

that a pencil of light reflected from the second surface of a transparent plate, and reaching the eye after two refractions and an intermediate reflexion, contains, at all angles of incidence, from zero to the maximum polarizing angle, a portion of light polarized in the plane of reflexion. Above the polarizing angle, the part of the pencil polarized by reflexion diminishes until the cosine of the sum of the angles of incidence and reflexion equals the cube of the cosine of the difference between these two angles, when it disappears, and the whole pencil has the character of common light. Above this last angle, the pencil contains a quantity of light polarized perpendicularly to the plane of reflexion, which increases to a maximum, and then diminishes to zero, when the angle has attained  $90^\circ$ . The effect of the two refractions in M. Arago's experiment, was to make the two quantities of light appear equal, when in fact the one was exactly double of the other.

The paper concludes with formulæ and tables for computing the exact quantities of polarized light at all angles of incidence.

*Observations made with the Invariable Pendulum (No. 4. Jones), at the Royal Observatory, Cape of Good Hope, for the purpose of determining the Compression of the Earth. By the Rev. Fearon Fallows, F.R.S. Astronomer of the Cape Observatory. Communicated by the Lords Commissioners of the Admiralty. Read February 18, 1830. [Phil. Trans. 1830, p. 153.]*

Of the two methods employed for determining the figure of the earth, namely, the direct measurements of arcs of the meridian, or of ascertaining the variations in the length of the seconds pendulum in different places, the author remarks that the former is attended with the collateral benefit of fixing the geographical position of certain stations in the country surveyed; but the latter possesses the advantage of enabling the observer to concentrate, under his own immediate eye, the results of his inquiries. The Observatory at the Cape of Good Hope having been furnished by the Lords Commissioners of the Admiralty with the invariable pendulum of Jones, which had for several years been strictly examined by Capt. Sabine, the author was anxious to begin a series of experiments with it; and as it was not likely that the observatory would be completed for a considerable time, he caused a strong brick pier to be built in an adjoining outhouse for the support of a transit instrument, the same which he had used in forming his catalogue of southern stars. He gives a detailed account of his mode of fitting up the clock, and other parts of the apparatus necessary for the pendulum experiments. He was ably assisted by Capt. Ronald and Lieut. Johnson, who took an active part in all the observations. He remarks, that the near agreement of the three independent series of observations, made by himself and these two gentlemen, and which accompany the paper, is no small argument in favour of their accuracy. The difference in the number of vibrations of the seconds pendulum at the Cape, from that

in London, in a mean solar day, he finds to be  $67\cdot12$ , from which it results that the compression of the earth is  $\frac{1}{2885}$ .

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  $67\cdot15$  vibrations instead of  $67\cdot12$ . 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 Bangkok, 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-