

Note on Prof. C. D. Perrine's Paper: On the Nature of Stellar Variability in AN 5505.

By P. R. Chidambara Iyer.

In one of the concluding paragraphs of his very interesting paper »On the Nature of Stellar Variability«, Astr. Nachr. Bd. 230, Nr. 5505, p. 181, Mr. C. D. Perrine of the Observatorio Nacional Argentino, Cordoba, makes the following suggestion:

»The Solar Corona varies with the spot-period. Does the outer portion of this envelope — the Zodiacal Light — also vary in a similar way? Is it not possible that the spots and faculae may be the result of a pulsation of that envelope instead of the other way round as is tacitly assumed — the Corona + the Zodiacal Light?) depending upon the spots and faculae? That the cause may be external instead of internal?»

There is no doubt that the tacit assumption referred to does not satisfy the scientific mind, and, if it could be proved that the pulsations started, by whatever cause, in the outer envelope of the sun transmit themselves or their influence inwards and give rise to spots, faculae, etc., undoubtedly the assumption of an internal cause for these must be set aside.

Mr. Perrine's suggestion therefore requires close examination. If pulsations in the outer envelope of the Sun are the cause of the various solar phenomena, we can with some reason suppose that the influence, travelling inwards from outside, will first affect the coronal envelope, then the prominences, and last of all, the spots and faculae. Let us see if changes take place in this chronological order. It is known

from a long time that changes in prominence activity set in only after, and not before, changes in spot activity, as can be seen by a reference to Kodaikanal Observatory Bulletin No. XXXIV, »A Comparison of the Periodicities in Prominences and Sunspots, by Dr. Royds, and Kodaikanal Observatory Memoir, Vol. I Part I (by Evershed) pp. 58-59«. And from the contributions of Dr. W. J. S. Lockyer, 1) »On a Probable Relationship between the Solar Prominences and Corona«, Monthly Notices of the Royal Astronomical Society, June 1903, p. 481, 2) »On the Relationship between Solar Prominences and the Corona«, Monthly Notices of the R. A. S. April 1922 p. 323 and 3) »The Forms of the Solar Corona and their Origin«, Supplement to »Nature« June 18, 1927, p. 93, showing the close connection between coronal forms and zones of prominence activity, we can conclude that changes in the coronal envelope will depend on those in the prominences. Thus it is seen that first we have the periodicities in spots and faculae, followed, with a lag in time amounting to about one year, by periodicities in prominences to whose distribution in latitude conforms the disposition of the coronal envelope. It looks as if some influence is travelling across the different layers of the sun from inside outwards, and not from outside inwards, and indicating a chronological order of events opposite to what we should expect in the case of an influence passing inwards.

Solar Physics Observatory, Kodaikanal, S. India, 1927 Nov.

P. R. Chidambara Iyer.

---

Inhalt zu Nr. 5544. H. v. Klüber. Photometrie von Absorptionslinien im Sonnenspektrum. 417. — G. Neujmin. Beobachtungen der partiellen Sonnenfinsternis 1927 Juni 29 in Simeis. 423. — Rolf Müller. Über die Helligkeitsschwankungen der einzelnen Maxima und Minima bei den Mirasternen. 425. — Axel V. Nielsen. Beobachtungen von Veränderlichen. 427. — J. Hartmann. Ein merkwürdiger Fehler in den geographischen Längen von Südamerika. 429. — P. R. Chidambara Iyer. Note on Prof. C. D. Perrine's Paper: On the Nature of Stellar Variability in AN 5505. 431.

---