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Dr. LEE, V.P., in the Chair.

Cyril C. Jackson, Esq., Grand Cairo; and  
 John Nicholl, Esq., LL.D., Professor of Astronomy in the  
 University of Glasgow,  
 were balloted for and duly elected Fellows of the Society.

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*On the Distribution of the Solar Spots in Latitude since the  
 Beginning of the Year 1854; with a Map.* By R. C.  
 Carrington, Esq.

I had fully hoped that by the time when the Society would meet again in the month of November I should have been able to present the members with a tolerably complete discussion of the series of solar spot observations which I have now kept up at Redhill for nearly five years; but a family loss by the hand of death has for the last three months deprived me of the leisure I had counted on, and compels me to confine the present paper to the publication of a single feature which the assembling and comparison of results has brought to light. It will be found to be another and instructive instance of the regular irregularity and the irregular regularity which, in the present state of our knowledge, appear to characterise the solar phenomena.

In the briefest form of statement, the result is, that throughout the two years preceding the minimum of frequency in February 1856, the spots were confined to an equatoreal belt, and in no instance passed the limits of  $20^{\circ}$  of latitude N. or S.; and that shortly after this epoch, whether connected with it or not, this equatoreal series appears to have become extinct, and in seeming contradiction to the precept, *Natura non agit per saltum*, two new belts of disturbance abruptly commenced, the limits of which in both hemispheres may be

roughly set at between  $20^{\circ}$  and  $40^{\circ}$ , with exceptions in favour of the old equatorial region. The tendency at the present time appears to be to contraction of the parallels.

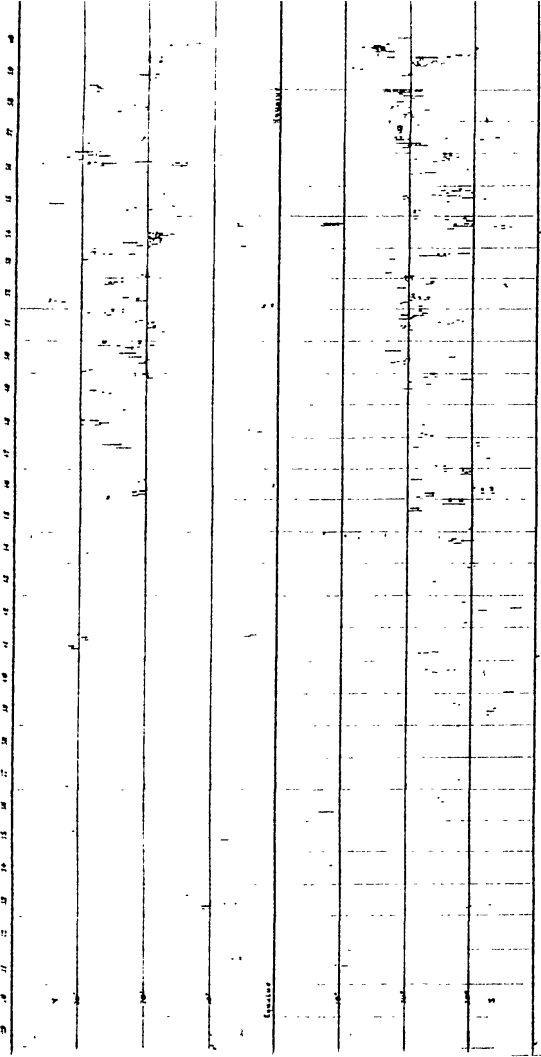
The method of reduction employed having already been explained and sufficiently illustrated in these pages, it is only necessary on this occasion to explain the arrangement of the accompanying map.

In a mean solar day the sun rotates through an angle of  $14^{\circ} 11'$  very nearly, and the heliographical longitudes of spots, as compared with that of the centre of the disk, increase by the synodic quantity corresponding. If an observer plots down on each day the positions reduced to noon of the spots recorded on the  $180^{\circ}$  viewed, and lays the successive sheets so as to superpose the positions of the same spot, his plotting sheets will advance daily to the left by  $13^{\circ} 12'$  nearly. And if he then agrees to adopt one figure of a spot as typical, to be laid down on a single continuous sheet, he will obtain a result such as I have deduced by computation (with the exception that for convenience my map is reversed left for right), and such as might be supposed to be produced by imagining the sun to be the central cylinder of one of Applegarth's printing-machines. In this state the graphical result would be of too extreme dimensions in length for the eye to take it in as a whole; and, accordingly, in the map lithographed the scale in longitude is reduced in the proportion of 72 to 1, as compared with the scale in latitude, and the delineations of spots compressed to mere vertical lines. The uncertainty of the exact period of rotation affects the result only in this way, that if the true period be somewhat longer than that adopted, the vertical lines which indicate the commencement of successive rotations, should be drawn somewhat wider apart, and *vice versa*; a matter of no importance, obviously, for our present purpose.

