

at different heights and in various directions over the field of view, of 15' in diameter, of his twenty-foot reflecting telescope. Frequent reference has already been made in the present work to his laborious process of "gauging the heavens." The field of view each time embraced only  $\frac{1}{833333}$ th of the whole heavens; and it would therefore require, according to Struve, eighty-three years to gauge the whole sphere by a similar process.\* In investigations of the partial distribution of stars, we must specially consider the class of magnitude to which they photometrically belong. If we limit our attention to the bright stars of the first three or four classes of magnitudes, we shall find them distributed on the whole with tolerable uniformity,† although in the southern hemisphere, from  $\epsilon$  Orionis to  $\alpha$  Crucis, they are locally crowded together in a splendid zone in the direction of a great circle. The various opinions expressed by different travelers on the relative beauty of the northern and southern hemispheres, frequently, I believe, depends wholly on the circumstance that some of these observers have visited the southern regions at a period of the year when the finest portion of the constellations culminate in the daytime. It follows, from the gaugings of the two Herschels in the northern and southern hemispheres, that the fixed stars from the fifth and sixth to the tenth and fifteenth magnitudes (particularly, therefore, telescopic stars) increase regularly in density as we approach the galactic circle (*ὁ γαλαξίας κύκλος*); and that there are therefore poles rich in stars, and others poor in stars, the latter being at right angles to the principal axis of the Milky Way. The density of the stellar light is at its minimum at the poles of the galactic circle; and it increases in all directions, at first slowly, and then rapidly, in proportion to the increased galactic polar distance.

By an ingenious and careful consideration of the results of the gauges already made, Struve found that *on the average* there are 29.4 times (nearly 30 times) as many stars in the center of the Milky Way as in regions surrounding the galactic poles. In northern galactic polar distances of  $0^\circ$ ,  $30^\circ$ ,  $60^\circ$ ,  $75^\circ$ , and  $90^\circ$ , the relative numbers of the stars in a telescopic field of vision of 15' diameter are 4.15, 6.52, 17.68, 30.30, and 122.00. Notwithstanding the great similarity in the law of increase in the abundance of the stars, we again find in the comparison of these zones an *absolute* pre-

\* *Etudes d'Astr. Stellaire*, note 74, p. 31.

† *Outlines of Astr.*, § 785