

# Kodaikanal Observatory.

BULLETIN No. LXXXIII.

## SUMMARY OF PROMINENCE OBSERVATIONS FOR THE FIRST HALF OF THE YEAR 1927.

In pursuance of the programme of work adopted since 1st January 1923 under the auspices of the International Astronomical Union, all observatories taking spectroheliograms of the sun have been asked to co-operate with the Kodaikanal Observatory by supplying copies of their photographs on those days when the Kodaikanal records are imperfect or wanting. In response to our requirements for the first half of the year 1927, the Mount Wilson Observatory supplied prominence plates for 21 days and H $\alpha$  disc plates for 18 days; Meudon Observatory supplied K $\beta$  disc plates for 18 days and H $\alpha$  disc plates for 12 days, and the Pitch Hill Observatory (Mr. Evershed's) at Ewhurst, Surrey, England, supplied 1 prominence plate and 1 H $\alpha$  disc plate.

When only incomplete or imperfect photographs for any day are available from more than one observatory, the best photograph is chosen as representing the solar activity of that day after weighting it according to its quality, and the remaining photographs are ignored.

The mean daily areas and numbers of prominences during the half-year are given below. The means are corrected for incomplete or imperfect observations, the total of 178 days for which plates were available being reduced to 164½ effective days.

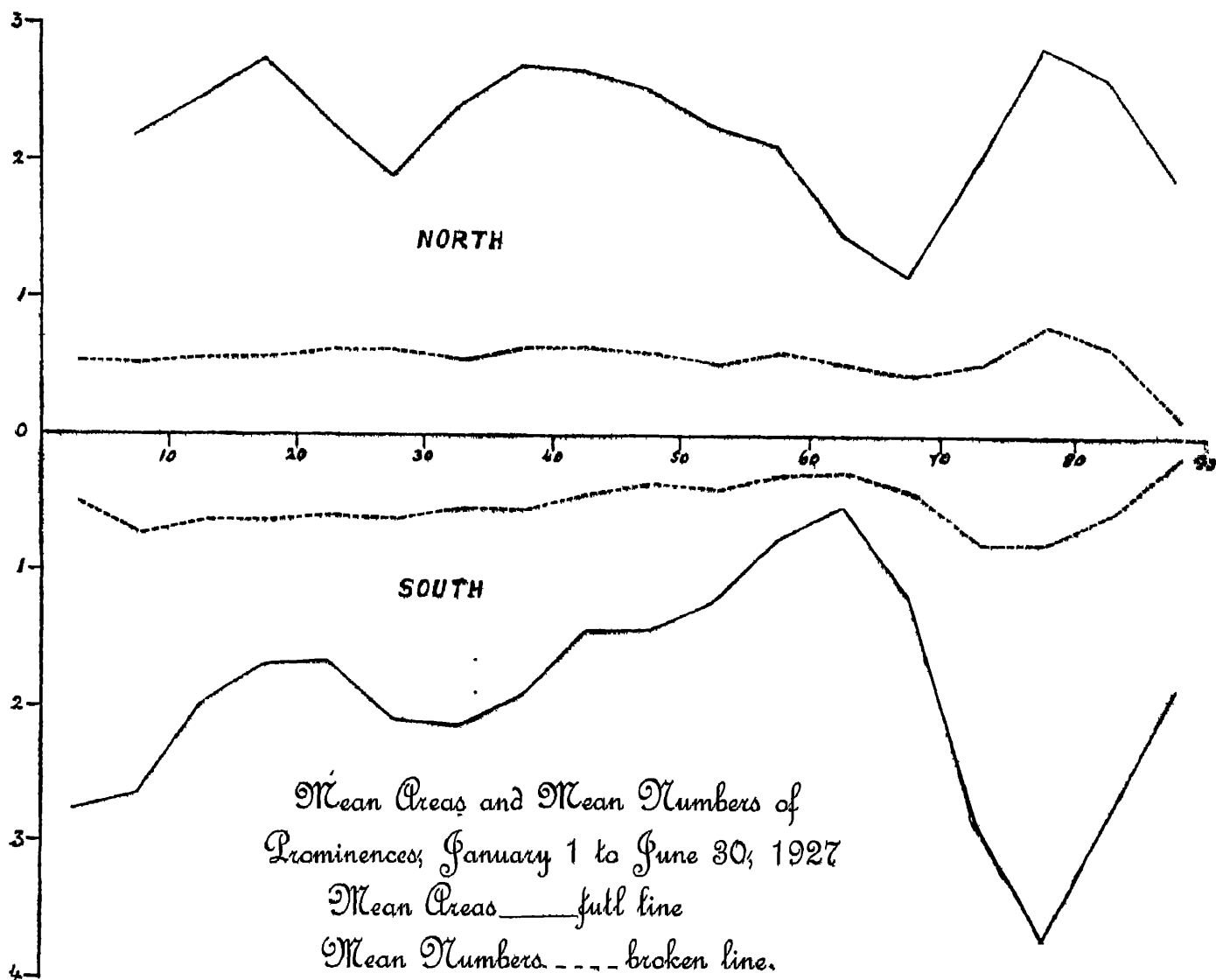
	Mean daily areas (square minutes).	Mean daily numbers
North ... ..	4 04	10 01
South .. ...	3 46	9 34
Total	7 50	19 35

Compared with the previous half-year, areas remain the same in the northern hemisphere, although numbers are 5 per cent larger, but in the southern hemisphere both areas and numbers show an increase, namely, 15 per cent and 12 per cent, respectively.

For comparison with bulletins issued prior to the co-operation of other observatories, the means based on Kodaikanal photographs alone are also given, 158 days of observation being counted as 148½ effective days.

