

*On the Theory of Experiments to Detect Aberration of the Second Degree.* EDWARD W. MORLEY, Western Reserve University, and DAYTON C. MILLER, Case School of Applied Science. (To be published in the *Proceedings* of the American Academy of Science, and in the *Philosophical Magazine*.)

In this paper there is a reconsideration of the simple theory of aberration of the second degree as given by Michelson and Morley in 1887, and of the general theory as given by Hicks. The effects due to aberration of the first, second and higher degrees have been computed, and the results are shown in curves. The conclusion is that the original theory was correct and sufficient, and that the modifications proposed by Hicks are effective in aberration of the third or fourth degree only, or are (in two instances) due to errors in his theory.

*Report of an Experiment to Detect Change of Dimension of Matter Produced by its Drift through the Ether.* EDWARD W. MORLEY and DAYTON C. MILLER. (To be published in the *Proceedings* of the American Academy of Science, and in the *Philosophical Magazine*.)

The paper describes a large interferometer designed for the measurement of ether drift, and for the determination of any differential change in the dimension of matter, resulting from such a drift. The support of the optical parts is a steel truss-pattern cross, which is circumscribed by a square with diagonals fourteen feet long. By repeated reflections the optical path of the light is lengthened to two hundred and eleven feet. The whole interferometer is floated on mercury to render observations possible in all azimuths. The distances apart of the mirrors are determined by interchangeable rods, which may be of any suitable material. Experiments have been

made using pine distance pieces, which give results in accordance with those of the original experiment made by Michelson and Morley in 1887 in which the distances were determined by sandstone.

The theory given in the preceding paper indicates a displacement of the interference fringes due to ether drift amounting to 1.53 wave-lengths, as the apparatus is rotated. The observations from 260 rotations show that the displacement is less than 0.015 wave-length. As the latter quantity is as small as the errors of observation, the conclusion is that there is no drift of the ether at the place where the interferometer is mounted.

*Recent Experiments and Theories on the Ether Drift.* D. B. BRACE, University of Nebraska.

*The Elimination of Gas Action in Experiments on Light Pressure.* G. F. HULL, Dartmouth College. (To be published in the *Philosophical Magazine* and in the *Physical Review*.)

When light is thrown on one vane of a torsion system suspended in a partial vacuum, the 'Crookes effect' or gas action is eliminated, leaving only light pressure effective, in the following ways: (1) By making the vane accurately vertical; (2) by enclosing the absorbing or reflecting surface; (3) by making the vane a cylindrical surface having its axis coincident with the suspending fiber; (4) by using inclined surfaces and polarized light.

Experiments are described and data given showing that the gas action is eliminated through large ranges of air pressure varying from about half an atmosphere up to a few millimeters of mercury.

A simple lecture room experiment is described for demonstrating that light pressure on a reflecting surface is greater than that on an absorbing surface in the ratio