

ON A DETERMINATION OF THE ACCELERATION DUE TO  
THE FORCE OF GRAVITY AT TOKIO.

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( *Abstract.* )

THIS determination was made by means of a pendulum vibrating in the physical laboratory of the University of Tokio. A number of experiments were made with a reversible pendulum in the early part of the year 1880, but as the laboratory at that time possessed no means of measuring the distance between the knife-edges with sufficient accuracy, no attempt was made to perfect this method.

In May a series of experiments was undertaken with what is commonly called a "Borda's pendulum" made by Salleron of Paris. It consisted essentially of a small brass sphere suspended upon knife edges by means of a thin platinum wire. There was also provided by the same maker an arrangement for measuring the length of the pendulum within the one-hundredth of a millimetre. The determination of the time of vibration was made by means of a chronograph and a break-circuit chronometer. The pendulum was made to record on the sheet of the chronograph a single beat at the beginning of a series of vibrations and again at the end. In this way the number of seconds and the fraction of a second in which the pendulum completed a given number of vibrations was ascertained without introducing objectionable resistance and with a much greater degree of precision, for the same length of time, than is possible by means of the ordinary method of coincidences. All parts of the pendulum were weighed and measured and the results were reduced and

corrected in the usual manner, allowance being made for the air dragged with the pendulum while in motion.

The results of a number of series of observations were given, agreeing well with each other, the mean of all giving for the value of the force of gravity at Tokio.

$$g=9.7984$$

Brief reference was made to a previous determination of the same constant, by Messrs. Ayrton and Perry, at the Imperial College of Engineering. (*Philosophical Magazine*, April, 1880. )

The method used was criticised, and many errors made in the reduction of the results were pointed out.