	Mean daily areas (square minutes).	Mean daily numbers
North (Kodaikanal photographs only) ...	4 15	10 01
South do. ...	3 58	9 36
Total ..	7 73	19 37

The distribution of the prominences in latitude is represented in the following diagram, in which the full line gives the mean daily areas and the broken line the mean daily numbers for each zone of  $5^\circ$  of latitude. The ordinates represent tenths of a square minute of arc for the full line and numbers for the broken line. The high latitude maximum has remained stationary in the northern hemisphere and advanced about  $5^\circ$  towards the pole in the southern when compared with the previous half-year. The minimum of activity near  $65^\circ$  has become more marked than in the previous half-year.



The monthly, quarterly and half-yearly areas and numbers, and the mean height and mean extent of the prominences on photographs from all the co-operating observatories are given in Table I. The unit of area is 1 square minute of arc. The mean height is derived by adding together the greatest heights reached by individual prominences and dividing by the total number of prominences observed; the mean extent is derived by adding together the lengths of the base on the chromosphere of individual prominences and dividing by the total number of prominences.

TABLE I.—ABSTRACT FOR THE FIRST HALF OF 1927.

Months	Number of days (effective)	Areas	Numbers	Daily Means		Mean height.	Mean extent
				Areas	Numbers		
1927						"	°
January	28½	232.5	557	8.1	19.4	41.7	6.11
February	26½	186.9	483	7.0	18.1	41.3	6.61
March	27½	220.2	497	8.0	18.1	42.2	6.51
April	29	213.3	564	7.4	19.4	35.0	6.12
May	28½	210.6	561	7.5	19.9	40.4	6.02
June	24½	169.1	527	7.0	21.7	37.1	5.31
First quarter	83	639.6	1537	7.7	18.5	41.7	6.40
Second quarter	81½	593.0	1652	7.3	20.3	37.5	5.83
First half-year	164½	1232.6	3189	7.5	19.4	39.5	6.10

*Distribution east and west of the Sun's axis.*

During the half-year areas showed a slight western excess and numbers a slight eastern excess as will be seen from the following table —

1927 January to June	East.	West	Percentage East
Total number observed . . .	1605	1584	50.3
Total areas in square minutes . . .	601.0	631.7	48.8

*Metallic prominences.*

Sixty-three metallic prominences were observed during the half-year, as against 19 in the previous half-year. Their details are given below :—

TABLE II.—LIST OF METALLIC PROMINENCES OBSERVED AT KODAIKANAL, JANUARY TO JUNE 1927.

Date.	Hour I.S.T.	Base	Latitude		Limb	Height.	Lines
			North.	South.			
1927.	H. M.	°	°	°		"	
January	1	8 55		23	W	15	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316·8, D <sub>1</sub> , D <sub>2</sub> , 6677.
	2	9 2		14	E	10	4924·1, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316·8, 6677, 7065
	2	9 6	4	28	W	30	4924·1, 5016, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, D <sub>1</sub> , D <sub>2</sub> .
	4	10 5	3		E	15	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316·8, D <sub>1</sub> , D <sub>2</sub> .
	8	9 21	6		W	20	4924·1, 5016, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, D <sub>1</sub> , D <sub>2</sub> , 6677
	10	9 22	2	6	W	25	4924·1, 5016, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub>
	15	12 26	5		W	10	4924·1, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316·8, D <sub>1</sub> , D <sub>2</sub> , 6677.
	17	9 25	4		W	20	4924·1, 5016·8, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, D <sub>1</sub> , D <sub>2</sub> , 6677
	18	8 58	3	8·5	W	15	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , D <sub>1</sub> , D <sub>2</sub> , 6677.
	21	10 35		17	W	30	4924·1, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , D <sub>1</sub> , D <sub>2</sub> .
	25	9 18	6		W	15	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub>
	26	11 32	3	20·5	W	10	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , D <sub>1</sub> , D <sub>2</sub>
	29	9 53		17·5	E	10	D <sub>1</sub> , D <sub>2</sub> , 6677, 7065.
February	1	9 2	4	26	E	15	5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316·8, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065.
	2	9 2	3	13·5	E	15	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	3	10 35			E	10	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	4	10 16	4		W	20	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, D <sub>1</sub> , D <sub>2</sub> , 7065.
	5	8 54		33	E	10	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·0, 5276·2, 5316·8, D <sub>1</sub> , D <sub>2</sub> .
	8	9 39	6		E	20	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065.
	15	9 6	3	8·5	W	10	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065.
	15	8 42	4	16	W	20	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub>
	16	8 55	3		W	15	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, D <sub>1</sub> , 5363·0, D <sub>2</sub>
	20	8 39	3	23·5	E	15	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub>
	22	9 5	3	31·5	E	10	4924·1, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316·8, D <sub>1</sub> , D <sub>2</sub> .
	23	8 40	3	16·5	E	20	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub>
	23	8 50		27	W	20	4924·1, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065.
27	9 15	4		E	10	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, D <sub>1</sub> , D <sub>2</sub> , 7065.	
27	9 28	3		E	30	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub> .	
28	9 20	2	20	E	10	4924·1, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316·8, D <sub>1</sub> , D <sub>2</sub> .	
March	5	9 12	7		W	20	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065.
	6	9 8	2		W	10	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316·8, D <sub>1</sub> , D <sub>2</sub> , 6677.
	9	8 26	2		W	15	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065.
	12	9 48	2	23	E	10	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , D <sub>1</sub> , D <sub>2</sub>
	13	9 8	4	32	E	10	4924·1, 5016·0, 5018·6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276·2, 5316·8, 5363·0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065.

