The Screen Effect of the Earth in the TETG (*).

(Theory of a Screening Experiment of a Sample Body at the Equator, Using the Earth as a Screen) (**).

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Summary. — In this paper the acceleration of gravity \( g \) is calculated at the same point of the Earth situated at the equator at midday (point A) and at midnight (point B), by following a suggestion of the referee made by the editorial staff of Il Nuovo Cimento on the opportunity of publishing the electrothermodynamical theory of gravitation (TETG). In fact the variation of \( g \) is due to the gravitational field of the Sun and the centrifugal accelerations as that report said. The calculations are realized for a revolution ellipsoidal figure of the Earth around an axis from the equator plane. The accelerations \( g \) are calculated in Newton's and in TETG theories, for the Earth, the Sun, centrifugal rotation and revolution movement of the Earth. The results are summarized in table III (for the point A) and table IV (for the point B), which contain the differences of the values in the two theories (Newtonian-TETG), namely \(-67.8 \mu g a l \) in A and \(1880.6 \mu g a l \) in B. The differences of the values of the two points A and B are \(-1014.9 \mu g a l \) in Newtonian theory and \(933.5 \mu g a l \) in TETG, the total difference between the two theories being \(-1948.4 \mu g a l \). Calculations are made for verifying these differences with a pendulum and with a ballistic gravimeter. These results are for an ideal figure of the Earth. Researches are necessary to be made for a dynamical figure of the Earth, for instance taking into account the deformation due to tides, nonhomogeneities of the Earth, etc.

(*) Electrothermodynamical theory of the gravitation (1).

0. – Introduction.

In the expert report from the review *Lettere al Nuovo Cimento* regarding the first form of paper \(^{(1)}\), the last observation from all the six made by the referee was the following:

« In the experiments to verify the validity of the equivalence principle \(^{(2,3)}\) one looks for a 24 h variation of the position of a pendulum subject to the gravitational field of the Sun and to centrifugal acceleration. Since the Sun is screened by the Earth once a day, in the present theory one should see an effect. It would be interesting to compute it and to compare it with the very precise experiment by *Braginski* » \(^{(2)}\).

In this paper we shall answer the first part of the problem, calculating only the screening effect of the Earth vs. the Sun at noon and midnight for a laboratory placed at the equator, in the case of the following configuration (fig. 1): the Earth and the Sun have the centres collinear through the equator, the Moon is in the first or in the last quarter for not to have vertical component of the gravitational acceleration and the effect of the other planets is neglected.

![Fig. 1. – Configuration Earth, Sun, Moon.](image)

1. – Formula of the distance covered by the « gravitational radiation » through the Earth for a point at the equator.

In order to be able to integrate around an equatorial axis, we consider the Earth \((E)\) as a revolution ellipsoid around an axis situated in the equator plane, having the semi-axes \(a_1, c_1, c_2\). With that end in view, we put the condition