statement, I hope that scientific workers will withhold their judgment on the latest discoveries of *Sinanthropus*, and ignore the inaccurate rumours already circulated that the last three skulls of *Sinanthropus* are identical with the *Pithecanthropus* or *Homo neanderthalensis* skulls.

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A Simple Means of Checking the Michelson-Morley Experiment

THE epoch-making work of Prof. Dayton C. Miller, as reported two years ago in NATURE[1], has established that the small effect found by Michelson and Morley is a reality. In a paper read by me before the American Physical Society which has as yet only appeared in abstract form[2], it is shown that there is a v^2/c^2 effect in both arms of the interferometer (also shown by Voigt[3] in 1887). If, however, the ray of light is not perfectly normal to the end mirror, the ray is displaced during the motion and this displacement gives rise to a small effect (about one four-thousandth of v^2/c^2 in Miller's case—due to the ray having an angle of obliquity of about 1′). I find on applying my formula to his results, a value for the cosmic motion of 300 km./sec., while his method of computing the effect gives 200 km./sec. The discrepancy between these results was traced to his floating apparatus being unbalanced, causing the interferometer to be *very slightly* out of level. Secondary effects due to this slight unbalance may be seen in his results, as well as the effect due to the obliquity of the ray, and it has been found, by inclining one arm of the interferometer while the other remains level, that a very large displacement of the fringes may be produced, since it is the *component* of the cosmic velocity in each arm which affects the ray in that arm.

As shown by Miller, the cosmic velocity is nearly vertical at some time during the day, and at some other time nearly horizontal. Therefore twice a day the cosmic velocity makes an angle of 45° with the normal to the plane of the horizon, and by inclining one arm of the interferometer at 45° while the other arm remains level, rotation about a vertical axis will bring the 45° arm into the line of direction of the cosmic motion, and we shall have in this arm not merely a component of this velocity, but the full value of 300 km./sec. When rotated 180° from this position, the 45° arm will be at right angles to the cosmic motion and the component will have a zero value, and we therefore have a full shift of the fringes between two points 180° apart. In the level arm there will be no change because, as shown by Voigt, while the motion of the source gives us a v/c effect and a v^2/c^2 effect, the v/c effect is annulled by the motion of the observer, the v^2/c^2 effect remains and is independent of the orientation of the interferometer, the wave surfaces being spherical. (See page 50 of Voigt's Doppler effect paper[4].)

It would be rather difficult to incline a large interferometer like Miller's at 45°, but it can easily be done with a small one. A simple turntable may be used which may be tested for suitability by placing a level interferometer upon it, and noticing whether there is any appreciable fringe shift on rotation; if not it may be assumed that the turntable is satisfactory. A good carpenter can make a framework in two or three hours that will support the interferometer solidly and stably at the proper angle. Send the ray of light from the source along the horizontal arm, and the fringes from the 45° arm may be seen by means of an auxiliary plane mirror suitably mounted (an ordinary mirror will do), and after having properly adjusted the interferometer, a short focus horizontal telescope may be used to view the fringes reflected from the auxiliary mirror.

Preliminary measurements with an interferometer having equal arms $6\frac{1}{2}$ in. long gave a shift of approximately six tenths of a fringe, in agreement with the following calculations.

$$\delta F = \frac{2l}{\lambda}\cdot\frac{v^2}{c^2} = \frac{31{\cdot}75}{5{\cdot}461\times10^{-5}}\cdot\frac{9\times10^4}{9\times10^{10}} = 0{\cdot}581.$$

Contrary to expectation, the magnitude of the fringe shift seems to be practically the same at any time of day.

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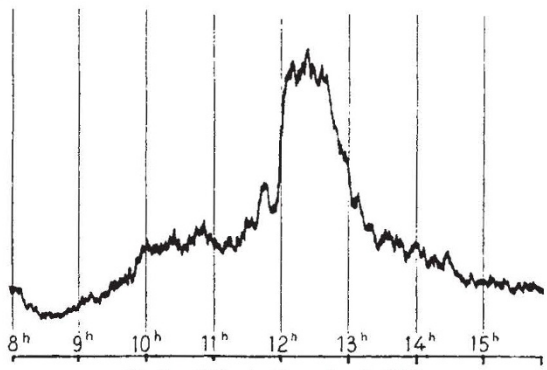
Dec. 7.

[1] Miller, Dayton C., NATURE, **133**, 162 (1934).
[2] Cartmel, W. B., *Phys. Rev.*, **2**, 49, 647, 649 (1936).
[3] Voigt, W., *Goettinger Nach.*, 1-21, 233 (1887).
[4] Voigt, W., *Goettinger Nach.*, 1-21, 41 (1887).

Abnormalities of the Ionosphere and Bright Solar Eruptions

IN a letter published in NATURE of December 12, 1936, p. 1017, Mr. H. W. Newton states that in December a bright hydrogen eruption was observed at the Royal Observatory, Greenwich (beginning at 11h. 57m. U.T. and bright eruption at 12h. 03m.) and he directs attention to the fact that this eruption coincided with "a marked abnormality in the ionosphere".



St. Cyr, 27 kc./s. December 3, 1936.

Fig. 1.

On the same day and at the same time, I pointed out in Paris (St. Cyr) a large increase in the number of atmospherics on 27 kc./s. (11,500 m.). Fig. 1 is from a photograph of the interesting part of the St. Cyr record. African records (Tunis and Rabat) show the same phenomenon at the same time, but less intense. These sudden rises in the number of atmospherics are not new phenomena. I have already reported such increases, some even more sudden, and I have pointed out that they depend on modifications of the ionosphere[1].