Date.	Hour I S. T	Base	Latitude		Limb	Height	Lines	
			North.	South				
1927.	h. m	°	°	°		"		
March	14	9 14	11	35 5	E	20	4922 4, 4924 1, 5016 0, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276 2, 5316 8, 5363 0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065	
	15	9 53	3		10 5	W	10	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub>
	19	10 20	1	15 5		W	5	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , D <sub>1</sub> , D <sub>2</sub>
	24	9 23	2	42 5		W	20	4924 1, 5016 0, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub>
	27	9 5	3	16 5		W	20	4924 1, 5016 0, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276 2, 5316 8, 5363 0, D <sub>1</sub> , D <sub>2</sub> , 6677
	27	9 0	4	28		W	10	4924 1, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	28	8 46	4	15		W	15	5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub>
	31	9 25	1	12 5		E	10	4924 1, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5234 8, 5269 8, 5276 2, 5363 0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
April	5	9 30	3		11 5	E	10	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	6	9 47	9		15 5	E	15	4922 0, 4924 1, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5198 0, 5206 3, 5208 7, 5234 8, 5276 2, 5316 8, 5363 0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	6	10 57	2		22	W	20	4924 1, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5234 8, 5276 2, 5316 8, 5363 0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	7	10 46	5	41 5		E	15	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , D <sub>1</sub> , D <sub>2</sub>
	8	8 55	5	19 5		E	20	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , D <sub>1</sub> , D <sub>2</sub> , 6677
	8	8 31	4		16	W	10	4924 1, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	10	9 12	3	29 5		E	10	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub> , 7065
	11	8 45	6	37		E	10	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	11	8 26			12	E	10	4924 1, 5016 0, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	12	8 45	2	26		E	10	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , D <sub>1</sub> , D <sub>2</sub>
	12	8 33	6	3		W	10	4924 1, 5016 0, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276 2, 5316 8, 5363 0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	13	10 14			17	E	10	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , D <sub>1</sub> , D <sub>2</sub>
	13	10 50	1	13 5		W	15	4924 1, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276 2, 5316 8, 5363 0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
	20	10 0	1		21 5	E	10	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub> , 7065
	24	8 45	10		13	W	15	4924 1, 5016 0, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5270 0, 5276 2, 5316 8, 5363 0, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065
May	7	9 33	4		4	E	20	4924 1, 5016 0, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5270 0, 5276 2, 5316 8, 5363 0, D <sub>1</sub> , D <sub>2</sub>
	7	9 36	2		10	E	10	5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276 2, 5316 8, D <sub>1</sub> , D <sub>2</sub>
	8	10 0	4		12	E	15	5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub>
	14	10 5	3		13 5	W	10	b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, 6677.
	22	9 15	3		20 5	E	10	4924 1, 5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5316 8, D <sub>1</sub> , D <sub>2</sub>
	25	9 55			26	W	10	5018 6, b <sub>1</sub> , b <sub>2</sub> , b <sub>3</sub> , b <sub>4</sub> , 5276 2, 5316 8, D <sub>1</sub> , D <sub>2</sub> , 6677, 7065

The distribution in latitude of the metallic prominences was as follows —

	1°—10°	11°—20°	21°—30°	31°—40°	41°—50°	Mean latitude	Extreme latitudes.
North . .	4	11	9	5	2	22° 0	3° and 42° 5
South ...	4	18	10	.	..	16° 7	4° and 28°

Thirty-two were on the east limb and 31 on the west limb.

## Displacements of the hydrogen lines.

Particulars of the displacements observed in the chromosphere and prominences are given in the following table :—

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINES.

Date.	Hour I.S.T.		Latitude.		Limb.	Displacement.			Remarks.
			North.	South.		Red.	Violet.	Both ways	
1927.	H.	M.	°	°		A.	A.	A.	
January	1	8 51	81.5		E		Slight		At base.
	1	9 3		13	E		1.0		At top.
	1	8 55	23		W	2	1.0		To red at top; to violet at base.
	2	9 24	13		E		1.0		At base.
	2	9 2		11	E	1.5			At top.
	2	9 2		14	E		1.0		At base.
	2	9 6		20	W	1.0			At top.
	2	9 14	44		W		1.0		At base.
	3	10 28	40		W		1.0		
	4	9 33	59		E		0.5		At base.
	4	9 59	4		E		1.0		At top.
	4	10 5		15	E		1.5		Do.
	4	10 5		17	E	1.0			At base.
	4	9 44		12	W		Slight		Do.
	8	9 5	44		E	1.0			At top.
	8	9 3	30		E	Slight			Do.
	8	9 28	11		E	0.5			At base.
	8	9 41		45	E		0.5		At top.
	8	9 30		42	W	Slight			Do.
	8	9 21		8	W	1.5			Do.
	8	9 14	23		W	1.5			Do.
	8	9 12	42		W	1.0			Do.
	9	9 1	39		E	0.5			Do.
	9	9 25		13	E	1.0			At base.
	10	9 7		40	W	0.5			At top.
	10	9 22	8		W	1.0			Do.
	11	9 23	10		E	1.0			At base.
	11	9 22	53		E	Slight			No prominence.
	11	9 32		83.5	E	Do.			At base.
	11	9 12		22	W	1.0	0.5		To red at top; to violet at base.
	11	9 2	16		W	Slight			
	11	8 55	74.5		W	0.5			At top.
	13	11 51	34		E		2.0		Do.
	13	11 54	28		E	1.5	2.5		
	13	10 40	24		W		1.0		At base.
	15	12 26		18	W	0.5			At top.
	16	8 43		13	E	2.0	1.0		To red at base; to violet at top.
	16	8 16		16	W	7.0			At top, in the middle of the promi- nence C was displaced 1.5 A to red.
	16	8 16		13'	W		1.0		At base.
	17	9 31	68.5		E	Slight			Do.
	17	9 6	64.5		E	Do.			At top.
	17	9 4	51.5		E	0.5			At base.
	17	9 34	40		E	1.0			At top.
	17	9 0	24		E	0.5			
	17	10 2		18	W		2.0		At base.
	17	9 25		16	W	2.5	1.0		To red at top; to violet at base. A ghost of C was displaced 6.0 to red at top.
	17	9 12	43		W		Slight		No prominence.
	18	8 46	47		E	Slight			At base.
	18	9 3	14		E		Slight		At top.
	18	9 0		17	W	1.0	0.5		To red at top, to violet at base.
	18	8 58	10		W	0.5			At top.
	19	8 55	58.5		E	Slight			At base.
	19	9 18	21		E		1.5		At top.
	19	8 50	18		E	1.5			Do.
	19	9 5		24	W	1.0			Do.
	19	9 3		17	W	1.5			Do.
	20	10 46	84		E		Slight		At base.

