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

Association of America. Professor Oswald Veblen, chairman of the section, presided.

The program comprised the following addresses:

1. *A mechanical analogy in the theory of equations,* by Professor D. R. Curtiss, retiring vice-president of Section A.
2. *The research information service of the National Research Council,* by Professor R. M. Yerkes, of the National Research Council.
3. *Subsidy funds for mathematical projects,* by Professor H. E. Slaught.
4. *Algebraic guides to transcendental problems,* by Professor R. D. Carmichael, retiring chairman of the Chicago Section of the American Mathematical Society and vice-president of the Mathematical Association of America. In the absence of Professor Carmichael, an abstract of his paper was read by Professor Arnold Dresden.

At a meeting of the sectional committee preceding this program, the following nomination was made for chairman of the section, to preside as vice-president for Section A at Boston and to give his retiring address at Cincinnati: Professor G. A. Miller, of the University of Illinois. At a business meeting of the section following the program this nomination was approved, and Professor Miller was elected at a meeting of the council of the association, held on December 30.

A joint dinner for mathematicians and physicists was given at Burwash Hall on Friday evening, December 30.

WM. H. ROEVER,
Secretary

SECTION B—PHYSICS—AND ASSOCIATED SOCIETIES[1]

SECTION B of the American Association held its session on Thursday morning, December 29, 1921, in conjunction with Section C of the American Association, the American Physical Society, the American Meteorological Society, and the Section of the Physical Science Committee of the National Research Council. Professor John C. McLennan, of the University of Toronto, retiring vice-president for Section B, delivered his address on "Atomic nuclei and extranuclear electronic configuration." The vice-presidential address was followed by a symposium on the Quantum Theory, with the following speakers: (A) R. C. Tolman, director, Fixed Nitrogen Research Laboratory, Washington, representing Section C (Chemistry), A. A. A. S., "Review of the present status of the two forms of the Quantum Theory"; (B) H. B. Phillips, Massachusetts Institute of Technology, Cambridge, representing the American Mathematical Society, "Mathematical aspects of the Quantum Theory"; (C) Saul Dushman, The General Electric Company, Schenectady, N. Y., representing the American Physical Society, "Some recent applications of the Quantum Theory to Spectra." This meeting proved to be of very great general interest.

At the business meeting of Section B, C. A. Skinner, of the Bureau of Standards, was elected to be a member of the section committee, his term of office to end January 1, 1926. Dr. F. A. Saunders, of Harvard University, is the vice-president for Section B for 1922.

The American Physical Society.—This society held sessions beginning Wednesday, December 28, and continuing until Friday afternoon. The annual business meeting of the society was held on Friday, December 30, at which time the following officers were elected: *President,* Theodore Lyman, Harvard University, Cambridge, Mass.; *Vice-president,* Charles E. Mendenhall, University of Wisconsin, Madison, Wis.; *secretary,* Dayton C. Miller, Case School of Applied Science, Cleveland, Ohio; *treasurer,* George B. Pegram, Columbia University, New York, N. Y. The president of the American Physical Society gave an address on "The spectroscopy of the extreme ultra-violet." The physicists' dinner was held on Friday evening at Hart House. During the sessions of the society 77 scientific contributions were read.

American Meteorological Society.—Sessions were held beginning Wednesday morning, December 28, and continuing through Thursday afternoon. The annual business meeting was held on Thursday morning, and the following officers were elected: *President,* Sir Frederic Stupart, 315 Bloor Street, Toronto, Canada;

[1] Toronto, December, 1921.