

Note on the Corona of 1908. By J. Evershed, F.R.S.

In the *Memoirs of the Kodaikánal Observatory*, vol. i. part ii., p. 67, the corona of 1908 is referred to as affording a test of the relationship of prominences to coronal streamers, since our Kodaikánal prominence photographs show considerable activity over the sun's south polar region and an almost complete absence of prominences over the north pole. This refers to the average conditions over each of the years 1907 and 1908. The eclipse occurred on 1908 January 3, but our photographs taken early in January, and one taken seven hours after the eclipse itself, do not show any temporary departure from this distribution.

The corona, as drawn by the late Mr. Wesley from photographs obtained at Flint Island by Mr. McClean,* shows the opposite distribution as regards the coronal streamers, which are more conspicuous over the north polar region than over the south, and thus the test in this instance appears to fail, although from previous eclipses there seemed to be a close correspondence between the coronal streamers and the principal zones of prominence activity. In view of this we were constrained to doubt whether the Flint Island plates were correctly oriented, and recently I have discovered evidence that shows, I think conclusively, that the orientation is incorrect, the north and south points being interchanged.

In the *Publications of the Astronomical Society of the Pacific*, 20, 71, Dr. Campbell publishes a photograph of the corona, taken at the same time and place as Mr. McClean's photographs, and in this a bright prominence 2' high is shown in the south-west quadrant at position angle about 212° , while Mr. Wesley refers to what is obviously the same prominence in the north-west quadrant. Again, Dr. Campbell refers to a coronal structure on the east limb radiating from a point within the disc at P.A. 75° , but this structure is plainly seen in Mr. Wesley's drawing at about P.A. 96° . These differences can be brought into harmony only by interchanging the north and south limbs.

The positions of the north and south points may be tested in another way. Mr. Wesley states that his orientation was determined from the point of reappearance of the sun at third contact, showing clearly on plate No. 9 of the series. But this of course only defines two opposite points on the eclipsed sun, one west and the other east, north and south remaining ambiguous. Now at all eclipses the point of third contact is in a clockwise direction from the sun's north point (or the north pole) as seen in the sky from any part of the earth; and this holds also in prints taken from negatives photographed with the camera pointing direct at the eclipse. But at Flint Island Mr. McClean used a mirror, and this reverses the direction, so that the north point must be in a clockwise direction from third contact. If, therefore, we take the reproductions in Mr. McClean's report to be unreversed copies similar to ordinary prints, as is highly probable, then, as the point of third contact is shown on the right-hand side in plate 10, obviously the north point should be at the

* *Report of the Solar Eclipse Expedition to Flint Island, 1908 Jan. 3*, by F. K. McClean, F.R.A.S., and others.

bottom and not at the top, as shown. The same applies to all the other photographs in the *Report*, and to Mr. Wesley's drawing.

If the north and south limbs are interchanged in the drawing on a diameter passing through the point of third contact there will be a practical agreement with Dr. Campbell's orientation, the prominence will then be in the south-west quadrant, and the point of convergence in the coronal structure on the east limb will be at about P.A. 70° . Also the unsymmetrical position of the solar axis to which Mr. Wesley calls attention as an anomalous feature will be greatly reduced.

Finally, I have compared the eclipse photographs with a prominence plate taken here on January 4, $8^{\text{h}} 53^{\text{m}}$ I.S.T., or about seven hours after the eclipse plates were exposed. Owing to changes during this interval in the form of the bright eruptive prominence recorded at the eclipse, the evidence is not very decisive, but strongly favours Dr. Campbell's orientation, for a high prominence of the eruptive type is seen on the south-west limb, P.A. 198° to 210° , whilst all other prominences are small.

I conclude therefore that Dr. Campbell's orientation is correct and that the corona of 1908 is not an exceptional case, but, on the contrary, adds weight to the evidence previously found for a close relationship between prominences and coronal streamers, as advocated by Major Lockyer in his recent and also his earlier paper.*

In Mr. Wesley's beautiful series of coronal drawings this error of orientation of the 1908 eclipse should be noted and corrected, as otherwise it may prove very misleading in any future researches.

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