THE REACTION OF DROSOPHILA TO ULTRAVIOLET

ALTHOUGH there is no unanimity of opinion as to the ability of insects to distinguish colors in the sense that humans do, it is fairly well established that the tendency is for them to react most strongly to wave-lengths in the violet end of our visible spectrum. This suggests the possibility that insects may be sensitive to ultraviolet, to which the human eye is relatively insensitive except indirectly by fluorescence in the cornea. The possibility is of interest in connection with the general problem of the biological relations between flowers and insects, for flowers may be "ultraviolet" as well as red, yellow, and so on. A committee of the National Research Council is planning to do field-work on this problem during the coming summer and it was thought that the following experiments might give useful preliminary information. They were made with the assistance of Mr. Ware Cattell.

Drosophila melanogaster exhibits a strong tendency to move toward the source of light. A large number of these flies were placed in a test tube about 30 cm. long and 2 cm. diameter, the end being closed with a plug of cotton. A strip of black paper was rolled around the tube to protect from stray light. By slipping the paper down from the end of the tube the flies could be "concentrated" next to the cotton plug. The paper was then replaced and the tube placed *horizontal* with its rounded end toward the spark from a 200 watt General Electric ultraviolet generator. Between the generator and the tube were placed four thicknesses, totaling about 1 cm., of Corning ultraviolet glass, number G586A (old number G55A62). After an exposure of 15 seconds the flies were found to have congregated in the end of the tube next to the source, showing that they were strongly attracted by the ultraviolet generated by the spark and transmitted by the special glass.

The transmission of this glass has been measured by the Bureau of Standards (Technological paper Number 148: "The Ultraviolet and Visible Transmission of Various Colored Glasses"). A thickness of one centimeter transmits about 70 per cent. of light in the neighborhood of 0.36; about 25 per cent. near .34; but only 5 per cent. at 0.40. This glass transmits also a small amount of red. The flies, however, did not react when we used a red glass which transmitted far more red than G586A.

To make a more accurate test, a quartz spectrograph was used to disperse the light from the ultraviolet generator. Light of wave-length greater than .39 was excluded by a strip of black paper in the focal plane. As before, the flies showed a very marked reaction when the horizontal test was "pointed" toward the ultraviolet source.

This last result was, however, rendered somewhat doubtful by the fact that the quartz lenses and the dispersing system scattered a small amount of blue and violet light. This scattered light was entirely eliminated, at least so far as human vision is concerned, by interposing a single thickness, 2.5 millimeters, of G586A in the path of the light. But even then the flies showed a marked reaction. The conclusion is that *Drosophila melanogaster* is more sensitive to ultraviolet light than is the human eye.

The question may still be raised that these phototropic reactions of *Drosophila* are due to fluorescence of eye media, similar to that experienced by the human eye when exposed to ultraviolet light. All that can be said at present in this connection is that the intensity was so low that we did not experience the visual sensation characteristic of such fluorescence, but the flies reacted promptly and definitely.

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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SECTION A—MATHEMATICS AND ASSOCIATED SOCIETIES

SECTION A of the American Association for the Advancement of Science met in Room 8 of the Main Building of the University of Toronto on Thursday afternoon, December 29, 1921, in joint session with the American Mathematical Society and the Mathematical