

TWO LONGITUDINAL ZONES OF APPARENT INHIBITION
OF SUNSPOTS ON THE SOLAR DISC.

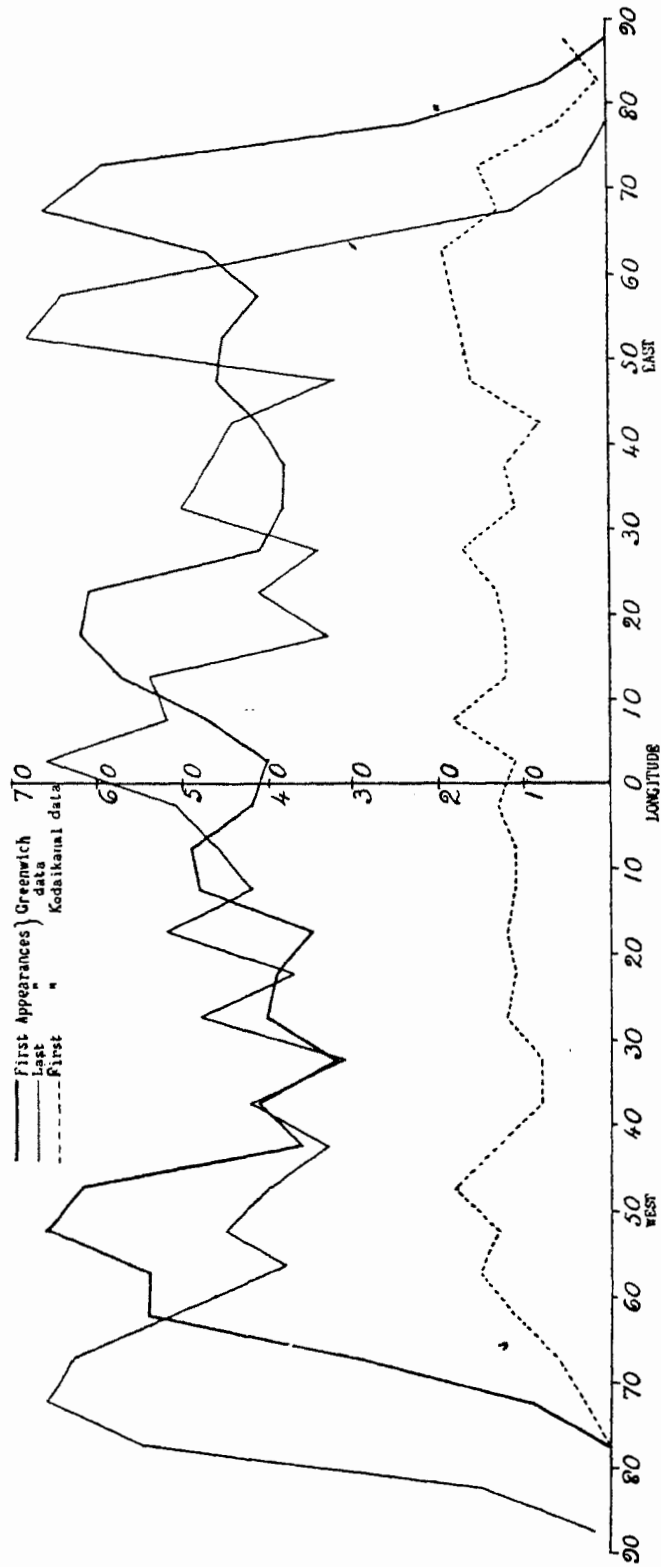
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In a paper (*Kodaikanal Observatory Bulletin*, No. 97) which is now in the press, I have given the results* of a study of the occurrence of sunspots in different longitudes on the visible disc of the Sun. For the investigation, the data of sunspots were taken from the Kodaikanal records for the years 1909 to 1929. Some data from the Greenwich Photoheliographic Results were also utilised for verification of the results. By noting the longitudes in which one-day spots were observed, it was found that the frequency of their occurrence showed a minimum between longitudes 30° and 50° on either side of the Sun's central meridian. This was confirmed by a similar study of one-day spots catalogued in the Greenwich Photoheliographic Results for the years 1874 to 1912.* From the Kodaikanal records the longitudes of the first appearances of spots of longer duration were analysed and, although the same effect was seen in their cases also, it appeared to be less marked, as mentioned in the Annual Report of Kodaikanal for 1930.

A further study of the question has now been made. From the Greenwich Photoheliographic Results the "longitudes when first seen" and the "longitudes when last seen" of two-day spots (*i.e.* spots which were seen on two consecutive days) were separately analysed by entering them in columns of 5° steps. Obviously the two are not really independent, but it was thought that by considering the two phases new features, if any, in the distribution of the beginnings and endings of their existence on the visible disc might be brought out. All the two-day spots from 1874 to 1930 were considered and during the fifty-seven years there were 1395 such spots. In the accompanying diagram the abscissæ represent the longitudes, and the ordinates the numbers of the spots. The thick-line curve shows the distribution of frequency of their first appearances and the thin-line curve that of their last appearances, so that between them the two curves tell the story of the life of these spots. As the spots are carried round by the Sun's rotation during the interval between the two observations, one would naturally expect the curve of first appearances to be bodily shifted so as to be identical with the curve of last appearances, except for a slight difference due to proper motions of the spots, but in the diagram the thin-line curve differs considerably in the minor details from the thick-line one. This is due to the facts that for the purposes of the analysis the spots have been grouped together arbitrarily in 5° zones and that the two consecutive days' observations have not taken place at the same hour in all cases. It will, however, be

* The distribution of one-day spots in longitude was subsequently examined statistically by Dr. S. R. Savur, Meteorologist, Poona, and he found that the dips in the curves at the regions mentioned were real and not due to random variations.

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readily seen that the phenomenon of minimum frequency of occurrence noticed above, viz. between longitudes 30° and 50° E. and W., is brought out with remarkable emphasis. Not only the births of these spots but also their deaths are comparatively rare in the two regions.

The bottom curve (dotted line) represents the distribution of the first appearances of two-day spots taken from Kodaikanal records for the period 1909 to 1929. There were only 389 spots. The troughs in the curve indicating the regions of minimum frequency are less marked and it is now evident, from a comparison of the curves, that this is due to the meagreness of the material available.

Kodaikanal Observatory :
1932 October 20.