
Having turned my 8½-inch refractor upon the sun, about noon on the 22d of October, I noticed that near the south-eastern edge there was an unusually large mass of bright streaks, or faculae. With the whole aperture and power 234 the edge was at times extremely quiet and very sharply defined. During the best views I satisfied myself that a bright streak, which formed the very edge, projected irregularly beyond the circular contour of the edge; reminding me of a ridge of low hills often seen at the enlightened limb of the moon. Nearly parallel to this, and about two or three seconds from it, ran another streak nearly as bright; and the space between them was observed to be darker than is the ordinary limb of the sun, but not so black as the umbra of a spot. I supposed it to be the penumbra of a large spot just entered on the disk, the umbra of which was as yet hidden by the inner bright streak.

At 2 p.m. I went again to the telescope. The state of the air was less favourable; but during the most tranquil moments I satisfactorily made out an excessively narrow black line, a little broken in two or three places, as if by irregularities in the inner bright streak, the top or outer edge of which was projected upon it. Clouds soon covered the sky, and an extraordinary storm of hail, sleet, and snow, came on.

The 23d was cloudy. On the 24th a fine spot was visible, with a remarkably extensive penumbra. At about 1 o’clock I made a sketch of it. On the 26th I saw it again; and finding the umbra had changed its form in a very extraordinary way, I carefully sketched it under tolerably favourable circumstances. I subsequently saw it well, and sketched it carefully, on the 27th, 29th, and 31st of October, and on the 2d and 3d of November. The changes were more extraordinary than I ever before observed, and some of the forms which the umbra assumed were curiously grotesque. The accompanying tracings from my sketches are as faithful representations of their outlines as my eye and hand could produce.*

The last transient view which I had of the spot was on November 4th, in the afternoon; and it passed off in the night of that day.

It appeared to me very remarkable, that in so violent and extensive a disturbance of the luminous envelopes, I could not find in any part of the umbra a really black nucleus. In spots of not one-tenth part of the area I have, in numerous instances, perceived a decidedly black portion, not always central, but comparatively well defined, and totally devoid of any light visible through the darkening glass rendered necessary by the

* These delineations were exhibited at the meeting, and attracted much attention.—Ed.
solar illumination of our own atmosphere. The umbra of this large spot was, however, of various depths of shade in different parts. It appears probable that the upward force by which the luminous envelopes were thrown aside must, in this instance, have acted upon them very obliquely.

To obtain ocular demonstration of the bright streaks being really elevated ridges or waves of the exterior luminous envelope, is, of course, a very rare occurrence; but in the present case the evidence was as complete as could be desired. The combination of circumstances was most fortunate; a bright streak of unusual size being precisely at the sun's edge, and the state of the air permitting the use of a large aperture and high power with full advantage.

The same spot has now come round again; but beyond the richness of its vicinity in faculae, there is nothing remarkable in the group into which it has resolved itself.

Haddenham, Thame, 21 November, 1859.

Physical Observations of Jupiter's Satellites.

By W. Lassell, Esq.

I take the liberty of drawing the attention of telescopic observers to the fourth satellite of Jupiter, which, after a considerable interval, has this year begun to pass across the disk of the planet. I saw it last night from about 11h 30m to 12h 30m p.m. near the following and south limb. At first I took it to be a shadow of one of the other satellites; but from the peculiarity of its aspect, I was induced to refer to the Nautical Almanac, which showed it to be the body of the fourth satellite. On viewing it again, I thought it scarcely so black as the shadows ordinarily appear, yet so very dark that a cursory glance would certainly have taken it for a shadow; and it was difficult to conceive that any object so dark in its present aspect could ever appear as a bright one. I remember, many years ago, having noticed it as a dusky spot; but I fancy never so dark as now. The atmosphere was not fine enough to see anything new upon the face of the planet; but reflecting upon the very different phenomena now presented from those which marked the disk twenty years ago, one cannot but be filled with wonder at the stupendous chronic changes which must be taking place, even though they should be wholly or principally confined to the atmosphere of the planet.

I had an opportunity, a few minutes after midnight, of noticing the striking contrast between the bodies of the fourth