ant I found that this organ is a compound nose, every segment being a sub-nose capable of discerning a certain odor while insensitive to all other odors.² If the antennæ of moths and butterflies be constructed on the same plan as are the antennæ of the ants, each sub-nose having power to discern a particular odor, then it may be that certain species of moths and butterflies possess, while other species lack, the sub-nose that perceives the effluvium of the adolescent female, whose ephemeral existence makes early mating necessary to the continuance of the tribe.

The result of the elision of the whole of both antennæ would not reveal the answer to the question concerning a sub-nose. Surgery would needs be applied, segment by segment, until the sub-nose discerning the female effluvium should be discovered through abnormal behavior produced by no other cause than the elimination of that particular segment. One species having antennæ might possess this sub-nose, while another species having antennæ might lack this sub-nose, and in this difference in the line or series of sub-noses would lie the cause of unlike behavior in species apparently endowed with similar organs of smell.

A curious and unexplained instinct in insects generally impels them to deposit their eggs upon substances that are the natural food of the larvæ hatched from the eggs. Since the mature insect does not eat the sort of food upon which the larvæ subsist and grow, and since the pupa-stage, in some cases continuing many months, intervenes between the larval period and the emergence in mature form, it seems improbable that memory of the gustatory joys of her own larval existence or an intelligent foresight in provision for her young is what induces the mother insect to deposit her eggs on the nutriment required by the larvæ issuing therefrom. The possession of an olfactory organ, a sub-nose discerning the chemical constituents of the nourishment ingested in her own earliest days, may account for the habitual behavior of the insect in choosing to deposit her eggs in a place that will favor the continuance of her tribe.

The tiny truffle hunting beetle, *Balboceras gallicus*,³ infallibly reaching its sole food by digging a vertical tunnel of from twelve to

² See bibliography under "Certain vesicles found in the integument of Ants" in the PROCEEDINGS for February, 1915.

³ Fabre, Social Life in the Insect World, pp. 217-237.

fifteen inches from the surface of the ground to its subterranean sustenance, probably has a sub-nose that smells nothing save the fungus whose odor emanates from the sandy soil.

There is great significance in the fact that spiders and scorpions, having no practical use for the sense of smell in their habitual activities, have no antennæ.

Summary.—If moths and butterflies, like certain ants, have a compound nose, then one of the sub-noses guiding the habitual activities of the male insect may function exclusively in discerning the odor of the adolescent female. Elision of the whole antennæ would then prevent, as it possibly did in the case of Fabre's Oak Eggers, a return under the allurements offered by the female.

Moths and butterflies normally lacking such a sub-nose would not be subject to this particular lure, although the antennæ were intact.

This hypothesis fits the phenomena and explains what has heretofore been considered mysterious.

Jacob Parsons Schaeffer, M.D., was elected a member.

The following were ordered printed:



1915. "March 16." *Proceedings of the Academy of Natural Sciences of Philadelphia* 67, 93–95.

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