Date	Hour I.S.T.		Latitude.		Limb	Displacement			Remarks.
			North	South		Red	Violet	Both ways	
1927	H	M	'	°		λ	λ	λ.	
January	20	10 41	18		E		05		At top
	23	10 33	10		E		10		Do.
	21	9 13		24	W	10			Do
	24	9 7	18		W	10			Do
	24	8 51	63 5		W	05			Do
	24	8 50	78 5		W	10			Do
	25	8 44	42		E		05		Do
	25	10 32	24		E		05		Do
	25	8 54	7		E	0.5			Do
	25	9 16		37	W		20		Do
	25	9 18		28	W	20			To red at base , to violet at top.
	25	8 49	20		W		05		At base
	25	8 47	26		W		15		In the middle of prominence
	25	8 46	75		W		Slight		No prominence
	26	11 28	20 5		W	10			To red at top , to violet at base.
	27	10 50	23		W	10			At top.
	27	10 49	27		W		10		At base.
	28	10 18	1 5		E		05		Do
	28	8 54	42		W		05		Do
	28	8 47	76		W	05			Do
	28	8 43	85		W	05			Do
	29	8 45	85		E	05			At top
	29	9 55	3 5		E		10		At base
	29	9 47		13	E	10			Do
	29	11 22		18	E	30			Do
	29	11 22		27	E	10			Do
	29	8 48	76		W	05			
	30	9 22	45 5		E		05		At base
	30	9 20	23		E	05			At top
	30	9 22	4		W	0.5			Do
	31	8 52	83		E	1.0			Do.
	31	9 1	60 5		E		Slight		
	31	9 0	48 5		E		05		At base
	31	9 14	26		E		10		At top
	31	9 12	14		E	05			To red at top , to violet at base.
	31	9 33		19	E	05			At base
February	1	9 9	24		E	30			To red at base , to violet at top.
	1	9 12	8 5		E		15		At top
	1	9 24		5	W	15			Do
	2	8 30	65 5		E		Slight		
	2	9 2	12		E		10		At top
	2	9 10	9		E	10			Do
	2	9 44		4	E		10		Do
	2	8 48		10	W		05		Do
	2	9 5	26		W	05			Do
	3	9 5	12		E	10			At base.
	3	9 6	6		E		10		Do
	3	10 21		13	E	10			To red at top , to violet at base.
	3	9 50	30		W		10		05
	3	9 44	35		W		10		At base
	4	9 50	32		E	Slight			
	4	10 16		10	W	10			To red at top , to violet at base.
	5	8 54	32		E	10			
	5	8 54	15		E	05			
	5	8 50		19	W	10			To red at top , to violet at base
	5	8 50		11	W	20			At top
	6	9 2	30		E		05		At base
	6	9 35	13		E	05			Do
	6	9 28		18	W	Slight			At top.
	6	10 42	53 5		W		05		Do
	7	9 24	19		W	Slight			Do
	7	9 30	3		W	10			Do
	7	9 30	20		W	0.5			Do
	8	9 26	39.5		E	05			Do
	8	9 39		24	E				Do
	8	9 39		28	E	40			At base

Date.	Hour I S T.	Latitude.		Limb.	Displacement.			Remarks.
		North	South.		Red.	Violet.	Both ways.	
1927.	H. M.	°	°		A	A.	A.	
February	9	8 54	45.5	E	1.0			At base.
	9	9 0	25	E		1.0		At top.
	11	9 15		W	2.0			At base.
	11	9 12		W	1.0			Do.
	11	9 10		W	1.0			Do.
	13	9 10	56.5	E	0.5			Do.
	13	9 12	34.5	E	2.0			Do.
	13	9 12	33.0	E		1.5		At top.
	13	9 19		W		1.0		Do.
	13	9 9		W		1.0		Do.
	13	9 9		W	1.0			At base.
	13	9 4		W	1.0			Do.
	14	9 2	61	E		0.5		At top.
	14	9 7	25	E	0.5	1.0		To red at base, to violet at top.
	14	9 30	21	E		1.0		At top.
	14	3 30	18	E	1.5			At base.
	14	9 11	13	E	0.5			Do.
	14	8 49		E	1.0			Do.
	14	8 46		E		1.0		At top.
	14	8 56		W		0.5		Do.
	14	8 52	14	W	0.5			Do.
	14	9 20	16	W	1.0			Do.
	14	9 20	18	W		0.5		At base.
	14	8 45	44.5	W		0.5		At top.
	15	8 24	61	E		Slight		
	15	9 6	5	W	2.0			At top.
	15	9 6	8	W		1.0		At base.
	15	8 42	18	W	1.5	1.0		To red at top; to violet at base.
	15	8 32	75.5	W		0.5		
	15	8 28	83	W	1.5			At top.
	16	9 12	13.5	E	2.0	1.0		To red at top; to violet at base.
	16	8 52		W	2.5	1.0		Do.
	17	9 15	6	W		1.0		Over whole prominence.
	20	8 20	63	E	Slight			
	20	8 39	24	E	1.0			At base.
	20	8 45	11	E		1.0		At top.
	20	9 20		W	Slight			Do.
	21	9 30	33.5	E	1.0			At base.
	21	9 34	9	E	3.0			At top.
	21	9 40		E	1.5			At base.
	21	9 42		E	Slight			
	21	9 1	39.5	W	1.0			At top.
	22	8 37	67	E		Slight		At base.
	22	9 21		E	1.0			At top.
	22	9 23		E	0.5			Do.
	22	9 26		E	1.5			At base.
	22	8 54	36	W	1.0	1.5		To red at top; to violet at base.
	22	8 50	75.5	W	0.5			At top.
	23	8 25	30	E	1.0			Do.
	23	8 40	16.5	E	2.0	0.5		To red at base; to violet at top.
	23	8 40	13	E		1.0		At top.
	23	9 32		E	1.0			At base.
	23	9 46		W	1.5			At top.
	23	9 46		W	2.0			Do.
	23	8 50	27	W	1.5	1.0		To red at base; to violet at top.
	24	10 5		E	1.0	0.5		Do.
	24	10 15		W		0.5		At base.
	27	9 15		E		1.0		At top.
	27	9 28		E	1.5	1.0		To red at base; to violet at top.
	27	9 0	30	W	2.0			At top.
	27	9 0	31.5	W		1.5		At base.
	27	8 53	48.5	W	1.5	1.0		To red at base, to violet at top.
	28	10 30	20	E	1.5	1.0		Do.
	28	9 2		W		1.0		At top.
	28	8 58	51.5	W		0.5		Do.
March	1	8 42	47.5	E		1.0		At base.



