

Repetition of the Michelson-Morley Experiment.

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THIS investigation was undertaken with the view of making a more accurate test than had hitherto been obtained, and may be divided into three parts as follows :

The first preliminary observations were begun in June 1926. The principle employed was not essentially different from that in the original Michelson-Morley experiment, with the exception that in this investigation the observer was mounted on the apparatus, revolving with it while making observations. Several hundred observations were made, all

stationary interferometer fringes could therefore be measured in the usual way by means of a micrometer eye-piece, the observer being at rest above the centre of the rotating disc. The length of the light path in this experiment was fifty-three feet.

In consequence of inadequate temperature provision (and probably unsymmetrical strains in the apparatus) the results, while not so consistent as could be desired, still show clearly that no displacement of the order anticipated was obtained.

In the final series of experiments, the apparatus

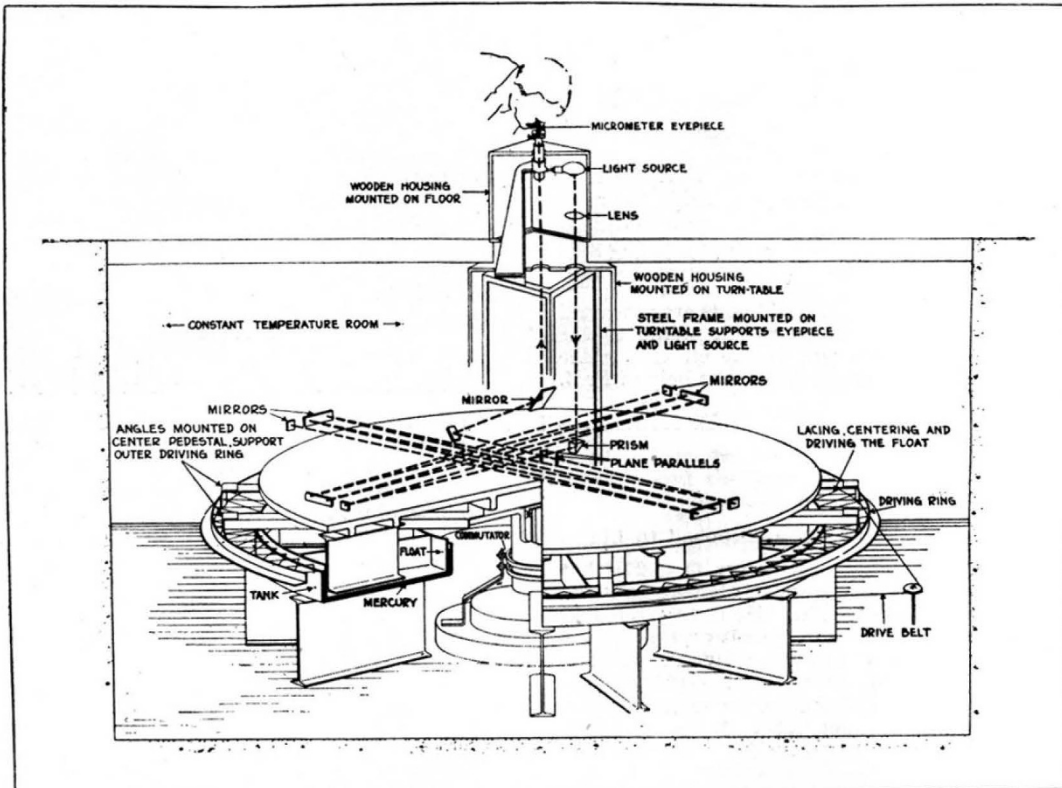


FIG. 1.

indicating the same negative result as was obtained in the original investigation. According to calculations furnished by Dr. Strömberg, a displacement of 0.017 of the distance between fringes should have been observed at the proper sidereal times. No displacement of this order was observed.

The second preliminary investigation was begun in the autumn of 1927. In this, the optical parts were supported on a heavy disc of cast iron, floating on a circular mercury trough as in the original experiments. The chief modification, however, consisted in the fact that the light source was placed vertically over the centre of the revolving disc and rotated with it. The return image, by a simple system of reflections, was rendered stationary, thus avoiding the necessity of mounting the observer on the apparatus. The

was transferred to a well-sheltered basement room of the Mount Wilson Laboratory. The length of the light path was increased to eighty-five feet, and the results showed that the precautions taken to eliminate effects of temperature and flexure disturbances were effective. The results gave no displacement as great as one-fifteenth of that to be expected on the supposition of an effect due to a motion of the solar system of three hundred kilometres per second.

These results are differences between the displacements observed at maximum and minimum at sidereal times, the directions corresponding to Dr. Strömberg's calculations of the supposed velocity of the solar system. A supplementary series of observations made in directions half-way between gave similar results.