

## SOLAR ACTIVITY

*Sunspots.*—During 1955 there was a steadily increasing number of sunspots; in fact the rate of rise in activity was at least as rapid as during any previous year following the epoch of sunspot minimum. The Zürich relative sunspot number for the year was 38·0, compared with 33·2 for 1945, the corresponding year of the previous sunspot cycle.

The largest sunspot group during the year passed the Sun's central meridian on June 17 at a latitude  $23^{\circ}$  S, reaching an area of 1140 millionths of the Sun's hemisphere on June 17, though it may better be regarded as comprising two groups close together with separate development. Many small flares and a few larger flares were observed in the vicinity.

In January a spot at latitude  $35^{\circ}$  N reached an area of 1000 millionths (Jan. 8). This was the largest spot recorded at as high a latitude in the past eighty years.

There were 44 spotless days during the year, of which 28 were during the months February to April. Sunspot numbers increased during the second half of the year so that the mean monthly Zürich sunspot number for November was 90 and for December 77. Solar flares became frequent after May but none of outstanding intensity was reported. Twenty-nine sudden enhancements of long-wave atmospherics were recorded at Herstmonceux, of which only two occurred before May 27. Also a number of short-wave Dellinger fade-outs were reported by Cable and Wireless Ltd. during the second half of the year.

Terrestrial magnetic activity was generally low throughout the year. One or two small storms occurred and there was a slight 27-day recurrence tendency during March, April and May. Otherwise there were no marked M-region storms. Faint aurorae were reported frequently during November and December.

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*Prominences.*—With the advance of the new sunspot cycle there has been in 1955 a very great increase in all forms of prominence activity compared to 1954. The mean daily areas and numbers of calcium prominences at the limb as derived from photographs taken at Kodaikanal are given below :

1955	Area in square minutes					Number				
	North	South	East	West	Total	North	South	East	West	Total
Jan.-June	2.21	1.14	1.59	1.76	3.35	4.24	3.28	3.71	3.81	7.52
July-Dec.	2.47	1.96	2.01	2.42	4.43	4.60	3.77	4.09	4.28	8.37
Whole year (weighted mean)	2.32	1.51	1.78	2.05	3.83	4.40	3.50	3.88	4.02	7.90

Compared with the previous year prominence activity as represented by areas shows an increase of 154 per cent while the numbers show an increase of 47 per cent.

The distribution of areas in five-degree ranges of latitude shows maximum activity in the zones  $45^{\circ}$ – $50^{\circ}$  in the northern hemisphere and  $40^{\circ}$ – $45^{\circ}$  in the southern hemisphere with a secondary maximum between  $10^{\circ}$  and  $15^{\circ}$ . The zone of maximum activity in the northern hemisphere has advanced nearly 10 degrees towards the pole and the peak in the southern hemisphere has moved five degrees nearer the pole from their positions in 1954. Greater activity than in the previous year is observed beyond latitude  $50^{\circ}$  in both the hemispheres. The western preponderance in prominence areas and numbers noticed last year continues.

Only one metallic prominence was observed during the year.

Doppler shifts of the H-alpha line observed in prominences and absorption markings with the prominence spectroscope and the spectroheliroscope are given below :

	North	South	East	West	To red	To violet	Both ways	Total
Prominences	58	43	52	49	6	..	95	101
Dark markings	8	1	5	4	1	1	7	9

The heights of 19 prominences were measured in H-alpha,  $D_3$  and H-beta lines with the prominence spectroscope. These were compared with the

corresponding heights in the K line as obtained from the spectroheliograms. The average heights were :

<i>K</i>	H-alpha	<i>D</i> <sub>3</sub>	H-beta
74".7	72".4	60".9	54".3

Four instances of sudden disappearance of absorption markings and prominences were observed during the year.

The mean daily areas and numbers of hydrogen absorption markings on the disc as obtained from Kodaikanal records are given in the following table. The areas and numbers in this table have been derived from the values computed for each five-degree zone for the four quadrants NE, NW, SE and SW of the disk.

1955	Area in millionths of the Sun's visible hemisphere (uncorrected for foreshortening)					Number				
	North	South	East	West	Total	North	South	East	West	Total
Jan.-June	902.4	376.5	686.3	592.6	1278.9	6.20	2.62	4.66	4.16	8.82
July-Dec.	1623.4	830.5	1108.0	1354.9	2453.9	10.01	4.90	6.78	8.13	14.91
Whole year (weighted mean)	1234.4	585.5	880.6	939.3	1819.9	7.95	3.67	5.63	5.99	11.62

Compared with the previous year there has been an abnormal increase in activity in both areas and numbers, the increase in areas being about 231 per cent and the increase in numbers 117 per cent.

The distribution of areas in latitude shows a pronounced peak of activity between latitudes 45° and 50° in both the north and the south hemispheres with a secondary maximum between latitudes 30° and 35° in the southern hemisphere. Here again both areas and numbers show a western excess.

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