transferred to Paris by an assumed retardation of 12ˢ, gives a length differing from M. Biot's by 0·00023. Borda's agrees within 0·00079 with M. Biot's, and Captain Kater's, so transferred, holds very nearly a mean between the two, but approaches rather nearer to Biot's than to Borda's.

On the Measurement of High Temperatures. *By* James Prinsep, *Esq. Assay Master of the Mint at Benares.* *Communicated by* Peter Mark Roget, *M.D. Secretary of the Royal Society.* Read December 13, 1827. [*Phil. Trans.* 1828, *p.* 79.]

The author, after adverting to the many abortive endeavours of former experimentalists to obtain instruments for the accurate admeasurement of high temperatures, and after suggesting doubts as to the confidence to which Wedgwood's pyrometer is entitled, describes several attempts of his own to effect this very desirable object. In the course of his inquiries, a remarkable fact presented itself to his notice in the change which occurred in an index constructed on the compensation principle, and formed by two slips of metal, the one of silver and the other of gold, originally quite pure, and united without any alloy. In the course of a few years, although it had never been subjected to a heat above that of melting lead, the whole surface of the gold became converted into an alloy of silver, the impregnation extending gradually to a considerable depth in the gold, and destroying the sensibility of the instrument to changes of temperature. After trying various plans, he gave the preference to one founded on the following principles: namely, that the fusing points of the pure metals are fixed and determined; that those of the three noble metals, namely, silver, gold, and platina, comprehend a very extensive range of temperature; and that between these three fixed points in the scale, as many intermediate ones as may be required may be obtained by alloying the three metals together in different proportions. When such a series of alloys has been once prepared, the heat of any furnace may be expressed by the alloy of least fusibility which it is capable of melting. The determinations afforded by a pyrometer of this kind will, independently of their precision, have the advantage of being identifiable at all times and in all countries: the smallness of the apparatus is an additional recommendation, nothing more being necessary than a little cupel, containing in separate cells the requisite number of pyrometric alloys, each of the size of a pin's head. The specimens melted in one experiment need only to be flattened under the hammer in order to be again ready for use. For the purpose of concisely registering the results, the author employs a simple decimal method of notation, which at once expresses the nature of the alloy, and its correspondence with the scale of temperature. Thus G .23 P would denote an alloy of gold with 23 per cent. of platina. As the distance between the points of fusion of silver and of gold is not considerable, the author divides this distance on the scale into ten degrees; obtaining measures of each by a suc-

cessive addition of 10 per cent. of gold to the silver, the fusion of which, when pure, marks the point of zero; while that of gold is reckoned at ten degrees. If minuter subdivisions were required for particular objects of research, these might easily be made, following always the decimal series. From the point of fusion of pure gold to that of pure platina, the author assumes 100 degrees, adding to the alloy which is to measure each in succession 1 per cent. of platina. Whether these hypothetical degrees represent equable increments of temperature is a question foreign to the purpose of this paper, and must be the subject of future investigation. The author then enters into a detailed account of the method he employed for insuring accuracy in the formation of the requisite series of alloys, and of various experiments undertaken to ascertain their fitness as measures of high temperatures. The determinations of the heats of the different furnaces adapted to particular objects, are given in a tabular form. The remaining portion of the paper contains the recital of the author's attempts to determine by means of an apparatus connected with an air thermometer, the relation which the fusing point of pure silver bears to the ordinary thermometric scale. An extensive series of experiments, of which the results are given in a table, were made with this apparatus. From the data thus afforded, after making the necessary corrections, the author deduces the following results in degrees of Fahrenheit: viz. A full red heat 1200°; orange heat 1650°; melting point of silver (which had been estimated by Wedgewood at 4717°, and by Daniell at 2233°,) 1830°; of silver alloyed with one tenth gold 1920°.

The paper is accompanied with drawings of the apparatus employed.

On Captain Parry's *and Lieutenant* Foster's *Experiments on the Velocity of Sound. By Dr.* Gerard Moll, *Professor of Natural Philosophy in the University of Utrecht. Communicated by Captain* Henry Kater, *V.P.R.S.* Read January 17, 1828. [*Phil. Trans.* 1828, *p.* 97.]

In this paper the author institutes a comparison between the results of the experiments on the velocity of sound made by Captain Parry and Lieutenant Foster in the arctic regions, and those deduced from the theoretical formula of Laplace. At the temperature of −17°·72 of Fahrenheit, and with a barometric pressure of 29·936 inches, the mean result of all the observations gave a velocity of 1036·19 feet per second. With the same data, this velocity, by calculation according to the formula of Laplace, would be 1017·72; differing from the observed velocity by 17·47 feet only. Similar comparisons of particular observations, which are selected as being made under favourable circumstances, with the deductions from theory, are made by the author with but little variation in the results. From the whole investigation, he draws the conclusion, that in very high latitudes, where the cold is very intense, the data on which the