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-

munication by describing his mode of examining delicate anatomical structures :—He procures a hollow sphere of glass, between two and three inches in diameter, of which one fourth is cut off at the open part, and the edges ground so as to fit upon a plate of glass to which the object is attached and immersed in water; the sphere is then filled with water, and inverted over the object upon the plate. The whole being withdrawn from the basin the object may be examined, and the portion of the sphere filled with water furnishes a convenient magnifying power.

A New Method of Solving Numerical Equations of all Orders, by continuous Approximation. By W. G. Horner, *Esq. Communicated by* Davies Gilbert, *Esq. F.R.S.* Read July 1, 1819. [*Phil. Trans.* 1819, *p.* 308.]

The process which the author endeavours to establish in this essay, being the leading theorem in the calculus of derivations, presented under a new aspect, may, he says, be regarded as an universal instrument of calculations, extending to the composition as well as analysis of functions of every kind, but it promises to be especially useful in the numerical solution of equations.

Mr. Horner then proceeds to the illustration of his method, and to explain the investigations to which it is applicable, by details which do not admit of explanation.

An Account of Experiments for Determining the Variation in the Length of the Pendulum Vibrating Seconds, at the principal Stations of the Trigonometrical Survey of Great Britain. By Captain Henry Kater, *F.R.S.* Read June 24, 1819. [*Phil. Trans.* 1819, *p.* 337.]

In this communication Captain Kater, having noticed the circumstances to which his researches owe their origin, proceeds to detail his investigations, and to describe the implements and apparatus employed in his various inquiries; the construction of the pendulum and its appendages is minutely explained, as also the rate of its expansion for each thermometric degree, whence is deduced the corresponding correction to be applied to the number of its vibrations. The operations at each station, with their results, are enumerated at length, and illustrated by numerous tables. The length of the seconds pendulum for the latitude of London is 39·13722 inches in parts of the scale which forms the basis of the trigonometrical survey; for the latitude of Unst 39·16939 inches, of Portsay 39·15952, of Leith Fort 39·15347, of Clifton 39·14393, of Arbury Hill 39·14043, and of Shanklin Farm 39·13407 inches. The calculation of the latitude of each of these stations is given at length, to afford the opportunity of any further examination desirable on that subject; but these and the other details relating to calculation do not admit of abridgement.

Captain Kater concludes this paper with some observations re-