Date	Hour I S T.		Latitude		Lamb	Displacement.			Remarks
			North	South.		Red	Violet.	Both ways	
1927.	II	M.	°	°		A.	A	A	
March	1	9 10		19	E	05			At top.
	1	8 51		14	W	Slight			Do.
	5	9 3		26	W	05			
	5	9 12		30 5	W		05		
	5	9 50	44 5		W	10			
	6	8 54	26		E		05		At base.
	6	9 3		11	W	10			At top
	9	8 26		20	W	10			Do
	9	8 24		11	W	10			Do
	9	8 22	11		W		2.0		At base
	10	8 40	25		E		0.5		
	11	8 58	25		E		1.0		At top
	11	9 3	1		E	1.0	1.5		To red at base, to violet at top.
	12	10 1	31.5		E		1.0		At top
	13	9 25	33.5		E	3.0			Do
	13	9 8	33.5		E	1.0	1.5		To red at top, to violet at base
	13	8 48	24		W	1.0			At top
	13	8 45	28		W	2.0			Do
	13	8 45	30.5		W		1.0		At base.
	13	8 41	35.5		W	1.0			At top
	14	9 50	60		E	2.5	1.0		To red at top, to violet at base
	14	9 28	51.5		E		4.5		At top
	14	9 14	36.5		E	20.0	5		To red at base, to violet at top.
	14	10 4		41.5	W	2			At top.
	15	9 0	55.5		E	1	2		To red at top, to violet at base
	15	9 12	39.5		E	1	1.5		To red at base, to violet at top
	15	9 26		10.5	W	1.5	1		To red at top, to violet at base
	15	9 9		7	W	1			At top
	16	10 6		10	W	0.5			Do.
	17	9 31	20		E		1		Do.
	17	9 29	8		E		1		Do.
	18	8 58	70.5		E		0.5		At base.
	18	9 30	40.5		E		1		At top
	18	9 16		6	E	0.5			At base
	18	9 17		16	E		1		At top.
	18	9 6		35.5	W		1		At base
	18	9 23		35.5	W		1.5		At top
	19	10 16	14		W	3			No prominence.
	19	10 35	16		W	1			At top.
	20	8 50	30		E	0.5			At base.
	20	9 15		79.5	E	0.5			Do
	21	9 3	55.5		E		0.5		Do.
	21	9 19	34.5		E	1			At top
	21	9 8	55.5		W	0.5			Do
	22	9 7	51.5		E	0.5			At base
	22	9 10	31.5		E	0.5			Do.
	22	9 0	38.5		W	1			At top
	23	9 3	71.5		E	Slight			At base
	23	9 9	12		E		1		At top
	23	9 1		11	W	0.5			Do
	24	9 9	60		E	1			Do
	24	9 9	57.5		E		0.5		At base
	24	9 31		30	W	0.5			At top.
	25	9 24	81		E	0.5			Do.
	25	9 9	57.5		E	1			Do
	25	9 29	33.5		E		2		Do
	25	9 31	20		E		0.5		Do
	25	9 19		26	W	2			Do.
	25	9 17		9	W	1			Do
	26	9 48	7		E	Slight			Do.
	26	9 45		1	E	1			At base
	26	9 33		74.5	E	0.5			No prommence.
	27	8 45	30		E	1			At top
	27	9 24		74.5	E	0.5			At base.
	27	9 8		8	W	1			At top.
	27	9 0	20		W	6		2	At base
	27	9 0	37		W	3			At top.

Date.	Hour I.S.T.	Latitude.		Lamb.	Displacement.			Remarks.
		North.	South		Red	Violet	Both ways	
1927.	π M.	°	°		A.	A.	A.	
March	28	8 58	30 5	E	1			At top.
	28	9 7	26	W	1			Do.
	28	8 52	37 5	W	1			Do.
	28	9 4	69	W		0 5		At base.
	30	10 27		W	Slight			At top.
	31	10 7	49	E		1		Do.
	31	9 20	26 5	E	2	2		To red at base ; to violet at top.
	31	9 23	20	E			1 5	
	31	9 24	12	E	2			Throughout top portion
	31	9 4	50	E		Slight		At top.
April	1	9 44	9	E		1		At top
	1	9 38		W	0 5			Do.
	1	9 30	36 5	W		0 5		At base.
	2	9 19	49 5	E		1		At top
	2	9 23	22	E	1 5			At base
	2	9 21	15	E	1			Do.
	2	9 25		E		2		At top.
	2	9 15	37 5	E	1			Do
	2	9 7	82 5	W	2	1		To red at base , to violet at top.
	3	9 20	30	E	1			At top.
	3	9 18	6	E	0 5			Do.
	3	9 33		E		1		Do.
	4	8 40	69	E	1 5			Do
	4	8 51	14	E	0 5			At base.
	4	8 45	8	W		1		Do
	5	9 35	76 5	E		0 5		Do
	5	9 30		E	1 5	1		To red at base ; to violet at top.
	5	9 44	21	W		1 5		At base.
	6	10 43	23	E	1			At top.
	6	9 37		E	4			Do.
	6	9 47		E			6	
	6	9 34		E		4		At base.
	6	9 35		E	1			At top
	6	9 24		W		1		Over middle of prominence.
	6	10 58		W		4 5		At top.
	7	10 35	23	E	1	1		To red at top ; to violet at base.
	7	10 37	15	E		1		At top.
	7	10 21		E		1		Do.
	8	8 55	20	E	1			Do.
	8	8 40		E		0 5		Do.
	8	8 31		W		1		At base.
	8	8 31		W	1			At top
	9	10 35		E	3			Over whole prominence.
	9	10 26		W	1			At top.
	10	9 20	38	E	1			Do
	10	9 12	30 5	E		1		At base
	10	9 6	19	E		2		Do
	10	9 6	16	E	1 5			At top.
	10	9 6	13	E		1		At base.
	10	9 30	13	E	2			At top
	10	9 32		E		2		Do
	10	9 28	23	W		0 5		At base.
	11	8 24	48 5	E		1 5		At top.
	11	8 24	38	E	1			At base.
	11	8 26	12	E	0 5			Do
	11	8 31		W	0 5			Do
	12	8 24	66 5	E		Slight		
	12	8 45	27	E		0 5		
	12	8 50		E	0 5			At base.
	12	8 33	2	W			1	
	13	10 45	43 5	E	1	1		To red at base ; to violet at top.
	13	10 43	37	E	0 5			At base.
	13	10 41	28	E		Slight		At top
	13	10 33	10	E		1 5		Do.
	13	10 11		E	1			At base.

