

in London, in a mean solar day, he finds to be 67·12, from which it results that the compression of the earth is $\frac{1}{884.5}$.

The author is of opinion that the invariable pendulum ought to be a standard instrument in every observatory; that it should be swung at all seasons of the year, and occasionally transferred to various fixed observatories in both hemispheres, and returned again to its original station, where it should undergo a renewed and rigid examination before it is sent round on a fresh circuit of these stations.

To this paper a note is subjoined by Capt. Sabine, containing a correction of the result obtained by Mr. Fallows, resulting from the application of the true elements of reduction for buoyancy and expansion, as stated in his late paper in the *Philosophical Transactions*, which had not reached the Cape when Mr. Fallows made his computations. The result of this correction gives 67·15 vibrations instead of 67·12. But when the observations of Capt. Ronald in London are taken in conjunction with those of Capt. Sabine, the retardation at the Cape is brought back to the exact number stated by Mr. Fallows.

Statement of the principal Circumstances respecting the united Siamese Twins now exhibiting in London. By George Buckley Bolton, Esq. Member of the Royal College of Surgeons, and of the Medical and Chirurgical Society of London. Communicated by the President. Read April 1, 1830. [*Phil. Trans.* 1830, p. 177.]

The twin brothers, of whom an account is given in this paper, were born of Chinese parents in 1811, at a small village in Siam, distant about sixty miles from Bankok, the capital of the kingdom. When the intelligence of their birth had reached the ears of the King of Siam, he gave orders that they should be destroyed, as portending evil to his government; but on being assured that they were harmless, and would be capable of supporting themselves by their own labour, he changed his intention, and suffered them to live. About six years ago Mr. Robert Hunter, a British merchant resident at Siam, saw them, for the first time, in a fishing-boat on the river, in the dusk of the evening, and mistook them for some strange animal. It was only in the spring of last year that permission could be obtained from the Siamese Government to bring them to England. They were taken to Boston, in the United States, where they landed in August last, and six weeks afterwards embarked for England, and arrived in London in November. They are both of the same height, namely, five feet two inches, and their united weight is 180 pounds. They have not the broad and flat forehead so characteristic of the Chinese race, but they resemble the lower class of the people of Canton in the colour of their skins and the form of their features. Their bodies and limbs are well made. The band of union is formed by the prolongation and junction of the ensiform cartilages of each, which meet in the middle of the upper part of the band, and form moveable joints with each other, connected by ligamentous structures. Under-

neath the cartilages there appear to be large hernial sacs opening into each abdomen, into which, on coughing, portions of the intestine are propelled, as far as the middle of the band; though in ordinary circumstances these herniæ are not apparent. The entire band is covered with common integument; and when the boys face each other, its length at the apex is one inch and three quarters, and at the lower edge not quite three inches. Its breadth from above downwards is four inches, and its greatest thickness nearly two inches. In the centre of the lower edge there is a cicatrix of a single navel. It possesses little sensibility, and is of great strength; for upon a rope being fastened to it, the twins may be pulled along without occasioning pain; and when one of them is lifted from the ground, the other will hang by the band alone without sensible inconvenience. For the space of about half an inch from the median line of the band, the sensibility of the skin appears to be common to both. The following experiment was tried upon them by Dr. Roget. A silver tea-spoon being placed on the tongue of one of the twins, and a disk of zinc on the tongue of the other, the moment the two metals were brought into contact, both the boys exclaimed "Sour, sour;" thus proving that the galvanic influence passed from the one to the other through the connecting band.

Their strength and activity are very remarkable. They can throw down, with perfect ease, a powerful man. They run with great swiftness, bend their bodies in all directions, and in their sports often tumble head over heels without the least difficulty or inconvenience. In all the bodily actions in which the concurrence of both is required, such as running, jumping, playing at battledoor and shuttlecock, they exhibit a wonderful consent or agreement without the appearance of any previous communication of their intentions. The intellectual powers of each are nearly equal, and they have both attained the same degree of proficiency in the games of chess, draughts, and whist. They both possess great powers of imitation. In their respective physical constitutions, however, several differences are observable. Chang, as the boy on the left is named, has more vigorous health, and greater regularity of functions, than his brother, whose name is Eng. In general they take their meals and obey the calls of nature at the same time. Asparagus, eaten by either of the twins, communicates its peculiar odour exclusively to the urine of the one who has eaten it.

The author details the circumstances of a catarrhal complaint which attacked both of them in December last, the symptoms and progress of which were similar in both, and from which they both recovered in the same manner and at the same time. In their healthy state their ordinary pulses are generally alike, and are easily excited; but that of the one may be accelerated, while that of his brother continues calm.

In their habits they are very cleanly and delicate; in their dispositions affectionate, and grateful for every kindness shown to them.

There exists between them the most perfect harmony. They always fall asleep at the same moment, and it is impossible to wake the one without also waking the other.

The author adverts, in the course of the paper, to the question whether they were the produce of a single or a double ovum; and also into that of the possibility, at some future time, of effecting their separation with safety to themselves; and he concludes by bearing testimony to the uniform kind treatment they have received from Capt. Coffin, Mr. Hunter, and Mr. Hale, who have evinced on all occasions the greatest anxiety for their welfare and happiness; and to the liberal manner in which they have always afforded access to men of science for promoting any object of philosophical inquiry.

On some Properties in Achromatic Object-glasses applicable to the Improvement of the Microscope. By Joseph Jackson Lister, Esq. Communicated by Dr. Roget, Secretary. Read January 21, 1830. [*Phil. Trans.* 1830, p. 187.]

The principles on which the reflecting, and also the achromatic refracting telescope are constructed, have been recently applied with considerable success to the microscope, and have added much to the power of that instrument. The author speaks with much commendation of the peculiar construction adopted in Mr. Tulley's compound achromatic microscopes, consisting of a combination of object-glasses of short focus and large aperture, the curvatures of which are such as very nearly to equalize the refractions produced by each. As the magnitude of the aperture, he observes, is valuable only in proportion to that of the pencil of light which it admits, the latter circumstance is that which chiefly claims attention; and as it is often erroneously estimated, a method is pointed out of ascertaining it with sufficient exactness for every practical purpose. He then enters into a detailed description of the several parts of an instrument in his possession constructed on the principles he recommends, referring to the drawings which accompany the paper. The magnifying power may be varied at pleasure, either by drawing out the tubes containing the eye-pieces, or by substituting an eye-glass of different power, or differently combined; and by these changes an uninterrupted range of amplification is obtained from 35 to 800 diameters. No sensible difference as to distinctness is observable, whether the effect is produced by changing the eye-piece, or varying the length of the tubes. The construction of the instrument admits of the utmost variation of magnifying power without the risk of losing sight of the object viewed: and every part which relates to the illumination being wholly detached from the stage, ample opportunity is afforded of rapidly moving the objects, and bringing into view a succession of them, while the light remains the same. Minute directions are given for the employment of the instrument, and its application to various purposes; and great stress is laid on the importance of a skilful management of the light.