ſome aſtronomers have brought from the ſhort time of its being invifible when the earth paſſes through its plane, we cannot ſet much value upon them; for they mult have ſuppoſed the edge of the ring, as they have alſo repreſented it in their figures, to be ſquare; but there is the greateſt reaſon to ſuppoſe it either ſpherical or ſpheroidal; in which caſe evidently the ring cannot diſ­appear for any long time. Nay, I may venture to ſay, that the ring cannot poſſibly diſappear, on account of its thinneſs; ſince, either from the edge or the ſides, even if it were ſquare on the corners, it muſt always expoſe to our ſight ſome part which is illuminated by the rays of the ſun; and that this is plainly the caſe we may conclude from its being viſible in my teleſcopes du­ring the time when others of leſs light had loſt it; and when evidently we were turned towards the unenlighten­ed ſide, ſo that we muſt either ſee the rounding ſide of the unenlightened edge, or elſe the reflection of the light of Saturn upon the ſide of the darkened ring, as we ſee the reflected light of the earth on the darkened part of the new moon. I will not, however, take upon me to decide which of the two maybe the caſe, eſpecially as there are other very ſtrong reaſons which induce us to think that the edge of the ring is oſ ſuch a nature as not to reflect much light. ”

Several aſtronomers have ſuppoſed that the ring of Saturn is full of mountains and inequalities, like the moon; and of this opinion Dr Herſchel himſelf was for a conſiderable time, till happening to obſerve one of theſe lucid points with attention for a conſiderable time, he ſaw it leave the ring altogether, and ſhow itſelf as a ſatellite never before obſerved. With regard to the ring itſelf, he concludes his obſervations in theſe words: “Upon the whole, therefore, I cannot ſay that I had any one inſtance that could induce me to believe that the ring was not of one uniform thickneſs; that is, equally thick at equal diſtances from the centre, and of an equal diameter throughout the whole of its conſtruction. The idea of protuberant points upon the ring of Saturn, indeed, is of itſelf ſufficient to render their exiſtence inadmiſſible, when we conſider the enormous ſize which ſuch points ought to be of to render them viſible at the diſtance we are from that planet.

With regard to the ſatellites, the Doctor informs us, that he was long convinced of the exiſtence of a ſixth; and had he been more at leiſure at the time of his diſcovering thoſe of the Georgium Sidus, he would pro­bably have completed the diſcovery of the ſatellites of Saturn alſo. The ſixth was firſt obſerved diſtinctly on the 28th of Auguſt 1789, and the ſeventh on the 17th of September the fame year. Theſe ſatellites, however, do not occupy the place which we ſhould have previouſly ſuppoſed them, being, in fact, the innermoſt of the whole. The ſeventh is next the body of the planet itſelf, and is very ſmall. It revolves at the diſtance of 27. ''366 from the centre of Saturn, and ſeems to move exactly in the plane of the ring; but the Doctor ob- ſerves, that it is exceedingly difficult to make a ſuffici­ent number of obſervations on it to determine the re­volution exactly. He computes its periodical time at 22h 40' 46''. The ſixth ſatellite is next to the ſeventh, and revolves at the diſtance of 35". 058 from the centre of its primary in 1d 8h 53'97. Its light is conſiderably ſtrong, but not equal to that oſ the firſt ſatellite of former aſtronomers, which Lies immediately beyond it.

The planet Saturn is now obſerved to have belts or faſciae upon its diſk as diſtinctly as Jupiter. Dr Her­ſchel, on the 9th of April 1775, obſerved a northern belt on his body, inclined a little to the line of the ring. On the 1st of May 1776, there was another belt ob­ſerved, inclined about 150 to the ſame line, but more to the ſouth; and on the following ſide came up to the place where the ring croſſes the body of the planet. — On the 8th of April two belts were obſerved, and theſe continued with variations, and ſometimes the appearance of a third belt, till the 8th of September, when the account of the obſervations was diſcontinued. The Doctor remarks, that he generally obſerved theſe belts in equatorial ſituations, though ſometimes it was other- wiſe. Two concluſions, he ſays, may be drawn from the obſervations he made this year. “The firſt, which relates to the changes in the appearance oſ the belts, is, that Saturn has probably a very conſiderable atmoſphere, in which theſe changes take place, juſt as the alterations in the belts of Jupiter have been ſhewn with great probability to be in his atmoſphere. This has alſo been confirmed by other obſervations. Thus, in oc­cultations of Saturn’s ſatellites, I have found them to hang to the diſk for a long while before they would vaniſh. And though we ought to make ſome allowance for the encroachment of light, whereby a ſatellite is ſeen to reach up to the diſk ſooner than it actually does, yet without a conſiderable refraction it could hardly be kept ſo long in view after the apparent contact. The time of hanging upon the disk in the seventh ſatellite has actually amounted to 20 minutes. Now, as its quick motion during that interval carries it through an arch of near six degrees, we find that this would de­note a refraction of about two ſeconds, provided the encroaching of light had no ſhare in producing the ef­fect. By an obſervation of the ſixth ſatellite, the re­fraction oſ Saturn’s atmoſphere amounts to nearly the ſame quantity; for this ſatellite remained about 14 or 15 minutes longer in view than it ſhould have done; and as it moves about 23/4 degrees in that time, and its or­bit is larger than that of the ſeventh, the difference is inconſiderable. The next inference we may draw from the appearance of the belts on Saturn is, that this pla­net turns upon an axis which is perpendicular to his ring. The arrangement of the belts, during the courſe of 14 years that I have obſerved them, has always fol­lowed the direction of the ring, which is what I have called *being equatorial.* Thus, as the ring opened, the belts began to advance towards the ſouth, and to ſhow an incurvature anſwering to the projection of an equa­torial line, or to a parallel of the ſame. When the ring cloſed up, they returned towards the north, and are now, while the ring paſſes over the centre, exactly ranging with the ſhadow of it, on the body, generallv one on each ſide, with a white belt cloſe to it. When I ſay that the belts have always been equatorial, I paſs over trifling exceptions, which certainly were owing to local cauſes. The ſtep from equatorial belts to a rota­tion on an axis is ſo eaſy, and, in the caſe of Jupiter, ſo well aſcertained, that I ſhall not heſitate to take the ſame conſequence for granted here. But if there could remain a doubt, the obſervations of June 19th, 20th, and 21ft, 1780, where the ſame ſpot upon one of the belts was ſeen in three different ſituations, would remove it completely, ”