Herschel's twenty-feet telescope, including the stellar light, "which is supposed to require 2000 years to reach our earth ?"[*]

The numerical data which I here publish in reference to this subject are chiefly obtained from the final results of my esteemed friend Argelander, director of the Observatory at Bonn. I have requested the author of the *Durchmusterung des nördlichen Himmels* (*Survey of the Northern Heavens*) to submit the previous results of star catalogues to a new and careful examination. In the lowest class of stars visible to the naked eye, much uncertainty arises from organic difference in individual observations; stars between the sixth and seventh magnitude being frequently confounded with those strictly belonging to the former class. We obtain, by numerous combinations, from 5000 to 5800 as the mean number of the stars throughout the whole heavens visible to the unaided eye. Argelander[†] determines the distri-

[*] On the space-penetrating power of telescopes, see Sir John Herschel, *Outlines of Astr.*, § 803.

[†] I can not attempt to include in a note *all* the grounds on which Argelander's views are based. It will suffice if I extract the following remarks from his own letters to me: "Some years since (1843) you recommended Captain Schwink to estimate from his Mappa Cœlestis the total number of stars from the first to the seventh magnitude inclusive, which the heavens appeared to contain; his calculations give 12,148 stars for the space between 30° south and 90° north declination; and consequently, if we conjecture that the proportion of stars is the same from 30° S. D. to the South Pole, we should have 16,200 stars of the above-named magnitudes throughout the whole firmament. This estimate seems to me to approximate very nearly to the truth. It is well known that, on considering the whole mass, we find each class contains about three times as many stars as the one preceding. (Struve, *Catalogus Stellarum duplicium*, p. xxxiv.; Argelander, *Bonner Zonen*, s. xxvi.) I have given in my *Uranometria* 1441 stars of the sixth magnitude north of the equator, whence we should obtain about 3000 for the whole heavens; this estimate does not, however, include the stars of the 6·7 mag., which would be reckoned among those of the sixth, if only entire classes were admitted into the calculation. I think the number of the last-named stars might be assumed at 1000, according to the above rule, which would give 4000 stars for the sixth, and 12 000 for the seventh, or 18,000 for the first to the seventh inclusive. From other considerations on the number of the stars of the seventh magnitude, as given in my zones—namely, 2257 (p. xxvi.), and allowing for those which have been twice or oftener observed, and for those which have probably been overlooked, I approximated somewhat more nearly to the truth. By this method I found 2340 stars of the seventh magnitude between 45° and 80° N. D., and, therefore, nearly 17,000 for the whole heavens. Struve, in his *Description de l'Observatoire de Poulkova*, p. 268, gives 13,400 for the number of stars down to the seventh magnitude in the region of the heavens explored by him (from —15°