

double course from the Earth to the Moon, and from thence to our eye. "Thus, when we have better photometric instruments at our command, we may be able," as Arago remarks,* "to read in the Moon the history of the *mean condition* of the diaphaneity of our atmosphere." The first correct explanation of the nature of the ash-colored light of the Moon is ascribed by Kepler (*ad Vitellionem Paralipomena, quibus Astronomiæ pars Optica traditur*, 1604, p. 254) to his highly venerated teacher Mästlin, who had made it known in a thesis publicly defended at Tübingen in 1596. Galileo spoke (*Sidereus Nuncius*, p. 26) of the reflected terrestrial light as a phenomenon which he had discovered several years previously; but a century before Kepler and Galileo, the explanation of terrestrial light visible to us in the Moon had not escaped the all-embracing genius of Leonardo da Vinci. His long-forgotten manuscripts furnished a proof of this.†

In the total eclipse of the Moon, the disk very rarely disappears entirely; it did so, according to Kepler's earliest observation,‡ on the 9th of December, 1601, and more recently, on the 10th of June, 1816; in the latter instance so as not to be visible from London, even by the aid of telescopes. The cause of this rare and extraordinary phenomenon must be a

* *Séance de l'Académie des Sciences, le 5 Août, 1833*, "M. Arago signale la comparaison de l'intensité lumineuse de la portion de la Lune que les rayons solaires éclairent directement, avec celle de la partie du même astre qui reçoit seulement les rayons réfléchis par la Terre. Il croit d'après les expériences qu'il a déjà tentées à cet égard, qu'on pourra, avec des instrumens perfectionnés, saisir dans la *lumière cendrée* les différences de l'éclat plus ou moins nuageux de l'atmosphère de notre globe. Il n'est donc pas impossible, malgré tout ce qu'un pareil résultat exciterait de surprise au premier coup d'œil, qu'un jour les météorologistes aillent puiser dans l'aspect de la Lune des notions précieuses sur l'état moyen de diaphanéité de l'atmosphère terrestre, dans les hémisphères qui successivement concourent à la production de la lumière cendrée." "M. Arago pointed out the comparison between the luminous intensity of that portion of the Moon which is illuminated directly by the solar rays, and that portion of the same body which receives only the rays reflected by the Earth. After the experiments which he has already made in reference to this subject, he is of opinion that with improved instruments it will be possible to detect in the *ashy light* indications of the differences in brightness, more or less cloudy, of the atmosphere of our globe. It is not, therefore, impossible, notwithstanding the surprise which such a result may excite on the first view, that one day meteorologists will derive valuable ideas as to the *mean state* of the diaphaneity of our atmosphere in the hemispheres which successively contribute to the production of the ashy light."

† Venturi, *Essai sur les Ouvrages de Leonard de Vinci*, 1797, p. 11.

‡ Kepler, *Paralip. vel Astronomiæ pars Opticæ*, 1604, p. 297.