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AN EXPERIMENT IN GRAVITATION

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In this work an attempt is made to repeat in somewhat altered form an experiment of the late Charles F. Brush, in which he believed he had observed a considerable deviation from the accepted relationship that the inertia of an object is proportional to its weight.

Two pendulums about 110 cm. long were suspended in vacuo, each in a heavy iron chamber. One of the pendulums was about 4 mm. shorter than the other, and gained a half period in about 13 minutes. Pendulum A had a brass bob, which was left unchanged throughout the experiment. Pendulum B was provided in succession with bobs which were of different materials, but of the same weight. The method of coincidences was employed to find whether any alteration in the period of pendulum B occurred when bobs were changed.

The pendulums could be set in oscillation from outside the chambers without disturbing the vacuum. They were started in an amplitude of about 1.8 degrees, the amplitude diminishing to about one sixth of this value in 12 hours. Ordinarily they were started twice each day, so that the average run was somewhat less than 12 hours, though a few were as long as 16 hours.

Some of the observations of coincidence were made visually, by focusing a telescope, through a pair of right angled prisms, upon the two suspensions. Others were made electrically, by means of photo electric cells, the suspensions interrupting beams of light as they passed the mid points of their paths.

The observed differences in the period of pendulum B when bobs were changed were within the probable experimental error for bobs of brass, white metal and zinc. For iron the variation was greater than this. Alterations in period which resulted from the placing of bar magnets near this pendulum led us to believe that the exceptional behavior of pendulum B when provided with the iron bob was due to magnetic influences rather than to altered inertia.

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