

Here, too, we find differences existing in the solidity or density of the spheroidally agglomerated matter. Our own solar system presents all stages of *mean* density (or of the relation of *volume* to *mass*.) On comparing the planets from Mercury to Mars with the Sun and with Jupiter, and these two last named with the yet inferior density of Saturn, we arrive, by a descending scale—to draw our illustration from terrestrial substances—at the respective densities of antimony, honey, water, and pine wood. In comets, which actually constitute the most considerable portion of our solar system with respect to the number of individual forms, the concentrated part, usually termed the *head*, or *nucleus*, transmits sidereal light unimpaired. The mass of a comet probably in no case equals the five thousandth part of that of the earth, so dissimilar are the formative processes manifested in the original and perhaps still progressive agglomerations of matter. In proceeding from general to special considerations, it was particularly desirable to draw attention to this diversity, not merely as a possible, but as an actually proved fact.

The purely speculative conclusions arrived at by Wright, Kant, and Lambert, concerning the general structural arrangement of the universe, and of the distribution of matter in space, have been confirmed by Sir William Herschel, on the more certain path of observation and measurement. That great and enthusiastic, although cautious observer, was the first to sound the depths of heaven in order to determine the limits and form of the starry stratum which we inhabit, and he, too, was the first who ventured to throw the light of investigation upon the relations existing between the position and distance of remote nebulae and our own portion of the sidereal universe. William Herschel, as is well expressed in the elegant inscription on his monument at Upton, broke through the inclosures of heaven (*cœlorum perrupit claustra*), and, like another Columbus, penetrated into an unknown ocean, from which he beheld coasts and groups of islands, whose true position it remains for future ages to determine.

Considerations regarding the different intensity of light in stars, and their relative number, that is to say, their numerical frequency on telescopic fields of equal magnitude, have led to the assumption of unequal distances and distribution in space in the strata which they compose. Such assumptions, in as far as they may lead us to draw the limits of the individual portions of the universe, can not offer the same degree of mathematical certainty as that which may be attained in all that