using a sliding weight, one end of the bar of which it consisted was filed away until the vibrations in the two positions were synchronous. In using the pendulum it is swung in front of the pendulum of an astronomical clock, the exact rate of which is known. By means of certain contrivances the number of vibrations made by the two pendulums in a given time can be compared exactly, and the number made by the clock being known that of the experimental pendulum is obtained. Certain corrections have to be applied. One for changes in the thermometer, which lengthen or shorten the pendulum: a second for changes in barometric pressure, which by altering the floatation effect of the atmosphere on the instrument, affect the action of gravity on it; a third for height of station above the sea level, which also affects the force of gravity, the latter diminishing with the square of the distance from the centre of the earth; and a fourth for the amplitude of the arc through which the pendulum swings, which, in theory, should be indefinitely small.

The number of pendulum oscillations in a given time has been observed at a vast number of stations in various parts of the world, and in latitudes from the equator to nearly 80°. The most extensive series of observations was one lately brought to a close in India, the pendulums used in which had been previously tested at Kew. The general results of all the pendulum experiments gives about 292 : 293 as the ratio of the earth's axes, which is the same as that deduced from measurements of meridianal arcs.