

ASTRONOMICAL NOTES.

SATURN has been the most interesting object in the heavens for some time and continues to delight the observer as the rings come more plainly into view; quite moderate optical power will show the space between the ball and the inner edge of the ring. The planet after passing, with retrograde motion to the south of the beautiful double star γ *virginis* is now taking up direct motion, and passing north of the star, will have shortly described a loop around it. The loop is formed at every opposition of the planet, but such a noticeable one as this is an extremely rare phenomenon. Saturn crosses the meridian now about 7 p.m., and sets shortly after midnight.

Jupiter, having emerged from the sun's rays, may be now seen in the early morning twilight. The giant planet will probably be an object of great interest to astronomers this year, as certain peculiarities in his system were recently recorded by Prof. Pickering stationed at Arequipa, Peru; notably, the fact that Sat. I, although having the shape of a prolate spheroid, in consequence of the great tidal influence of the planet upon it, yet rotates upon its axis several times in a revolution. This is directly against the theory of retardation of axial rotation and is the more remarkable when it is noted that the gravitating force of Jupiter upon the satellite is nearly 300 times greater than the force which, exerted by the earth upon our moon while it was still plastic, has gradually retarded the axial motion of the latter till it corresponds with the period of revolution.

When to this is added that two of the other satellites do not rotate on their shorter axis, there would seem to be abundant field for the mathe-

matical astronomer to work upon, if theory and observation are to be reconciled. The innermost satellite of Jupiter discovered last year by Barnard will be forever associated with his name, but it may be seen only in the noblest instruments; it is much more difficult for the telescopist than the moons of Mars, and these are beyond any instrument mounted in Canada, unfortunately.

A Toronto observer has expressed the opinion that there is a satellite yet to be found between Sat. I and Barnard. A certain harmony in periodic time would probably be satisfied if such a one were seen, but its existence may be discussed on other grounds to which we may again refer.

Certain it is that we do not yet know all that is to be known of the solar system. The constitution of the sun itself—the maintenance of its heat—these are still in the field of hypothesis; and it is interesting to note here that certain solar phenomena hitherto supposed to have some connection with terrestrial events, so far from being remarkable, are of such frequent occurrence that almost any given result may be coincident with them. Prof. Hale, of Kenwood observatory, has brought to light some facts which completely darken the prospects of the prophets who would associate solar outbursts with peculiarities of rainfall and the rise and fall of markets! The cause of the Aurora, however, a phenomenon with which we are all familiar, and which seems to have a distinct connection with activities in the sun, has been widely discussed, and a mass of records of observations taken in various parts of the world have to be carefully analysed. Mr. Arthur Harvey recently called attention to the fact that geological formation has