

opinion maintained in an anonymous letter from Freyberg, published in the 4th volume of Mr. Nicholson's Journal, are sufficient to diminish in any degree the value of that assistance which mineralogy derives from chemical investigation.

*Description of the Anatomy of the Ornithorhynchus Hystrix.* By Everard Home, *Esq. F.R.S.* Read June 3, 1802. [*Phil. Trans.* 1802, p. 348.]

The specimen from which this description was taken, and which was exhibited to the Society at their Meeting, was brought from New South Wales. It is a male, probably arrived at its full growth. It is seventeen inches in length from the point of the bill to the extremity of the tail; and its greatest circumference measures likewise about seventeen inches. Its back and sides are covered with quills, the longest of which are about two inches and a half in length. Its bill projects from the head one inch and three-fourths, tapering from its base, where it is seven-eighths of an inch in diameter to its point, where its diameter is not above three-eighths of an inch. It is tubular, convex on the upper, and flat on the lower surface. The tongue is cylindrical, very small towards the point, and eight inches long. This species has a peculiarity in its mode of managing its food, which distinguishes it from the *Paradoxus*. The food is first bruised by small horny prominences adhering to the tongue and palate, and then swallowed with a certain quantity of sand, the stomach being sufficiently large to contain this extraneous matter, together with the food, and effectually defended from injury by a cuticular lining.

Mr. Home proceeds, with his usual accuracy and minuteness, in his technical description, both of the external and internal parts, which he illustrates with a number of figures. Having completed this detail, he observes in general, that this species of *Ornithorhynchus* being a nearer approach to the more perfect quadruped than the *Paradoxus*, and its tongue being in some respects similar to those of the *Manis* and *Myrmecophaga*, he thought it necessary to look among the different species of these genera for other parts of resemblance. The result of this comparison is, that the *Ornithorhynchus* is essentially different from all other quadrupeds, bearing in some respects a resemblance to birds, and in others to the *Amphibia*, so that it may be considered as an intermediate link between the classes *Mammalia*, *Aves*, and *Amphibia*. To the first class it no doubt approaches nearest in the instance of the *Myrmecophaga*; and to the birds it bears a singular affinity in the male organs of generation, as is here illustrated by comparing its penis with that of the drake.

From the whole of this investigation are deduced the following characters as peculiar to this animal, considered as a genus. The male has a spur on the two hind legs, close to the heel. The female has no nipples, differing essentially in this, as well as in the organs of generation, from the *Mammalia*. The beak is smooth, while the rest of the animal is covered with hair. The tongue has horny pro-

cesses, which answer the purposes of teeth. The penis of the male is solely appropriated to the passage of the semen, its external orifice being subdivided into several openings, so as to scatter the semen over an extent of surface, while the urine passes by a separate canal into the rectum. And lastly, the female has no common uterus, the tubes, which correspond to the horns of the uterus in other quadrupeds, receiving the semen immediately from the penis of the male.

Mr. Home concludes his paper with a conjecture, that more species of this extraordinary animal will be gradually discovered; a drawing having already been received from Van Diemen's Land of an individual similar to the *Hystrix* here described, only with the spines much shorter. And he thinks it probable that the class will in time be found to consist of various kinds, and that those hitherto known will be arranged under different genera.

*A Method of examining refractive and dispersive Powers, by prismatic Reflection.* By William Hyde Wollaston, M.D. F.R.S. Read June 24, 1802. [*Phil. Trans.* 1802, p. 365.]

The principle of this method depends on the reflection of light at the inner surface of a denser refracting medium. Its application in the first instance is deduced from a theorem, from which we gather, that since the range of inclination within which total reflection takes place, depends not only on the density of the reflecting prism, but also on the rarity of the medium adjacent to it, the extent of that range will vary according to the difference of the densities of the two media. And that hence when the refractive power of one medium is known, that of the rarer medium may be thence inferred, by ascertaining the angle at which the ray of light will be reflected from it.

Having exemplified this by several instances of different media, the author proceeds to give an account of an instrument he has contrived for the purpose of applying this principle to practice. Its object is to measure by mechanical means, which can only be understood by inspecting the drawing annexed to the paper, the sine representing the refractive power of the medium applied to the prism. One of the advantages which this method possesses above the usual mode of examining refractive powers is, that whereas hitherto it was necessary that the substances under examination should have two surfaces inclined towards each other under a known angle, this method enables us to deduce the results from only one surface, and without any computation. Hence also, as trials can be made by mere contact, may the refractive powers of opaque bodies be easily determined. And these powers in different bodies may likewise be used as convenient tests in many philosophical inquiries.

This method applies also to media of which the refractive densities are not uniform, such as the crystalline lens in the eyes of animals, which is now known to be more dense in the centre than at its surface. It is here shown in what manner, by placing one of these varied media in contact with a prism, all its gradations of density,