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POPULAR AND PRACTICAL ENTOMOLOGY.

INSECT TROPISMS.*

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The behaviour of insects, like that of other animals, is the result of the interaction between the organism and the medium or environment in which it lives. When properly understood it has the value but not always the precision of a chemical reaction, being the summation of a long series of physico-chemical changes.

The fundamental relation between organism and medium is determined by the necessity of the former to extract its nutriment from the latter. The medium not only furnishes food for the organism but also for its enemies and, in addition, it is the source of catastrophic danger. In order to procure its food the insect has to circumvent the enemies which persecute it and evade the dangers which threaten it. There are thousands of ways of avoiding or minimizing risk and thousands of species to adopt one or other of these ways. They all come under the head of "avoiding reactions," whether they operate as visible movements or attitudes, or as structural features; in the former case they may be called "global" reactions, in the latter they are cell or tissue reactions, *i. e.*, reactions of the idioplasm resulting in adaptive growth.

After the emergence from the egg the life-history of the holo-metabolous insects is broken up into two sharply marked periods of active struggle for existence. The larval activities are directed towards solving the problem of food and growth; those of the imago are concerned directly or indirectly with the problem of reproduction to which all the sense-organs are subordinated. A larva has only one question to answer: What can be eaten with impunity? For the imago the burning question of the day is: Where can the eggs be laid with safety? It is one of the tasks of the entomologist to ascertain how these elementary realities are

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