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Drift of The Ether (I)

(空間エーテルの流れ)

A dramatic culmination of a controversy that has divided the scientific world for more than 40 years was the appearance upon the same program of the National Academy of Science, meeting which was held in Washington recently, of two papers which present new evidence on the question of Einstein's theory of relativity. The first paper was by the president of the Academy, Prof. A. A. Michelson of the University of Chicago, whose historic experiments in 1881 first showed that there was something wrong about our traditional ideas of space and time, and so led to the Einstein theory. The second was by Prof. Dayton C. Mille. of the Case School of Applied Science, Cleveland, who has recently repeated the original Michelson experiments on the top of Mount Wilson, California, and got different results which conflict with the Einstein theory. The question at issue is whether there is an ether pervading all space and if so whether it is stationary or carried along by moving matter.

All attempts to prove the existence of the ether or to measure "ether drift" through moving bodies have so far failed. The crucial experiment was that tried by Michelson in cooperation with Morley in 1881. He set up in the basement of the Case School a marvelously accurate instrument named the "interferometer," because it measures the interference of fringes, or black and white bands, produced when two beams of light come together in such a way that their crests and troughs conflict.

Besides rotating on its axis from west to east at the rate of a third of a mile a second, the earth revolves around the sun once a year, at a rate of eighteen miles a second, and the sun with the earth and the rest of the planets is moving through space at the rate of about ten miles a second. But whichever way Michelson turned the arms of his interferometer he found no difference in direction and got no evidence of ether drift. He repeated the experiment in 1887 with more accurate apparatus and in the same place, but still got negative results.

This seemed to prove that the earth did not move through a fixed ether. But to assume the contrary, that the earth did not move but was permanently at rest in a fixed ether, was inadmissible because that would upset Copernicus and all the astronomers since.