

On the Nerves of the Face; being a second Paper on that Subject.
 By Charles Bell, Esq. F.R.S. Read May 28, 1829. [*Phil.*
Trans. 1829, p. 317.]

After recapitulating the contents of his former paper, the author cites cases which have occurred since its publication, in support of his doctrine, first, that the sensibility of the head and face depends on the fifth pair of nerves; secondly, that the muscular branches of that pair are subservient to mastication; and, thirdly, that the portio dura of the seventh pair controls those motions of the parts of the face, whether voluntary or involuntary, which are connected with respiration. Instances are given of lesions of the portio dura, from accident or from disease, followed by paralysis of the muscles on the same side of the face, while the sensibility remained. On the other hand, cases are related of injury to the fifth pair, being attended with loss of sensibility in all the parts receiving branches from the injured nerve, while the power of motion continued unimpaired. In one case of this description, where one half of the under lip had become insensible, on a tumbler being applied to the mouth, the patient imagined it was a broken glass that he touched. A similar delusion was experienced by another patient, in whom the half of the upper lip had been deprived of sensation by an injury to the sub-orbital branch on the same side. From these facts the author deduces the absurdity of the practice of cutting the portio dura for the relief of tic douloureux.

He next enters into an anatomical description of the course of that division of the fifth pair of nerves, which is unconnected with the Gasserian ganglion, and passes under it, and which he considers as the motor or manducatory portion of the fifth, being distributed to the temporal, masseter, pterygoid, and buccinator muscles; some branches of it supplying the muscles of the lips, and also the mylo-hyoideus and anterior belly of the digastricus, the action of which is to depress the jaw.

In proof that this nerve is destined to manducation, the root of the fifth pair being exposed in an ass, and irritated, the jaws closed with a snap; and on its being divided, the jaw fell relaxed and powerless.

The author next endeavours to show the necessity of an accordance between the motions of the lower jaw and those of the cheeks during mastication; and the probability that this connexion of motions is brought about by means of the connexions which exist among their respective nerves, and between which a sympathy may in consequence be established. In one case violent spasms took place in the masseter and temporal muscles, while the motions of the features were free and unconstrained; and in another, the muscles of the jaw on one side were paralysed, with loss of sensibility on that side of the face. On the other hand, when the portio dura was paralysed, all the muscles of the face wasted, except those supplied by the fifth pair.

The author concludes by a warm tribute of acknowledgement to

his brother-in-law, the late Mr. Shaw, for the valuable assistance he afforded him in the whole course of his investigations on the nerves.

On the Reduction to a Vacuum of Captain Kater's convertible Pendulum. By Captain Edward Sabine, of the Royal Artillery, Secretary to the Royal Society. Read June 18, 1829. [*Phil. Trans.* 1829, p. 331.]

Recent investigations having shown that the method employed by Captain Kater for the reduction of his experiments on the length of the pendulum vibrating seconds in air, to that of the same pendulum *in vacuo*, was founded on erroneous principles, the author undertook to ascertain, by direct experiment, the actual difference of the number of vibrations of the pendulum employed by Captain Kater, in air of ordinary density, and in highly rarefied air. The alteration of density in the medium in which the pendulum is swung, would, in the first place, if its form were not symmetrical, affect its convertibility; that is, the same adjustment of the axes which gave an equality of oscillations in reversed positions, when vibrating in air, would not afford the same equality in a more rarefied medium. It follows also, from the corrected investigation, that the amount of the retardation occasioned by the air is considerably greater than what had been originally computed from the simple consideration of buoyancy.

These inferences have been fully confirmed by the experiments of Captain Sabine. The increase in the number of vibrations *per diem* with the convertible pendulum as it was used by Capt. Kater, that is, vibrating with the great weight below, *in vacuo*, above those in air of the temperature of 49° , under a pressure of 30 inches of mercury at 32° , was 15.71: when inverted, the other conditions remaining the same, the increase was 16.13 vibrations *per diem*.

Captain Kater had observed that considerable changes in the hygrometric state of the atmosphere destroyed the convertibility of his pendulum, from their affecting the weight of the pieces of wood at both of its ends. In order to remove this source of error, and also to ascertain its amount, the author first reduced the wooden tail-pieces from 17 inches, their original length, to 6.4 inches. The increase of the number of vibrations was then, with the great weight above, 14.91, and with the great weight below, 12.41 *per diem*. When the wooden tail-pieces were wholly removed, and slips of brass substituted for them, the increase was further reduced, in like circumstances, to 12.83 in the former case, and 11.58 in the latter.