

circulating fluids in these animals as the great agent both in the absorption and the growth of parts, and throws out the suggestion, that as it flows into the stomach, it may also act as a solvent to the food received into that cavity. The particles which exist in these fluids show their analogy to those in the blood of the higher animals on the one hand, and to those in the sap of vegetables on the other: some appear to be derived from the digested food, and others from the melting down of parts absorbed. In these polypi the author never saw the least appearance of cilia, or of currents in the surrounding water, which are so frequently met with in other tribes of zoophytes.

The latter part of the paper is occupied by the account which the author gives of his various observations, first, on *Ascidie*, of which he enters into an anatomical description; secondly, on the internal currents of water, permeating the branchial sacs, and determined by the vibratory movements of cilia which are seen in that animal; and, thirdly, on the alternations in the course of the circulation of the blood in the vessels, which at one time flows in one direction, and, after a certain interval, takes the contrary course; so that the same vessel which at one time performs the function of an artery, performs, at another, that of a vein. This phenomenon of alternate currents, like that in the *Sertularia*, was met with in every specimen of *Ascidie* which was examined by the author, and also in a *Polyclinium*.

The paper concludes with several observations on *Flustræ*, from which, as far as relates to the circulation of currents, the author was led to results in many respects analogous to the preceding.

A paper was then read, entitled, "On the Theory of the Moon." By J. W. Lubbock, Esq., V.P. and Treasurer of the Royal Society.

The author, adverting to the appearance of M. Plana's admirable work entitled *Théorie du Mouvement de la Lune*, enters into a comparison of the analytical methods employed by that author and M. Damoiseau, and points out some differences in the numerical values of the coefficients of some of the arguments in the expression for the true longitude of the moon in terms of her mean longitude. He then prosecutes the subject by a series of analytical investigations, which are not susceptible of abridgement, but from which he obtains formulæ which do not quite agree with those of M. Plana.

A paper was also read, entitled, "Some Suggestions relative to the best method of employing the new Zenith Telescope lately erected at the Royal Observatory." By John Pond, Esq., F.R.S., Astronomer Royal.

During the observations made by the author, in the course of last summer, with the new zenith telescope lately erected at the Royal Observatory, for the purpose of measuring the zenith distance of γ Draconis, it occurred to the author to avail himself of subsidiary observations on another star, of about the fifth magnitude, which has nearly the same zenith distance towards the south that γ Draconis has towards the north, and which passes the meridian between 20 and 30 minutes, in time, after it. The angular distance between the

two stars being determined in the usual manner, by observing them on the same night, and in the same position of the instrument, gives the *sum* of their zenith distances : and if on the next or some following night γ Draconis be observed, and after its passage the instrument be turned half round, and the other star observed, then the difference of the measure, as read on the micrometer, will be the *difference* of the zenith distances of the two stars. These sums and differences, thus ascertained on different nights, will be independent of any change that may happen to the instrument in the interval. This method affords the means of determining, with almost unlimited precision, the value of the small equations which become the subject of investigation in the employment of the instrument. Thus all changes of the position of the stars, occasioned by aberration, nutation, &c., will produce double the effect on the small differential or subsidiary angles, as measured by this method. For the investigations of these small equations it will not be necessary to have determined either the exact zenith distance of each star, or the exact difference of their zenith distances, or the absolute magnitude of this subsidiary angle ; its variation from time to time being the only important object of research. The author is led to expect that this property may, at some future period, be applied with advantage in investigations made with moveable zenith instruments.

March 20th, 1833.

MARK ISAMBARD BRUNEL, Esq., Vice-President, in the Chair.

A paper was read, entitled, " Narrative of the Proceedings of Commander Thomas Dickinson, of His Majesty's Sloop *Lightning*, while employed in the Enterprise for the Recovery of the Public Stores and other property sunk in His Majesty's late Frigate *Thetis*, on the south-west side of the Island of Cape Frio." By Commander Thomas Dickinson, R.N. Communicated by P. M. Roget, M.D., and J. G. Children, Esq., Secretaries to the Royal Society. It was preceded by the reading of a letter from the author to the Secretary, explaining the reasons which induced him to lay this narrative before the Royal Society, and place on the records of its proceedings the information it contains relative to the commencement of an enterprise, wholly planned and undertaken by himself, and which, under his superintendence, was, by the great, persevering and meritorious exertions of his officers and crew, most successfully accomplished.

The narrative commences with the statement of the consternation produced at Rio de Janeiro on the receipt of the intelligence of the loss of the *Thetis*, with a freight of about 810,000 dollars, on the south-west side of the island of Cape Frio, and of the determination of the author, on finding that no one seemed disposed to take any step towards the recovery of the property thus lost, to make the attempt himself, if he could obtain from the Commander-in-chief at that