Date.	Hour L S T		Latitude		Lamb	Displacement.			Remarks
			North	South		Red.	Violet .	Both ways.	
1927	II.	M	°	°		A	A.	A.	
April	13	10 50	13 5		W	Slight			At top
	13	11 6	73		W	2			Do
	14	9 46	47		E		1		Do
	14	9 38	37		E	1			Do.
	14	9 20		11	E		05		At base.
	14	9 17		27	E	1			At top.
	14	10 10	12 5		W	Slight			Do
	15	9 0	27		E		Slight		No prominence.
	15	8 58	11		E	1			At top
	15	9 4	62 5		W		1		At base.
	16	9 2	44 5		E	05			At top.
	16	9 16	6		E	Slight			Do
	16	9 9	15		W	05			Do.
	17	8 48	83 5		E		05		At base.
	17	8 45	17		E	1			At top.
	17	9 0	10		E	05			At base
	17	8 54	2		W	1			
	18	9 52	57 5		E		Slight		At base.
	18	9 19	21		E		Slight		At top
	18	8 48	14		E	05			Do
	18	8 57	19		W	1			Do
	19	8 32	72		E	05			Do
	19	8 37		17	W	2	15		To red at top , to violet at base
	19	8 37		13	W	3			At top
	20	10 8	3		E	1			Do
	20	9 50		11	E	Slight			At base.
	20	9 55		21	E		2		At top.
	20	10 18		22	W	1			Do.
	20	10 21		14	W	2	1		To red at top ; to violet at base
	20	10 35	37		W			1	At top
	21	10 10	43 5		E	05			Do.
	21	11 20		2	E	2			At base
	21	9 50		19	E		1		At top.
	21	10 26	25 5		W		1		Do
	21	10 30	43		W	05			Do.
	22	8 21	61 5		E		05		At top.
	22	8 45		29	E	1			Do.
	24	8 34	25		E		1		At base.
	24	8 50	23		E	05			Do
	24	8 32	85		E	05			Do
	24	9 7		43	E		05		Do.
	24	8 45		18	W		3		Do.
	24	8 45		16	W	15			At top
	24	8 40	25		W	05			Do.
	24	8 38	31		W	1			Do.
	25	9 55	1		E	05			At base.
	25	9 57		10	E		1		At top
	25	9 31	50		W	Slight			
	30	9 54	36		E	Slight			At base.
May	1	8 25	18		E		05		At base.
	1	8 23	10		E	1			At top.
	1	8 30	64 5		W	1			Do.
	3	9 32	35		E	05			Do
	6	8 44	52		W	05			Do
	7	9 32		1	E	15	05		To red at top , to violet at base.
	7	9 36		10	E	05			At base.
	7	9 18		33	E	1			At top.
	7	9 15		52	E	05			Do
	7	9 49		4	W	Slight			Do
	8	9 43	32		E		05		At base
	8	10 0		12	E	15	25		To red at base , to violet at top
	8	9 50		18	W	1			At top.
	8	10 10		18	W	2	3		To red at base , to violet at top
	9	8 44	20		E	1			At top.
	9	11 45		23	W	2			Do
	10	9 38		17	E		15		Do

