

time, some experiments for determining the actual effect on the vibrations of the pendulum, by changes of temperature, independently of any theoretical allowance.

The portion of Captain Hall's letter, which was not adapted to public reading, consists of six series of observations at London, the Galapagos, San Blas, and Rio de Janeiro. These are given in the fullest detail, together with every attendant circumstance likely to have any effect on the experiments.

Second Part of the Paper on the Nerves of the Orbit. By Charles Bell, Esq. Communicated by Sir Humphry Davy, Bart. P.R.S. Read June 19, 1823. [*Phil. Trans.* 1823, p. 289.]

This is a paper in continuation.—In this part the author states that there are six nerves of the brain which go to the eye, while there are in all only nine nerves coming from the brain. He proceeds to show that each nerve has a distinct or appropriate function.

The branch of the fifth nerve, called Ophthalmicus, bestows upon the parts within the orbit and the coats and surfaces of the eye, sensibility to pain, and that modification of sensibility which causes the winking and rapid motions of the eyelids and eyeball, and produces tears. It is shown that by the loss of this nerve the eye is deprived of its sensibility to touch and irritation, while it continues to enjoy the sense of vision, and the motions of the eye and eyelids remain perfect.

Having shown that the motions of the eyelids depend on a branch of the seventh nerve, and not on the fifth, as hitherto supposed, and having proved in the former part of the paper that there is a corresponding motion of the eyeball and eyelids, necessary for the preservation of the organ, he proceeds to show that this connexion is established through the fourth nerve; that the fourth, or trochlearis, goes to that muscle which performs the instinctive and insensible motions of the eyeball, in sympathy with those of the muscles of respiration, and consequently with the eyelids.

Having thus shown that the fourth, and a branch of the seventh, as enumerated by authors, perform the instinctive and involuntary motions of the eyeball and eyelids, he then explains the office of the third and sixth to be exclusively for the voluntary motions of the eye, and for directing the eyeball in subservience to its office of vision.

By the discovery of the peculiar functions of the fourth, fifth, and seventh, the nerves of the head become thus arranged according to their uses:—

The first is the olfactory nerve.

The second is the nerve of vision.

The third is for the voluntary motions of the eye.

The fourth for the instinctive motions of the eye.

The fifth entirely for sensation of the head generally, and for the regulation of certain motions of the jaws.

The sixth for the motions of one muscle of the eye.

The seventh for the voluntary and involuntary motions of the muscles of the face.

The eighth is the great respiratory nerve.

The ninth, for the voluntary motions of the tongue.

The nerve sometimes enumerated as the tenth of the brain, is properly the first spinal nerve : like those of the spine it has a distinct double root, and is a nerve both of sensation and of motion.

In the end of the paper certain conclusions are drawn, which have reference to the subjects of the preceding papers of the same author. And here the author advocates the importance of anatomical investigation as superior to experiments on living animals, affirming that erroneous opinions in physiology have been sometimes strengthened instead of corrected by such experiments.

An Account of Experiments made with an Invariable Pendulum at New South Wales, by Major-General Sir Thomas Brisbane, K.C.B. F.R.S. Communicated by Captain Henry Kater, F.R.S., in a Letter to Sir Humphry Davy, Bart. P.R.S. Read June 19, 1823. [Phil. Trans. 1823, p. 308.]

In this communication, laid before the Royal Society at the request of Sir Thomas Brisbane, Captain Kater gives the results of experiments made by Sir Thomas Brisbane and Mr. Dunlop, at Paramatta, in New South Wales ; and by Sir Thomas Brisbane, Captain Kater, and Mr. Rumker, in Portland Place, London, with an invariable pendulum belonging to the Board of Longitude.

The number of vibrations made by this pendulum in a mean solar day at London, in latitude $51^{\circ} 31' 8'' 4$, at the temperature of 60° , and reduced to a vacuum, was found to be 86090.17 : at Paramatta, in latitude $33^{\circ} 48' 43''$ S., by Sir Thomas Brisbane's experiments 86021.59 ; and by those of Mr. Dunlop 86022.21.

Captain Kater, after detailing these observations, proceeds to deduce the compression, and finds it, by comparing the vibrations at London with those resulting from Sir Thomas Brisbane's experiments at Paramatta, to be $\frac{1}{100000}$; by Mr. Dunlop's $\frac{1}{100000}$.

By the comparison of the vibrations at Unst with those at Paramatta, Sir Thomas Brisbane's experiments give $\frac{1}{100000}$, and those of Mr. Dunlop $\frac{1}{100000}$ for the compression.

But the author remarks that these numbers are not to be deemed conclusive, as a small alteration in the number of vibrations made by the pendulum would occasion a considerable difference in the fraction indicating the compression.