

low density, combined with many other phenomena which it exhibits, has led most scientists to the conclusion that it is entirely in a liquid state.

The most conspicuous feature in its surface is its being traversed by several bands of alternate light and dark, one great bright band circling the planet just at the equator, while the others are arranged with symmetry on either side of it, and constantly change both in color and outline, though generally remaining as permanent features of the regions to which they belong. On different occasions a different number of these belts may be distinguished; sometimes only a few, sometimes very many appear, and occasionally they are accompanied by other markings of various shapes, which though generally evanescent, sometimes last for a number of years. Of the latter the most notable instance is that of the "great red spot," a large oval spot, embracing an area of about 30,000 miles by 7,000, which was just observed in the year 1878, and for a long time formed the most prominent feature in the planet's appearance. It was of a clear, strong, brick-red color, and remained thus for three or four years without change, and then began gradually to fade in color and diminish in brightness, retaining, however, the same shape and proportions, and it has now, after thirteen years, almost entirely disappeared. A very peculiar circumstance connected with this spot is that its time of rotation has changed more than five seconds in ten years.

These belts are generally looked upon by astronomers as great masses of cloud, continually drifting and rolling beneath the observer's gaze. Different theories have been put forward to account for their existence and phenomena. Herschel considered the dark bands to be zones of the planet's atmosphere more tranquil and less clouded over than the rest, so that through them a portion of the true surface of the planets might be distinguished. The rapid change in the shape and colour undergone by these bands give a great probability of truth to this theory, and, indeed even the clouds themselves are at times plainly visible, being generally similar to a series of white cumulus clouds, such as are often seen piled up near our horizon on a summer's day, and there is also occasionally seen above the dark

bands a veil of light, fleeting clouds, like the cirrus of our atmosphere. The bright belts, then, are likely caused by the reflection of the sun's light from these clouds, while the dark ones indicate the absence of this reflecting medium. But, from the fact that, if this were the case, the planet's disk should be seen with a more irregular outline, the dense belts projecting beyond the rest, an appearance which has never been noticed, Proctor concludes that either the atmosphere does not extend high enough to cause this irregularity, or that the dark bands are but a lower layer of cloud, and not the surface of the planet. The latter opinion is also strengthened by the appearance in the dark bands of still darker spots, very much resembling sun-spots, which have been noticed by Cassini, Madler, and other noted observers, and thought by them to be the true surface of the planet, or else a still deeper and denser layer of cloud.

Many astronomers think that there is in Jupiter a motion of the atmosphere similar to our trade-winds, and that by its action the clouds are thus drifted about in such curious forms, while the great bright belt which remains constantly around the equator, is equivalent to what sailors call the "Doldrums" or equatorial belt of calms. This theory appears plausible enough, but when we consider the small amount of heat which Jupiter receives from the sun, we can scarcely believe it sufficient to cause even as much disturbance as is experienced on the earth, whereas the motions of the cloudy forms indicate the presence of continuous and powerful action, so that either they do not owe their origin to this cause, or there is some other force at work within the planet besides the mere heating power of the sun.

Proctor, by connecting the three relations, the small density of the planet, its apparently extensive atmosphere, and the changes in shape and color continually going on in its belts, and taking into consideration the small quantity of heat it receives, is led to the conclusion that there must be some other force at work, and that is internal heat, which from the interior liquid mass sends forth huge volumes of vaporous matter, which, in the rapid rotation of the planet, forms itself into rings circling about it, and continually breaking and changing, swayed by the