mechanical clock-work and photographic apparatus, as the result of prolonged observations during the many months of serene weather enjoyed in a tropical climate. The meteorological processes at work in the gaseous envelopes of the dark body of the Sun are the causes which produce the phenomena termed Sun-spots and conglobate luminous clouds. It is probable that there, as in the meteorology of our own planet, the disturbances of very multifarious and complicated character depend upon such general and local causes, that it can only be by means of prolonged observations, characterized by completeness, that we can hope to solve even a portion of this still obscure problem.

II.

THE PLANETS.

GENERAL *comparative* considerations of a whole class of cosmical bodies must here precede their individual description. These considerations refer to the 22 *principal planets* and 21 *moons* [*satellites*, or *secondary planets*] which have been discovered up to the present time, not to the *planetary bodies* in general, among which the comets whose orbits have been calculated are alone ten-fold more numerous. The planets possess, upon the whole, a feeble scintillation, inasmuch as they shine by the reflected light of the Sun, and their planetary light emanates from disks. (*Cosmos*, vol. iii., p. 76.) In the ash-colored light of the Moon, as well as in the red light of its obscured disk, which is seen with great intensity between the tropics, the Sun's light undergoes, in reference to the observer upon the Earth, a twice repeated change in its direction. Attention has been already directed elsewhere* to the fact that the Earth and other planets possess in themselves a feeble power of emitting light, as is specially proved by some remarkable phenomena upon that portion of Venus which is turned away from the Sun.

We shall consider the planets according to their *number*, the *sequence* of their discovery, their *volumes* compared either with each other or with their *distances* from the sun; according to their relative *densities*, *masses*, *periods of rotation*, *degrees of eccentricity*, *the inclinations of their axes*, and characteristic differences *within* and *beyond* the *zone of the*

* *Cosmos*, vol. i., p. 201, and note p. 202.