

by the writer in the *Philosophical Magazine* for May, 1904.

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SOME COMMENTS ON THE REACTIONS OF PERICHÆTA

IN a discussion of the method of trial in *SCIENCE*, Vol. XXVI., 662, Professor H. B. Torrey referred to the writer's description of the light reactions of *Perichæta*. He interpreted the behavior of *Perichæta* in weak light as displaying "Unterschiedsempfindlichkeit" and not the tropic reaction, with the resulting conclusion that there would be no orientation in weak light. The writer had stated that *Perichæta* responds to weak light chiefly when the anterior end is extended, presumably because of the greater exposure of photoreceptor cells in the integument. Torrey called these "Unterschiedsempfindlich" reactions because apparently due to an increase in the intensity of the light on the cells. Loeb first introduced the distinction between the tropism as a constant stimulus effect and the reaction to change of intensity in the case of *Serpula*, which bends towards the light and also withdraws suddenly into its tube from the stimulus of a shadow cast upon the oral end. Except for the opposite sign of the heliotropism the reactions of *Perichæta* and this other annelid bear a family resemblance. I need only refer to the familiar facts that *Perichæta* or *Lumbricus* turn away from all but the weakest light and retract into their burrows on sudden illumination. In the open, the worm gives the "Unterschiedsempfindlich" reaction of retracting its head on sudden illumination with strong enough light and after a period of backward creeping follows this up by a tropic, turning response effects of sudden illumination are conspicuously wanting in weak light, as ordinarily only turning movements appear.

A form of response to illumination of the anterior end which is between these extremes consists of creeping backward after a distinct pause, which is often prolonged, and without any sudden movements which would naturally be related to the change produced by the stim-

ulus. These weaker responses might naturally be regarded as constant stimulus effects. Reactions attributed to change of intensity ought to give manifest evidence of the shock in resulting movements or inhibitions.

The objection is raised that the transitoriness of the stimuli in weak light, received during extension movements, would preclude their giving rise to orientation. The tropism is ascribed to a differential tonus produced on the muscles of the two sides. There is no apparent reason why even transitory light stimuli of any intensity might not produce some appreciable tonic effects. It appears, however, that a considerable change of intensity is required to temporarily inhibit forward movement, as is the case in retraction of the head. If the sudden manifestations of shrinking are absent in weak light is it not apparent that the threshold for "Unterschiedsempfindlich" effects is higher than for purely tonic, *i. e.*, tropic effects in the earthworm? As for the application of the trial hypothesis to the behavior in weak light, that is only giving a name to the somewhat gradual process of orientation, interrupted by movements contrariward which are less influenced by the light.

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ENTOMOLOGICAL CONFERENCE ON THE PACIFIC COAST

THE department of entomology of the University of California has for several years past held four conferences during the school year at stated intervals, the place alternating with Berkeley. Thus during the last school year four such conferences were held, two at Berkeley, one at Watsonville and another at Davis. The last of these meetings, held in Berkeley, was planned to be more inclusive, inasmuch as entomologists from the entire Pacific coast were invited to attend and present papers. The hope was also expressed that a special organization of western entomologists might be effected, inasmuch as the insect problems of the Pacific slope are so different from those on the other side of the Rocky Mountains.

At this meeting, held April 20 to 23, the following general program was carried out:

Tuesday afternoon (April 20), Lime Sulphur, Its Use and Manufacture. Evening, The Manufacture of Miscible Oils and Arsenical Insecticides.

Wednesday morning (April 21), The European Elm Scale, and the Codling Moth. Afternoon, The Orange Scale and the Citrus Mealy Bug. Evening, Exhibits of Insecticide Materials, Insect Collections, Apparatus illustrating Methods of Study, etc.

Thursday morning (April 22), Visit to Oakland Formicary. Afternoon, Forest Insects and Apiculture. Evening, Medical Entomology.

Friday morning (April 23), Methods Used in the Study of Sensory Reactions, Insect Photography. Afternoon, permanent organization.

The meeting was well attended, notwithstanding the enormous distances separating the workers on the Pacific coast. As had been hoped at the outset, a permanent organization was effected under the name Pacific Slope Association of Economic Entomologists. The constitution adopted requires that active membership shall be limited to the official and professional entomologists of the Pacific slope, while associate membership shall be open to agriculturists and to all others interested in the objects of this association. The following officers were elected:

President—Professor C. W. Woodworth, University of California, Berkeley, Cal.

Vice-presidents (representing each state concerned)—Professor R. W. Doane, Palo Alto, Cal.; Professor S. B. Doten, Reno, Nevada; Professor J. Elliott Coit, Phoenix, Arizona; Professor Fabian Garcia, P. O. Agricultural College, New Mexico; Professor E. D. Ball, Logan, Utah; Professor A. B. Cordley, Corvallis, Oregon; Professor A. L. Melander, Pullman, Washington; Professor L. F. Henderson, Moscow, Idaho; Professor C. P. Gillette, Fort Collins, Colorado; Professor R. A. Cooley, Bozeman, Montana; Professor Aven Nelson, Laramie, Wyoming; Hon. Thos. Cunningham, Vancouver, B. C.

Executive Committee—Mr. R. R. Rogers, San Francisco, Cal.; Mr. H. P. Stabler, Yuba City, Cal.; Mr. L. H. Day, Oakland, Cal.

Secretary-Treasurer—Professor W. B. Herms, University of California, Berkeley, Cal.

It is planned to hold the next meeting this summer at Portland, Oregon.

W. B. HERMS,
Secretary-Treasurer

SOCIETIES AND ACADEMIES

THE PHILOSOPHICAL SOCIETY OF WASHINGTON

THE 667th meeting was held on May 22, 1909, Vice-president Wead in the chair. Mr. Edwin Smith read a biographical sketch of Mr. William Eimbeck. Two papers were read.

Investigation of Dip Needle Corrections by Experimental Methods: P. H. DIKE, of the Carnegie Institution of Washington.

The values of the inclination, or dip of the magnetic needle, as observed by the absolute method with the dip circle, in general still require some correction, and the error is not eliminated by multiplying observations as the correction is a constant one for a given station. The correction is found to vary with the dip and the total force, and it is accordingly necessary to take account of this variation in the reduction of the observations made by the various expeditions of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington covering a large range of the magnetic elements. In the *Galilee* work on the Pacific Ocean dip circles were compared with observatory instruments over as wide a range of dip as possible ($+74^{\circ}$ to -68°), and from the corrections thus obtained empirical formulæ were established by least square methods from which the probable corrections for intermediate values of dip were derived.

The purpose of the present investigation is to derive these corrections by comparison with a single standard instrument (an earth inductor) at one station and through the whole range of positive and negative dip. An artificial field is produced by a system of coils, through which a uniform current from a storage battery flows. Two coaxial coils of 80 cm. radius are mounted with axis vertical, 80 cm. apart, each coil having 100 turns of wire. A second pair 90 cm. in radius and 90 cm. apart are mounted with axis horizontal, the middle points of the axes of the two pairs of coils coinciding. The second pair has 50 turns each of wire. By regulating the currents in the two sets of coils any desired magnetic field can be produced at the center, and this field is extremely uniform over a considerable area. Two systems of coils are set up about 50 feet apart, the horizontal coils of one being in series with those of the other, and the vertical coils likewise in series with each other. Simultaneous observations with earth inductor and dip circle are made