light of a satellite revolving round *α* Centauri would have to traverse in order to reach our telescopic vision. But is it absolutely necessary that we should assume the existence of satellites around the fixed stars? For when we cast a glance at the subordinate particular systems within our large planetary system, we find that, notwithstanding the analogies which may present themselves in planets attended by many satellites, there are others, such as Mercury, Venus, and Mars, which have no attendant moons. If we disregard that which is merely possible, and limit ourselves to the consideration of that which is actually explored, we shall be vividly impressed with the idea that the solar system, especially in the great mutual connection revealed to us during the last ten years, yields the richest image of the evident and direct relations borne by many cosmical bodies to a special one.

The more limited sphere of the planetary system affords by its very limitation undoubted advantages, both as to the certainty and correctness of the facts ascertained by measuring and calculating astronomy, over the results of a contemplation of the heaven of the fixed stars. Many of these results are only connected with contemplative astronomy, through the medium of stellar swarms and nebulous groups, as well as of the insecurely-based photometric arrangement of the stars. The most certain and brilliant portion of astrognosy is the determination of positions by right ascension and declination —a department of astronomical science that has been very extensively improved and increased in our own day, in reference to isolated fixed stars, double stars, stellar masses, and nebulæ. Equally difficult, although more or less accurately measurable relations likewise present themselves in the proper motion of the stars—the elements from which their parallaxes are determined—telescopic star-gauging, which leads

that of Uranus, according to Hansen, about 1586 millions. The distance of Sirius amounts, according to Galle (assuming the parallax computed by Henderson), to 896,800 radii of the Earth's orbit, or 74,188,000 millions of geographical miles, a distance which gives fourteen years for the passage of light. The aphelion of the comet of 1680 is forty-four times the distance of Uranus, and therefore twenty-eight times that of Neptune from the Sun. According to these assumptions, the Sun's distance from the star *α* Centauri is nearly 270 times that of this comet in its aphelion, which we regard as the minimum of the very bold estimates of the radius of the solar system (see p. 204). The estimate of such numerical relations has, at all events, this merit, notwithstanding other defects, that the assumption of a very high standard of measurement of space leads to results which may be expressed in smaller numbers