

constantly observed, and necessarily existing in material creation. The limitation of our capacities may render this division or classification necessary, but we must be careful to remember that it is still artificial, and that the sciences are not independent branches of knowledge. This view of the physical sciences will prove the propriety of the effort we are now making, to avail ourselves of their united assistance in explaining the conditions of the earth; and sufficient has already been said to convince the reader that an extensive series of phenomena, such as we behold wherever we may be placed, can only be understood by an acquaintance with many branches of knowledge.

The first doubt as to the perfect sphericity of the earth, is said to have arisen from observations on the pendulum. M. Ritcher, while observing the transits of the fixed stars in the Island of Cayenne, noticed that the pendulum of his clock moved at a rate of 2' 28" a day less than it ought, as regulated by the motion of the sun, and found it necessary to shorten the length of his pendulum nearly one fourth of an inch, in order that it should make vibrations equal to those it made at Paris. This singular phenomenon excited the attention of the astronomer, and, when inquiring into the cause, he was induced to suspect that the earth was not perfectly round.

It may not, however, be quite clear to the reader, what connexion there is between the vibration of a pendulum and the form of the earth, and we may be permitted to illustrate the statement by a few remarks. The instrument we call a pendulum consists of a heavy body suspended by a slight cord or thread, and is frequently used in combinations that are intended for the measurement of time. It must not, however, be supposed, that the pendulum is in any case the moving power; it acts as a regulator in clocks, and the motion originates in the fall of a weight, or in the recoil of a spring attached to the machine. Weights are invariably used in clocks, springs in watches; and the latter are generally regulated by a balance-wheel, and not by a pendulum. The contrivance by which the pendulum of a clock is connected with the train of wheels, and regulates their motion, is called the escape-movement, and of this there are several varieties, as the lever, and the dead beat, the latter being so named on account of the peculiar sound it produces.

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