translucent illuminated ether which lay beyond them.* Derham, and even Huygens, did not appear disinclined to explain in a similar manner the mild radiance of the nebulæ.†

When we compare the stars of the first magnitude, which, on an average, are certainly the nearest to us, with the non-nebulous telescopic stars, and further, when we compare the nebulous stars with unresolvable nebulæ, for instance, with the nebula in Andromeda, or even with the so-called planetary nebulous vapor, a fact is made manifest to us by the consideration of the varying distances and the boundlessness of space, which shows the world of phenomena, and that which constitutes its causal reality, to be dependent upon the *propagation of light.* The velocity of this propagation is, according to Struve's most recent investigations, 166,072 geographical miles in a second, consequently almost a million of times greater than the velocity of sound. According to the measurements of Maclear, Bessel, and Struve, of the parallaxes and distances of three fixed stars of very unequal magnitudes (*a* Centauri, 16 Cygni, and *a* Lyræ), a ray of light requires respectively 3, $9\frac{1}{4}$, and 12 years to reach us from these three bodies. In the short but memorable period between 1572 and 1604, from the time of Cornelius Gemma and Tycho Brahe to that of Kepler, three new stars suddenly appeared in Cassiopeia and Cygnus, and in the foot of Serpentarius. A similar phenomenon exhibited itself at intervals in 1670, in the constellation Vulpis. In recent times, even since 1837, Sir John Herschel has observed, at the Cape of Good Hope, the brilliant star η in Argo increase in splendor from the second to the first magnitude.‡ These events in the universe belong, however, with reference to their historical reality, to other periods of time than those in which the phenomena of light are first revealed to the inhabitants of the Earth : they reach us like the voices of the past. It has been truly said, that with our large and powerful telescopic instruments we penetrate alike through the boundaries of time and space : we measure the former through the latter, for in the course of an

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* Aristot., *Meteor.*, ii., 5, 1. Seneca, *Natur. Quæst.*, i., 14, 2. "Cœlum discessisse," in Cic., *de Divin.*, i., 43.

† Arago, in the *Annuaire*, 1842, p. 429.

‡ In December, 1837, Sir John Herschel saw the star η Argo, which till that time appeared as of the second magnitude, and liable to no change, rapidly increase till it became of the first magnitude. In January, 1838, the intensity of its light was equal to that of *a* Centauri. According to our latest information, Maclear, in March, 1843, found it as bright as Canopus; and even *a* Crucis looked faint by η Argo.