

A paper was read, entitled, "Experiments on the Length of the Seconds' Pendulum; made at the Royal Observatory at Greenwich." By Captain Edward Sabine, of the Royal Regiment of Artillery, F.R.S.

The experiments described in this paper were made with the original convertible pendulum constructed by Capt. Kater, and employed by the author in Portland Place, in the year 1817; except that the tail pieces were removed, and the moveable weight dispensed with: and they were made on the vacuum apparatus established in the south-west angle of the Pendulum-room, the place assigned for it by the Astronomer Royal. Having had reason to suspect that the retardation of the vibrations of the pendulum performed in circular arcs, when the weight was above, was greater than that assigned by the formula commonly employed, the author first investigates the correction necessary to be applied from this cause. He next ascertains the reduction to a vacuum for the small residue of air which the apparatus still contained, or for the small portion which may have introduced itself by leakage. The alteration of rate for each degree of Fahrenheit is then determined to be 0.441, a quantity almost exactly the same as that which was deduced from a former inquiry. The result of the present inquiry is, that the vibrations of Captain Kater's pendulum, which at 57° were found to be 86069.1 are at 62° , 86066.9. At this latter temperature, the length of the seconds pendulum, in vacuo, would be 39.13734 inches. Tabular details of the experiments accompany the paper.

A paper was read, "On recrossed Vision; being the Description of a distinct Tribe of ocular Phenomena, supplementary to a Rationale of the Laws of cerebral Vision, recently published." By John Fearn, Esq. Communicated by Captain John Grover, F.R.S.

The phenomena described in this paper, and which the author designates those of *recrossed vision*, are cases in which objects placed between and very near the eye, such as the two sides of the nose, appear on opposite sides of the sphere of vision: the object on the right side of the nose being seen to the left by the right eye, and that which is on the left of the nose being seen to the right by the left eye. These and other phenomena illustrative of the well-known law by which we estimate the position of objects with relation to the eye to be in a line drawn from its image in the retina through the centre of the eye, are considered by the author as requiring further explanation. Not satisfied with the theory of Berkeley, that the mind is guided by the perceptions received from the sense of touch, in interpreting the signs furnished us by the sight, the author proposes to explain these phenomena by an hypothesis of his own, which he states in the following words. "Over and above the gift of two external or cranial eyes, man has been by his adorable Creator endowed with an internal cerebral organ, which performs the office of a *third eye*, by being the common recipient of impressions propagated either from one, or both of the external eyes; and the mind, in her chamber of percipience, steers with regard to ex-

ternal objects by the same principle on which the mariner steers by his compass. Thus the two cranial eyes are analogous, in principle and situation, to two magnetic compasses placed upon a ship's deck; while the third, or cerebral eye, corresponds to another compass placed in the cabin below; and the mind, situated like the captain-mariner in his cabin, knows, from consulting the cerebral eye, on what point of direction the body is steering; although the mind no more perceives either any external object, nor yet any image in the cranial eye, than the mariner perceives (even in the vulgar sense of the word perceiving) the far-off land, or haven, towards which he is surely making his way."

A paper was read, "On the Thermostat or Heat Governor, a self-acting physical Apparatus for regulating Temperature;" constructed by Andrew Ure, M.D., F.R.S.

The principle of the instrument here described is the unequal expansion of different metals by heat. A bar of zinc, alloyed with four or five per cent. of copper, and one of tin, about an inch in breadth, one quarter of an inch thick, and two feet long, is firmly and closely riveted along its face to the face of a similar bar of steel of about one third in thickness. The product of the rigidity and strength should be nearly the same, so that the texture of each may pretty equally resist the strains of flexure. Twelve such compound bars are united in pairs by a hinge joint at each of their ends; having the zinc or alloy bars fronting one another. At ordinary temperatures these bars will be parallel, and nearly in contact; but when heated, they bend outwards, receding from each other at their middle parts, like two bows tied together at their ends. When a more considerable expansion is wanted, a series of such bars is laid one over the other. The movement thus resulting is applied by the author in various ways to regulate the opening of dampers, letting in either cold air or cold water, or closing the draught of a fireplace, as the case may be. He proposes its employment to regulate the safety valves of steam boilers, as working with more certainty than the common expedients.

A paper was read, "On the Determination of the Thickness of solid Substances, not otherwise measurable, by Magnetic Deviations." By the Rev. William Scoresby, F.R.S. Lond. & Edin. Corresponding Member of the Royal Academy of Sciences of Paris, &c.

In the first part of this paper, the author states the results of a series of experiments undertaken by him with the view of ascertaining whether all bodies are equally and uniformly permeable to the magnetic influence. Out of a great number of substances not ferruginous, but of various qualities, thickness, and solidity, which were subjected to trial, no instance occurred of their offering any perceptible obstruction to the action of a magnet on a compass, when interposed between them. No interruption to this action occurred even when the intervening bodies were iron ores, of which several