

equatorial region between  $3^{\circ}$  north and  $3^{\circ}$  south latitude, and that they do not occur at all in the polar regions. They are, on the whole, most frequent in the region between  $11^{\circ}$  and  $15^{\circ}$  north of the equator, and generally of more common occurrence in the northern hemisphere, or, as Sömmering maintains, may be seen there at a greater distance from the equatorial regions than in the southern hemisphere. (*Outlines*, § 393; *Observations at the Cape*, p. 433.) Galileo even estimated the extreme limits of northern and southern heliocentric latitude at  $29^{\circ}$ . Sir John Herschel extends them to  $35^{\circ}$ , as has also been done by Schwabe. (*Schum. Astr. Nachr.*, No. 473.) Laugier found some spots as high as  $41^{\circ}$  (*Comptes Rendus*, tom. xv., p. 944), and Schwabe even in  $50^{\circ}$ . The spot observed by La Hire in  $70^{\circ}$  north latitude, must be regarded as a very rare phenomenon.

This distribution of spots on the Sun's disk, their *rarity under the equator* and in the polar regions, and their parallel position in reference to the equator, led Sir John Herschel to the conjecture that the obstructions which the third vaporous external atmosphere may present at some points to the liberation of heat, generates currents in the Sun's atmosphere from the poles toward the equator similar to those which upon the Earth occasion the trade-winds and calms near the equator, owing to differences of velocity in each of the parallel zones. Some spots are of so permanent a character that they have continued to appear for fully six months, as was the case with the large spot visible in 1779. Schwabe was enabled to follow the same group eight times in the year 1840. A black nucleoid spot, delineated in Sir John Herschel's *Observations at the Cape* (to which I have made such constant reference), was found, by accurate measurement, to be so large, that supposing the whole of our Earth to be propelled through the opening of the photosphere, there would still have remained a free space on either side of more than 920 geographical miles. Sömmering directs attention to the fact that there are certain meridian belts on the Sun's disk in which he had never observed a solar spot for many years together. (*Thilo. de Solis maculis a Sæmmeringio observatis*, 1828, p. 22.) The great differences presented in the data given for the period of revolution of the Sun are not, by any means, to be ascribed solely to want of accuracy in the observations; they depend upon the property exhibited by some spots, of changing their position on the disk. Laugier has devoted special attention to this subject, and has observed spots which would