Mr. Birt, Note on a Group of Solar Spots.

so also the coefficient of \( \cos (2 \tau + \xi + \eta') = \) coefficient of \( \cos (2 \tau + \xi) = \frac{3}{8} \)

\[ \cos (2 \tau + \xi + n \eta') = \cos (2 \tau + n \xi) \]

whatever \( n \) may be.

Many other similar equations of condition obtain. When I published the development in question I was not aware of the extent to which this means of verification may be carried in the lunar theory, but, as owing to Mr. Cayley’s recent work, no uncertainty can exist with regard to the numerical order of any coefficient in this stage of the approximation, it is unnecessary to give any further examples.

March 14, 1859.

Note on a Group of Solar Spots observed on the 23d of February, 1859. By W. R. Birt, Esq.

Mr. Birt’s observations were made with Mr. Slater’s refractor of 15 inches aperture, which was liberally placed at his disposal for the purpose. They were accompanied with a sketch exhibiting the details of the phenomena seen by him.

The nucleus of the principal spot presented a striated appearance, the direction of the striae being that of the longest diameter of the spot. The illumination of the cloudy stratum was of a varied character, conformably to Mr. Dawes’ observations (Monthly Notices, vol. xii. p. 168). It also exhibited unmistakeable traces of a striated formation, which seemed to be connected with the jagged or uneven edge of the nucleus. In this respect the observations of the author do not accord with those of Mr. Dawes.

The author thus proceeds —

"The most interesting feature of the nucleus consisted in two luminous patches presenting nearly if not quite the same intensity of light as the surrounding penumbra. These patches during the time of observation exhibited a somewhat fluctuating character, not so much in respect of luminosity as of position. They were confined to the upper part of the nucleus, but underwent changes of configuration.

"The Penumbra manifested the striated or ridged appearance spoken of by Mr. Dawes in a most characteristic manner. I am strongly disposed to regard the penumbra of this particular spot as radiated. Mr. Dawes’ sketch before alluded to exhibits very distinctly the kind of radiation which I noticed in the spot now under consideration; the edges of the penumbra were notched, jagged, and uneven, and the outline was not coincident with the outline of the nucleus. I particularly remarked that the luminosity of the penumbra was nearly uniform, and broken only by a bright spot near the horns, forming the upper
angle of the nucleus, and by a brighter space between the nucleus and largest detached spot within the penumbra: the latter, however, might have resulted from contrast."

The observations were made with a magnifying power of 220.

On some Indications of Rotation in a Solar Spot.

By W. R. Birt, Esq.

Finding that a somewhat large spot had entered on the visible hemisphere of the sun on February 22, I availed myself of Mr. Slater's kindness, and obtained two views, one shortly before its passage of the centre, and one exactly three days after the first. The two drawings accompanying this communication indicate the nature and extent of the changes that occurred during the three days.* Power employed, 220; aperture, 15 inches, reduced to 4 inches for subduing the light.

<table>
<thead>
<tr>
<th>Sketch No.</th>
<th>Date</th>
<th>h</th>
<th>m</th>
<th>G.M.T.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>February</td>
<td>2</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>No. 2</td>
<td>March</td>
<td>3</td>
<td>45</td>
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The two sketches are strictly comparable, having been executed about the same time of the day.

Nuclei.—The nuclei of the two principal spots in the group presented a more or less uniform appearance. I did not remark the peculiar striated appearance so distinctively apparent in the spot of the 23rd of February, an account of which I communicated to the Society. It will be seen from the drawings that the nuclei of both spots underwent external configuration of form.

Penumbra.—The radiated appearance of the penumbra, as seen in the spot of February 23, was not detected in the penumbra of the two principal spots of this group. In Sketch No. 1, Feb. 28, three well-marked luminous patches were discernible near the left-hand upper edge of the penumbra (as seen in the telescope); also an intense luminous space between the principal nucleus and the smaller one in the largest spot.

On taking the second sketch, the penumbra around the two nuclei of the large spot appeared to be quite uniform in its luminosity; the smaller nucleus had increased considerably in size, and the intense luminous space between it and the principal nucleus had increased in brilliancy. It appeared to me that between the two nuclei the penumbra, properly so called, was absent; or this increase of brilliancy might have resulted from contrast.

The penumbra of the smaller spot underwent, in the three days, a marked change of form; the direction of the longer

* These drawings were exhibited at the meeting of the Society.