Date	Hour I S T		Latitude.		Limb	Displacement.			Remarks.
			North.	South		Red	Violet.	Both ways.	
1927	H.	M	°	°		A.	A	A	
May	10	9 34		27	E	1			At top.
	10	9 24		62	E	0.5			Do.
	10	10 1		46	W		0.5		At base.
	11	9 27		42	W		Slight		Do.
	11	9 54		24.5	W	0.5			At top.
	11	10 3	10		W	0.5			Do.
	12	9 52		14.5	E	1	1		To red at base; to violet at top.
	12	10 9	49.5		W		1		At top.
	13	9 29		21	E		1.5		Do.
	13	9 21	15		W	1			Do.
	14	9 38	59.5		E	0.5			Do.
	14	9 27		24	E	Slight			Do.
	14	9 53		13.5	W	1	0.5		Do.
	15	9 7	56		E	Slight			Do.
	15	8 49	40		E		Slight		
	15	8 47	31		E		0.5		At base.
	15	9 2		16	E	0.5			
	15	9 10		30	E	0.5			At base.
	15	8 55		21	W	0.5			
	15	8 53		11	W	1			At top.
	16	10 54	45		E	0.5			Do.
	16	10 59	26		W	1			Do.
	17	10 8	67		E	0.5			Do.
	17	10 0		35	E	Slight			Do.
	17	10 20		55	W	0.5			Do.
	17	10 23		13	W		Slight		Do.
	17	10 24		13	W	1			At base.
	17	10 26	10		W	1			At top.
	18	10 12		8	E		0.5		Do.
	18	10 36		21.5	W	1	0.5		At base.
	20	8 58	18		E	Slight			To red at top; to violet at base.
	20	9 25		47	E	1			At top.
	20	9 10		70	W	1			At base.
	20	9 2	15		W	1	1		Do.
	21	9 32	14		E		0.5		At top.
	21	9 25		19	E		1		Do.
	21	9 22		47	E	1	0.5		At base.
	21	9 15		61	E	Slight			At top.
	21	9 55	19		W	1			Do.
	21	9 58	57		W	0.5			Do.
	22	9 12	26		E		0.5		Do.
	22	9 15		18	E		1		At base.
	22	9 8		67	W		Slight		At top.
	22	9 3		5	W				
	24	9 28	22		E	0.5			At top.
	24	9 26		24	E	0.5			Do.
	24	9 6		86.5	W		1		Do.
	25	9 25	17.5		E		Slight		At base.
	25	9 5		87.5	W		0.5		Do.
	25	9 41		34	W	1	1		At top.
	25	9 46		26	W	1			Do.
	26	11 20	51		W		0.5		To red at top; to violet at base.
	27	9 11	16		W		1		At base.
	28	9 20	43		E	Slight			At top.
	28	9 13	14		E		1		Do.
	28	9 12		11	E		0.5		At base.
	28	9 31		22	W		Slight		Do.
	28	9 33		10	W	1			At top.
	29	9 33		38	W	0.5			Do.
	30	9 2	14		E		1		Do.
	30	9 24		58	E	0.5	1		At base.
June	6	8 54	80		E		Slight		At base.
	6	9 12		25	W		Do.		At top.
	6	9 4	35		W		0.5		At base.
	6	9 1	49		W				At top.
	7	9 46	43		E	Slight	0.5		At top.
						0.5	1		Do.

Date	Hour I S T.		Latitude		Limb	Displacement			Remarks
			North	South		Red.	Violet	Both ways	
1927	II	M	°	°		A	A	A.	
June	7	9 43		8	E	0.5			At top
	7	9 41		32	E		1		Do
	8	9 22	10		E	Slight			Do.
	8	9 20		13	E	0.5			Do
	8	9 40		9.5	W	0.5			Do
	8	9 43	39		W	1			Do
	9	9 19	47		E		Slight		Do
	9	9 58		33	W		Do		In the chromosphere
	9	9 36	6		W	Slight			At top
	9	9 44	58.5		W		1		Do
	10	8 47	54		E	1			Do
	10	8 46	45		E	Slight			Do
	12	11 26	29		E	1			Do.
	15	9 2		36	E		0.5		At base.
	15	9 1		42	E		1		At top
	15	8 58		72	E		Slight		Do
	15	9 50		16	W	1.5			Do
	15	9 52	18		W	1			Do
	19	8 54	12		E	0.5			
	19	8 55		6	E	0.5			At base
	19	8 51	17		W	0.5	0.5		
	19	8 50	56		W				
	21	10 13	50		E	1			At top
	21	10 3		20	E		0.5		Do
	24	9 56		20	W	1			Do.
	26	9 49		7	E		1		Do
	26	10 2		17	E	1			At base
	27	10 2	9		W		0.5		Do
	28	9 58	36		E		0.5		Do

The total number of displacements was 535 as against 230 in the previous half-year, and their distribution was as follows :—

Latitude	North.	South.
1°—30° ... ..	169	167
31°—60° .. ...	111	38
61°—90° ... ..	35	15
	Total ...	315
		220
East limb .. ..	...	312
West limb . . . .	...	223
	Total ...	535

Three hundred and six displacements were towards the red, 224 towards the violet and 5 both ways simultaneously.

*Reversals and displacements on the Sun's disc.*

Five hundred and ten bright reversals of  $H\alpha$  line, 382 dark reversals of  $D_2$  line and 214 displacements of  $H\alpha$  line were observed during the half-year. Their distribution is given below :—

	North	South.	East.	West
Bright reversals of $H\alpha$ ... ..	216	294	264	246
Dark reversals of $D_2$ ... ..	149	233	204	178
Displacements of $H\alpha$ ... ..	93	121	124	90

One hundred and fifty-one displacements were towards the red, 61 towards the violet and 2 both ways simultaneously.

*The Eruptive Prominence of 14th March 1927.*

A remarkable eruptive prominence was photographed on the 14th March 1927. At 8<sup>h</sup> 40<sup>m</sup> I.S.T. and at 8<sup>h</sup> 53<sup>m</sup> low prominences were photographed between 30° and 53° in the north-east quadrant the highest part reaching to 1' 5" above the chromosphere. The next photograph taken at 9<sup>h</sup> 18<sup>m</sup> shows a large irregular prominence reaching to 6' 55", a rise of 254,000 kms. in 25 minutes or less. From this time photographs were taken as rapidly as possible until 11<sup>h</sup> 13<sup>m</sup> when it had almost completely subsided. Making visual observations with a prominence spectroscopie Mr. S. Balasundaram Ayyar noted a displacement of the C line extending from 5 A to the violet to as far as 20 A to the red. This is one of the largest displacements ever recorded and although lasting only a few minutes the magnitude of the displacement was confirmed by other observers. The helium line  $D_2$  was displaced as far as the sodium line  $D_2$ . The displacements of the C line indicate velocities in the prominence ranging from 230 kms. per second towards the earth to 915 kms. per second away from the earth. The existence of these large displacements prevents the true forms and velocities in the prominence being shown in the spectroheliograms. This view is supported by the difficulty of recognizing identical parts of the prominence in succeeding photographs and also by the fact that although the prominence was growing in height between 8<sup>h</sup> 53<sup>m</sup> and 10<sup>h</sup> 14<sup>m</sup>, individual parts were either stationary or descending. After 10<sup>h</sup> 14<sup>m</sup> the height of the prominence diminished and the parts which could be identified in successive photographs indicated descent whilst the prominence as a whole became fainter. At 11<sup>h</sup> 13<sup>m</sup> it was faint with a height of only 3' 46". Throughout the whole time of these rapid changes, a small prominence at 51°–53° NE remained unchanged with a height of about 40".

