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Wateringbury, Maidstone
8 Sept. 1855

Dear Sir

I have much pleasure in acknowledging the receipt of your very interesting letter, & return you my sincere thanks for it. I began a reply to it more than a month ago, but was suddenly obliged to leave home, and I regret that, in consequence of illness since my return, I have been till now unable to resume my pen.

I am very glad to learn that you were able to pay continued attention to Saturn throughout his last apparition. Your observations are extremely valuable, & will be thankfully received by our Astronomical Society. There can be no reasonable doubt of the great excellence of your large Munich Equatoreal; and the observations you have made with it are evidently of great weight.

I was not aware that you were paying so particular attention to the projection of the southern edge of the ball on to the rings, with a view to mark its exact place. - The only occasion when I judged it to be quite clear of the division between A & B was on 26 Sept. 1854; & on that night I entered in my journal as follows: - "The division between A & B is seen to extend all "round at both the north & south points of the ball, which does "not seem to me to encroach on it at all, though it certainly "touches it on the southern side. The diameter of the ball therefore "from north to south appears to be exactly equal to the minor "axis of the exterior edge of B." - This was evidently a careful observation: - but I have also recorded respecting the state of the air; "The air is not in a fine state; yet occasionally the views are sharp "for several seconds together, though considerable tremor is always "present." - The highest power I was able to use with sufficient

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distinctness was 357; & my subsequent observations led me to doubt the perfect correctness of my inspections on Sept. 26. I perceive however that I entered in my journal on that night a brief note which I overlooked when preparing my observations for the Royal Astron.l Society & the Astron. Nachr.; referring to the brighter line at the interior edge of B; viz. - "The brighter line just at the interior "edge of B is visible: it is very narrow". - This brighter line is well shown in the lithograph of my picture which accompanied my paper on Saturn in 1852, & appeared in N.o 840 of the Astron. Nachr. It also appears in M.r Lassell's picture on the same page; and it is mentioned by him in his more detailed account of his observations at Valletta printed in N.o 922 of the Astr. Nachr., under date Dec. 6 (1852); but he had previously to that date received from me a copy of my picture from which the lithograph was drawn; and in my accompanying letter I had drawn his attention to that point. - This fact he does not allude to in his description.

The concentric bands of shading, of different degrees of darkness, on the surface of B, constitute a remarkable feature of that ring. - I first distinctly saw them, on 26 Oct. 1851, & have detailed my observations in N.o 793 of the Astron. Nachr., as well as in a paper which was sent to the R. A. S. & printed in the N.o 1 (p. 12) of Vol XII of the Monthly Notices under date Nov. 14, 1851. - See also the Monthly Notices for Nov. 12, 1852, p. 17, where, under date 1852, Sept 20 & 25, I record observations of the streaky shading on B, & of the brighter line at its interior edge. - M.r Lassell also mentions these bands of shading in his observations at Malta on 29 Oct. 1852; but, as usual, does not refer to any previous observations of the phenomena, though he was fully aware of them. -- It is remarkable that neither Herschel I nor Herschel II ever noticed these bands; - nor even Struve at Dorpat in 1826; but his negative evidence is of no great weight & cannot be deemed sufficient to prove that the phenomenon is variable.

According to the commonly received ratio of light in a Newtonian reflector & an achromatic refractor, (which I believe to be very near the truth,) the illuminating power of Mr. Lassell's 20-foot Newtonian of 24 inches in aperture is equal to that of a refractor of about 17 inches in aperture; which is more than three times the illuminating power of your large refractor. These large reflectors will therefore prove extremely efficient on nebulæ, on faint Satellites, & the Milky Way &c; but on the minute phenomena of a planetary surface they fail in comparison with refractors of far inferior size, in consequence of the inequalities of figure inseparable, I fear, from the system of mechanical approximation employed in the process of figuring. - Were it not for this source of imperfection, the ~~Lord~~ large reflector of Lord Rosse, with its 6-foot diameter, might long ago have settled all questions respecting the small & close Satellites of Uranus, the number of Satellites attached to Neptune, the details of the phenomena on the surface of Saturn, &c &c. But, so far from this, it is a singular fact that we are not indebted to this enormous telescope for any planetary discoveries whatever! - not even in Satellites!!

It is very gratifying to me to see that you are attending to the measurement of Double Stars. - I have observed but little this Spring, - my health having been far from good. In some instances, my measures of ~~stars~~ in your list (in N°. 975 of Astr. Nachr., in which are many very interesting things to which I have not now time to refer,) agree very closely with yours. Of γ Virginis I obtained,

1855·33 P = 171°·18; D = 3″·362; on 4 nights, with a Double-image microm. by Amici.
·46 171·17; 3·308; — 5 —, with the Parallel-wire micrometer.

Of ξ Bootis I obtained the following

1854·52 P = 322°·99; D = 2″·686; on 3 nights, with parall. wire microm.
1855·53 323·63 2·638; — 1 night, with Double image micr. by Amici.

Like yourself, I have been much interested with the appearance of Jupiter. The dark cap on the north pole is split up into innumerable

narrow stripes, differing in depth of colour; & there has usually been one narrow interrupted streak remarkably lighter than the rest, rather nearer to the southern edge of the cap than to the north pole. - Oh! for correct photographic pictures of these delicate phenomena! - Having unfortunately caught a very severe cold just before my return home, my eyes were affected with inflammation; & I find the light of Jupiter much too powerful for them at present; & consequently have been constrained to remit my observations of him, & of almost all other objects.

In conclusion permit me again to thank you very warmly for your valuable letter, & to assure you that I shall always esteem it an honour & a pleasure to be favoured with your correspondence. - You have greatly the advantage of me in your excellent acquaintance with my language, while I with difficulty read yours; & indeed could not quite make out some of your quotations from your journal; but Mrs. Smyth (the accomplished wife of Admiral Smyth) whom I visited in my late journey, kindly deciphered & translated them for me.

Believe me to remain,
With high consideration,
Very truly yours,
W. R. Dawes.

To Professor A. Secchi
Rome