liquity, gives the diminution for an interval of nearly sixty years, with almost sufficient accuracy to state with some confidence the mass of Venus; but to obtain this point with certainty, the present obliquity, deduced from a mean of the observations of different astronomers, should be used. Upon this subject the author alludes to the opinion of astronomers, that observations of the winter solstice have given a less obliquity than those of the summer solstice,—an opinion sustained by the observations of Maskelyne, Arago, and Pond, but questioned by Bessel and Bradley. Dr. Brinkley refers this difference to some unknown modification of refraction; he has observed that at the winter solstice the irregularity of refraction for the sun is greater than for the stars at the same zenith-distance. He points out the necessity of paying attention to the observations at the winter solstice, and gives a table, exhibiting the mean obliquity reduced to January 1813.

Dr. Brinkley next alludes to the maximum of the aberration of light, which appears from his observations of last year to be 20″·80.

On some New Methods of investigating the Sums of several Classes of Infinite Series. *By* Charles Babbage, *Esq. A.M. F.R.S.* Read April 1, 1819. [*Phil. Trans.* 1819, *p.* 249.]

The object of this paper is to explain two methods of finding the sums of a variety of infinite series. One of these the author discovered several years ago; but finding that some of the results to which it led were erroneous, he then declined publishing it. In inquiring into the causes of these errors, he was led to the second method, which employs the process of integration relative to finite differences. The cause of the fallacies in the former method was afterwards discovered, and in this paper a criterion is proposed for judging of the truth of the results, and a mode of correcting them where found to be erroneous. The sums of a variety of series are found by these methods; and the author concludes by observing, that he has since been informed by M. Poisson, that that gentleman had arrived at some nearly similar results in investigating a problem in physical astronomy, and also that some investigations of a similar nature were found amongst the papers of Lagrange, but that neither of these mathematicians had explained the cause of the errors, or given a method of correcting them.

On the Optical and Physical Properties of Tabasheer. *By* David Brewster, *LL.D. F.R.S. Lond. and Edin. In a Letter to the Right Hon. Sir* Joseph Banks, *Bart. G.C.B. P.R.S. &c.* Read May 6, 1819. [*Phil. Trans.* 1819, *p.* 283.]

Tabasheer is a substance found in the cavities of the bamboo, existing originally in the state of a transparent fluid, but gradually indurating into a solid of different degrees of hardness: it consists of 70 silica, + 30 potash and lime. One variety has a milky trans-

parency, transmitting a yellowish, and reflecting a bluish light; another is translucent, and a third opake: the two first varieties become transparent, and evolve air when immersed in water: the third evolves air also, but remains opake. If the first varieties be only slightly wetted they become quite opake. The property of acquiring transparency by the evolution of air from, and the absorption of water by its pores, belongs also to the hydrophanous opal; but the faculty of becoming opake by a small quantity, and transparent by a larger, of water, shows a singularity of structure in tabasheer. As the tabasheer disengages more air than hydrophane, its pores must be more numerous; and therefore the transmission of light, so as to form a perfect image, indicates either a very feeble refractive power or some peculiarity in the construction of its pores. To determine this, Dr. Brewster formed a prism of tabasheer with an angle of 34° 15′, and upon measuring its refractive power found it very low, though various in different specimens, the index of refraction varying from 1·11 to 1·18, that of water being 1·33, of flint-glass 1·60, of sulphur 2·11, of phosphorus 2·22, and of the diamond 2·47. So that tabasheer has a lower refractive power than any other solid or liquid, and holds an intermediate place between water and the gases. Dr. Brewster then gives a formula for computing the absolute refractive power of bodies, and a table of results, from which it appears that, in this respect, the refractive power of tabasheer is so low as to be separated by a considerable interval from all other bodies.

The author next proceeds to detail a variety of experiments upon the absorbent powers of the different kinds of tabasheer, in respect to several liquids, and the corresponding effects upon its optical properties and specific gravity, and concludes with observations on the cause of the paradox exhibited by the transparent tabasheer, in becoming opake by absorbing a small quantity of water, and transparent when the quantity is increased.

An Account of a Membrane in the Eye, now first described. By Arthur Jacob, *M.D., Member of the Royal College of Surgeons in Ireland, Demonstrator of Anatomy and Lecturer on Diseases of the Eye in the University of Dublin. Communicated by* James Macartney, *M.D. F.R.S.* Read July 1, 1819. [*Phil. Trans.* 1819, *p.* 300.]

In this paper the author describes a delicate transparent membrane, covering the external surface of the retina, and united to it by cellular substance and vessels. Its appearance varies in the different classes of animals, and at different ages. In young animals it is transparent and tender; but in the adult firm, and stained by the pigment. In fishes, it has been described by Haller and Cuvier as the medullary layer of the retina; but the author thinks incorrectly, since it presents no character of nervous structure, and the retina remains perfect before it. The author concludes this com-