*Prominences projected on the disc as absorption markings.*

Photographs of the Sun's disc in  $H\alpha$  light were available from Kodaikanal and the co-operating observatories for a total of 176 days, which were counted as 171 effective days. The mean daily areas of  $H\alpha$  absorption markings (corrected for foreshortening) in millionths of the Sun's visible hemisphere and the mean daily numbers are given below :—

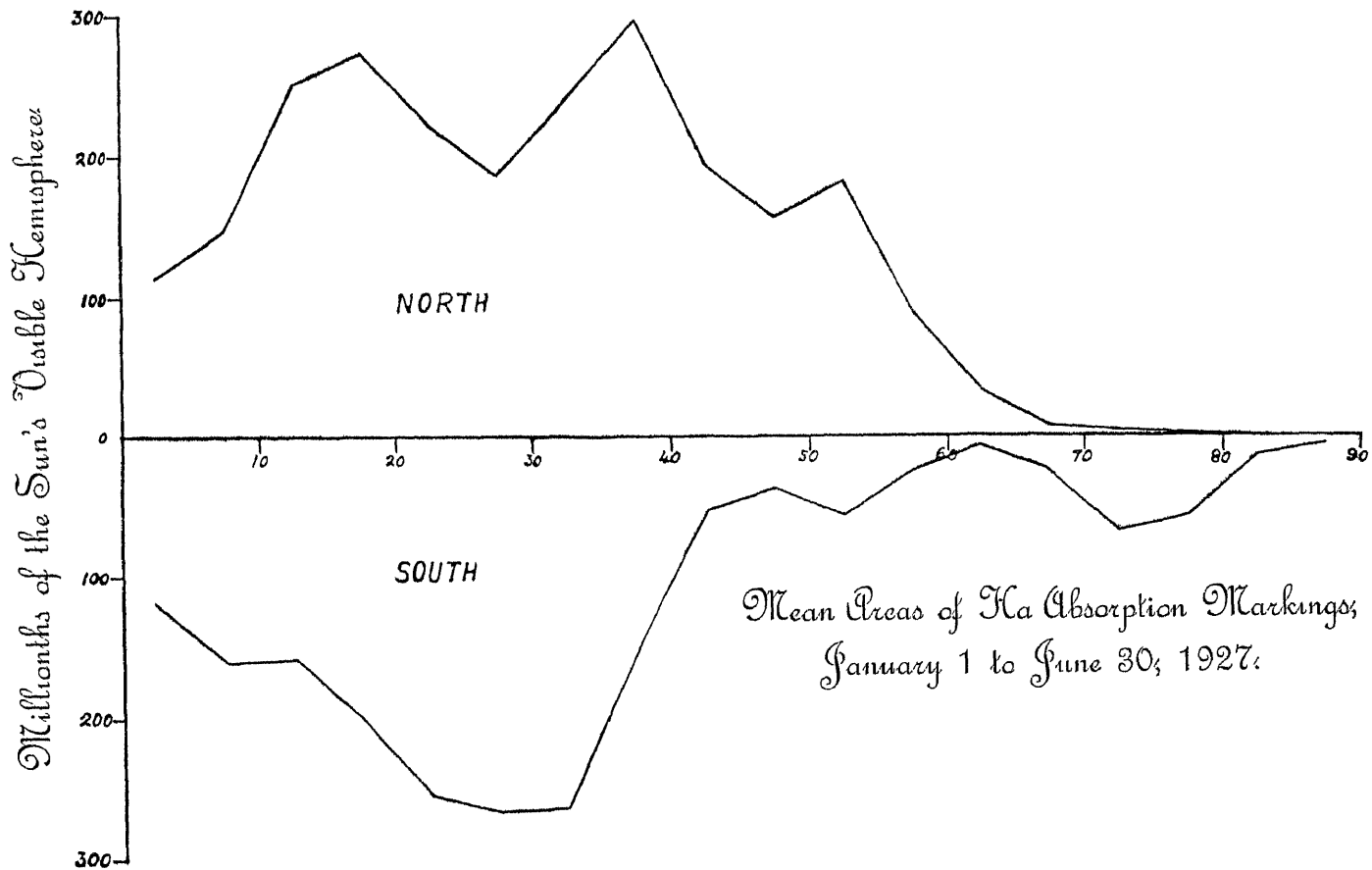
	Mean daily areas.	Mean daily numbers.
North ... ..	2,386	19.9
South ... ..	1,911	19.2
...	—	—
... .. Total ...	4,297	39.1
	—	—

The above figures show an increase of 15 per cent in areas and 19 per cent in numbers compared with the previous half-year.

For comparison with bulletins issued prior to the co-operation of other observatories, the means based on Kodaikanal photographs alone are also given, 154 days of observation being reckoned as 150½ effective days.

		Mean daily areas.	Mean daily numbers
North (Kodaikanal photographs only)	... .	2,395	20 3
South do	... .	1,961	20 1
		—	—
Total	..	4,356	40 4
		—	—

The distribution of the mean daily areas in latitude is shown in the following diagram. There are two zones of activity in the northern hemisphere near  $20^{\circ}$  and  $40^{\circ}$ , while the maximum of activity in the southern hemisphere is about  $30^{\circ}$ . The prominence activity in high latitudes has no counterpart in the northern hemisphere but persists in the southern.



The activity was in excess in the eastern hemisphere, the percentage east being 50.96 in the case of numbers and 51.05 in the case of areas.

Thanks are due to the co-operating observatories for the photographs supplied by them.

THE OBSERVATORY, KODAIKANAL,  
19th February 1928.

T ROYDS,  
Director, Kodaikanal and Madras Observatories