The variation of the limiting parallels being established, the inquirer next desires to turn back to such past records as may throw light on their changes and their relation to epochs. In this respect I would call attention to a short, but very condensed and important paper, communicated to me by Dr. C. H. F. Peters, formerly of Naples, and lately of Albany, and published, I believe,\* by the American Association for the Advancement of Science. Dr. Peters observed the sun with an object and purpose very similar to my own, from September 1845 to October 1846 inclusive, and obtained 813 places of 286 spots, which he subsequently reduced with a skill and exactness in which I place great confidence. He has given a plate exhibiting the gross distribution in latitude during the period of his labours, in which I find the limits laid down as  $40^{\circ}$  N. and  $30^{\circ}$  S. with a desolate region from  $8^{\circ}$  N. to  $5^{\circ}$  S., and with, on the whole, a preponderance of action in the north

\* I have by me only the sheets of the volume containing this particular paper, sent by post.

The Sun from the beginning of the year 1875, as deduced from the observations taken by Mr. Carrington at Washington at Washington  
 is given in the lines and the other change of distribution commencing with the 12<sup>th</sup> column in another following column.



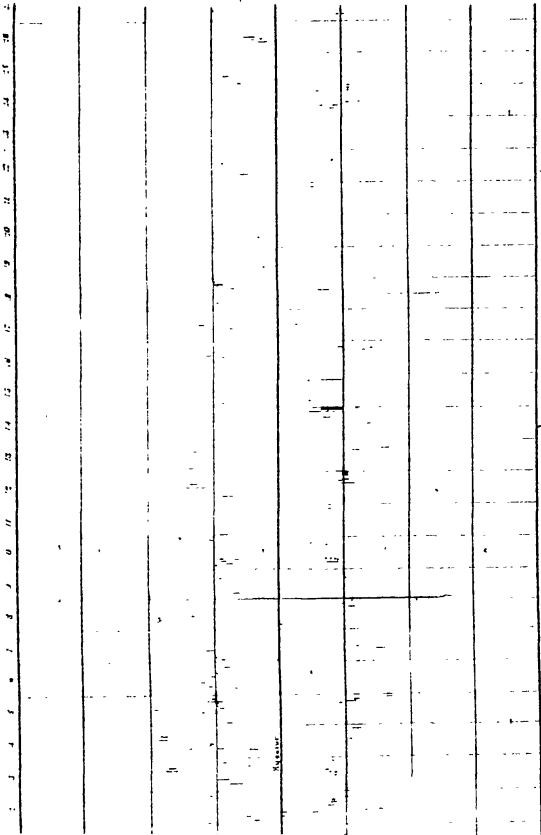
1880-0

1875-0

Year of minimum frequency

and some (commonly few) others, but by far numbers and other cases, are necessarily not represented

As the number of sunspots in latitude of the Solar Spots during an successive rotation  
 and in latitude of 10° and 20° is compared to 1875, half an inch - nearly all the



1880-0

1875-0

Spots which have appeared and disappeared in the hemisphere toward from the

hemisphere. We know now that at that time the sun was passing from a period of minimum activity to a maximum, as now. The distribution is very similar to that which now holds, excepting that at the present time there appears an excess of activity in the south. The records of Dr. Peters are not all which leisure and research may make available in this branch of the history of solar action, there are those of Scemmering and others; nevertheless, it is difficult to express the degree of regret which a student of the sun feels when evidence such as the present meets him of the state of maturity his subject might have attained ere this, had not the opportunities of two centuries been neglected, by his predecessors condemning the research as one of idle curiosity, fit matter for a University thesis, but below the level of Philosophy.

The most cursory consideration will show that success in educing such conclusions in the case of the sun depends mainly on the continuity of the labours of the observer. The conclusion which an observer would have arrived at from a discussion of the observations made during the years 1854 and 1855 would have been exceedingly imperfect, though apparently borne out by a tolerably extensive experience; and the conclusion which I draw from the four years' results now accumulated is, that our knowledge of the sun's action is but fragmentary, and that the publication of speculations on the nature of his spots would be a very precarious venture.

I am very anxious to know what the magnetic observers have to produce, corresponding or not corresponding with the results of my map; and I would take the opportunity of remarking that the question of the correspondency of the solar and magnetic disturbance phenomena is in the curious and imperfect state of a correspondency established in the aggregate, but not for particulars.

I shall shortly offer some conclusions on the independent movement of spots, and on the divergence of neighbouring nuclei, a very singular and marked action, in the detection of which I find, however, that Dr. Peters has anticipated me.

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*New Variable Star (R Sagittarii).* By Norman Pogson, Esq.

(Communicated by Dr. Lee.)

On the night of August 7th, 1849, Professor Argelander observed a star of the 8.5 magnitude, south preceding a fine but widely-spread group, which has recently proved to be variable. In August 1856, when commencing my chart of Hour 19, the star in question was missing; but supposing an erratum in the published zone, no suspicion was entertained of