

REPORT OF SPECTROSCOPIC OBSERVATION OF  
THE TWILIGHT GLOWS DURING FEBRUARY  
AND MARCH, 1884.

By A. B. BIGGS.

[*Read April 8, 1884.*]

In venturing to submit the following notes to the Fellows of the Royal Society, I would observe that I commenced the observations only in the beginning of February. I much regret that I had not the opportunity of conducting observations from an earlier period when the "glow" was in all its grandeur.

Referring to the diagram, the regular solar lines are distinguished as usual—A, B, C, etc. The features to which I wish to draw particular attention are distinguished by numerals—1, 2, 3, etc.—1 and 2 being the most remarkable. I have adopted Roscoe's frontispiece scale—A being at 20, B at 28, C at 34, and D at 50, etc.

The diagram gives, as nearly as I can show it, the appearance of the spectrum near the horizon when the "glow" is moderately strong. By far the most prominent feature in this spectrum is the line or band (2) at scale 41. I have noticed that the deeper the glow the broader and deeper does this band become. The line (1) at 37 also comes into great prominence at such times, fully equalling, and sometimes exceeding C in intensity. This line (1) is, however, very persistent, continuing more or less conspicuous throughout the day. (3) At about 44 is a faint line, which is scarcely perceptible in the twilight. (4) Is a well-known vapour-band, always more or less conspicuous about the horizon. (5) On the edge of the green is a very broad band, shading off a good way into the green and somewhat resembling a shadow.

I noted, on the evening of 26th March, when the air was filled with smoke from bush fires that C and 1 were very intense; 2 was as usual at times of pretty deep glow. The sunset sky was very red on that occasion, evidently from smoke.

On 31st March (evening), after rain, I noted "C and 1 very strong; 2 much lighter than usual, being only a little stronger than D." As an instance of the variability of these lines, I noted on 6th inst., at 3 p.m.—"Glow lines all indistinguishable except 1, which was very distinct—Bar., 30·25; fine."

On the evening of 31st March, by means of the gas flame turned down to blueness, I got the spectrum of calcium into the spectroscope with the "glow" spectrum, and found the line 2 nearly, if not quite, coincident with the edge of the principal calcium band towards the red end.

The positions of 1 and 2 I obtained by careful micrometer measurement, the other numbered lines I estimated.

The spectra I have given for comparison (atmospheric and calcium) are the only ones I can find mapped in Roscoe's work that can at all compare with the "glow" spectrum; that of calcium, especially *Bunsen's*, appearing to me to have the most resemblance.

In recording these observations I do so in the position of a *witness*, and not that of a *judge*, hoping that the evidence I have to offer may, in connection with that contributed by others, help in some measure to elucidate the mystery of the phenomenon that has excited so much interest. I dare not venture to offer an opinion upon these observations, only, I would remark, that the idea of calcium vapour being in the air at this time is perhaps not very absurd, considering the vast quantity of limestone that must have been in contact with volcanic heat.

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I am not yet prepared to offer a definite opinion upon the deposit which I collected from the January rains. I have submitted it to a partial examination in the microscope, and found the heavier portion, obtained by precipitation in water, to consist, apparently, chiefly of silicious particles, intermixed with insect exuviae, etc.; also a few particles of magnetic substance, somewhat pear-shaped, evincing, in proximity of a magnet, decided polarity. The lighter washing exhibited, microscopically, a marked resemblance to a specimen of volcanic dust with which I compared it.

This volcanic dust specimen was given me by Mr. Dean, sen., of Launceston, who obtained it, I believe, from the captain of the ship upon which it fell in the vicinity of Sunda.

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REFERENCES TO BARON CONSTANTIN VON  
ETTINGSHAUSEN'S RECENT OBSERVATIONS  
ON THE TERTIARY FLORA OF AUSTRALIA,

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., F.R.S.,  
F.G.S., ETC.

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The 47th volume of the Imperial Academy of Science, Vienna, issued this year, contains an important essay on tertiary vegetable fossils of Australia, the results of original