ASTRONOMISCHE NACHRICHTEN.

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On some new Phenomena in the Ring of Saturn, by the Rev. *W. R. Dawes*.

Wateringbury near Maidstone, Kent, February 10, 1851.

In the autumn of last year I removed my observatory to this place from my former residence, Camden Lodge, Cranbrook. The telescope is an equatorially mounted refractor by *Merz* and Son of Munich, having an aperture of 6 inches, and a focal length of 8 feet, Paris measure.

On Nov. 25, 1850, the air was very favorable in the early part of the evening. Having turned the telescope to the planet Saturn, with power 425, I was astonished at the appearance of a faint light extending over rather more than one third of the interval between the inner edge of the bright ring and the ball. It was with great difficulty that I arrived at the conclusion that this was a reality: and before I had satisfied myself on this point, my observations were interrupted. On returning to them, I found the air had become greatly disturbed, and nothing further could be discovered.

The next fine night occurred on Nov. 29. With power 460, the same phenomenon was again observed. There appeared to be a continuation of the breadth of the ring towards the ball, extremely faint, as if capable of reflecting very little light. A dark and rather sudden shading off was observed to form a boundary between this dull zone and the bright ring; the breadth of the zone being about two thirds the breadth of the outer ring. At the interior edge of the ring where it crosses the ball, a very narrow dark line was noticed, which became broader towards the east and west edges of the planet. I concluded that this dark line was the projection of the obscure zone, the full breadth of which is seen at the ansae. These observations were entered at the time in my observatory journal, and a diagram made in it to illustrate my description. The accompanying picture is taken from that diagram, corrected only as to the form of the ellipse.

On Dec. 2, my friend Mr. *Lassell*, of Starfield near Liverpool, visited me; and, the evening of the 3d proving fine, we both distinctly saw the phenomena recorded above.

On the morning of Dec. 4th, I saw a paragraph in The Times newspaper, announcing that Mr. *Bond*, at Cambridge in the United States, had discovered an interior very faint ring of Saturn, by the help of the large refractor by *Merz*, having an aperture of 14 French inches. In my telescope,

the dark boundary between the bright and the faint rings did not appear so absolutely black as the interval between the two bright rings; and I had therefore imagined the faint zone to be attached to the ring, though differing greatly in reflective power. No doubt Mr. *Bond's* view of it is correct. But as no further details of his discovery have been received in this country, so far as I know, all my information respecting this new phenomenon is derived from my own telescope, except the actual separation of the faint ring from the bright one.

On three nights I have obtained micrometrical measures of the distance of the inner edge of the obscure ring from the inner edge of the bright ring. The observations, which were extremely difficult, give the following results, reduced to the mean distance of Saturn. Magnifying power 375.

1850 Dec.	20	1 ^h 807	by 6 observations:	weight = 6
	22	1,967	" 6	" 10
1851 Jan.	23	1,958	" 10	" 32

Mean, allowing
weights, = .. 1,941 by 22 observations.

I have frequently received the impression of the obscure ring being divided into two, or else composed of two zones of different reflective power: the one which is nearest to the planet being fainter, and also narrower, than the other. On several fine days the observations have been begun in daylight, and the time noted when the different parts became visible as the light faded. First appeared the portion furthest from the planet, and separated from the bright ring by a dark boundary nearly equal in breadth to the primary division between the bright rings; — its outer and inner edges presenting an elliptic curve pretty well defined for so faint an object. It extends to about one third of the distance between the bright ring and the ball. In about 12 minutes afterwards the inner edge of the interior portion became visible, an extremely narrow dark boundary or division lying between the two portions. I have also observed that when the obscure ring, taken as a whole, is best seen, it is not of uniform brightness, the outer portion being the brighter: and in ordinary states of the air, this outer portion alone is visible;

while, during occasional intervals of better vision, and on very fine nights, the inner portion also is seen.

Supposing that, according to *Struve's* measures, the

Interval between bright ring and exterior obscure ring	0 ^h 3
Breadth of exterior obscure ring	1,1
Breadth of interior obscure ring and dark boundary between the two	0,6

Sum 2,0

Interval between inner edge of obscure ring and the ball 2,34

I have always observed that the upper and more distant part of the obscure ring is more plainly seen than the corresponding part on the side nearest the earth: and also that its projection at the minor axis of the ellipse, seen on the planet as a dark line of elliptic form, is considerably narrower than accords with its breadth at the major axis. To avoid the effect of irradiation in diminishing its apparent breadth I have carefully examined this dark line in daylight and strong twilight, when the air was quiet and the image sharply defined. By comparison of its breadth with that of a spider's web of the micrometer, I concluded it to be not more than from 0^h2 to 0^h25 at the minor axis; which, for the time of observation, corresponds to a breadth of from 1^h08 to 1^h35 at the major axis. The appearances would be satisfied by supposing that a section of the obscure ring may be somewhat wedge-shaped, the thicker edge being outwards;

interval between the interior bright ring and the ball is 4^h34, I have estimated the breadth of the different portions nearly as follows: —

and that a section of the bright ring may also be wedge-shaped, its thickest edge being inwards: — thus

The same supposition might also tend to account for the outer edge of the shadow of the ball upon the ring appearing slightly convex towards the ball; as I have always observed it during this apparition of the planet. But perhaps this may be only the effect of contrast with the much greater curvature of the edge of the ball, influencing the judgment of the eye. It may also be questioned whether the thickness of the ring can be sufficient to allow of the requisite variation of substance in its different parts. Would it not be seen when its plane passes through the earth, either as a bright line on each side of the ball, or as a dark line of considerable breadth on the ball itself?

The Planet Saturn

as seen at Watlingbury near Maidstone on November 29, 1850

by *W. R. Dawes*.