

However wonderful are the improvements made in optical instruments within scarcely sixty years, we are at the same time too well acquainted with the difficulties of their construction to indulge in the bold and even unlicensed anticipations so ardently cherished by the intellectual Hooke from 1663 to 1665.\* Moderation in the expectations entertained will be the most likely to lead to their fulfillment. Each succeeding generation has reaped the noblest and most exalted results from the triumphs of free intellect in the different stages to which art has gradually exalted itself. Without attempting to express in definite numbers the distances to which the space-penetrating powers of telescopic vision may already reach, and without attaching much confidence to such numbers, the knowledge of the velocity of light yet proclaims that the appearance of the remotest star—the light-generating process on its surface—is the “most ancient sensuous evidence of the existence of matter.”†

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### β. THE SOLAR REGION.

PLANETS AND THEIR SATELLITES.—COMETS.—RING OF THE ZODIACAL LIGHT.—SWARMS OF METEOR-ASTEROIDS.

ON passing, in the Uranological portion of the physical description of the universe, from the heaven of the fixed stars to our solar and planetary system, we descend from the great and universal to the relatively small and special. The domain of the Sun is the domain of one individual fixed star among the millions revealed to us in the firmament by telescopic aid—the limited space in which very various cosmical bodies, in obedience to the direct attraction of a central body, revolve around it in more or less extended orbits, whether they are isolated or encircled by other bodies similar to themselves. Among the stellar bodies whose arrangement we have endeavored to consider in the sidereal portion of the Uranology, there is, indeed, a class of those millions of telescopic fixed stars—*double stars*—which exhibit *special*, binary, or multiple systems; but notwithstanding the analogy presented by the forces by which they are impelled, they yet differ in their natural character from our solar system. In

\* Lettre de Mr. Hooke à M. Auzout, in the *Mém. de l'Académie*, 1666-1699, tom. vii., partie ii., p. 30, 73. † *Cosmos*, vol. i, p. 154.