

Kodaikanal Observatory.

BULLETIN No. CXIV.

SUMMARY OF PROMINENCE OBSERVATIONS FOR THE FIRST HALF OF THE YEAR 1937.

The observations of prominences made at the Kodaikanal Observatory form the primary material of the present review ; but they have been supplemented, whenever required, by the data available from other observatories which under the auspices of the International Astronomical Union, co-operate with this Observatory by supplying copies of their photographs on requisition. The data from the co-operating observatories which have been made use of in this summary are calcium (K_{238}) prominence plates for three days and $H\alpha$ disc plates for two days from Mount Wilson, $H\alpha$ disc plates for 11 days from the Meudon Observatory, and $H\alpha$ prominence plate for one day from Mr. Evershed's Observatory at Ewhurst. It is to be remarked, however, that even this international co-operation has not been able to provide complete data for all the days of the half-year under review, so that it has been necessary to adopt the following procedure for estimating the solar activity of those days for which only incomplete photographs are available. The activity of a day of incomplete observation has been taken to be represented by the best photograph of the day, after weighting it according to its quality, the remaining photographs being ignored.

Calcium Prominences at the limb.—The mean daily areas and numbers of prominences derived from all available photographs secured during the half-year by means of the K line of Calcium are given below. The means are corrected for incomplete or imperfect observations in the way indicated above, the total of 176 days for which plates were available being reduced to 166 effective days.

	Mean daily areas (square minutes).	Mean daily numbers.
North	8.61	7.16
South	4.16	8.08
Total	7.77	15.22

The above figures show that compared to the previous half-year there has been an increase of about 6 per cent in areas and a decrease of about 5 per cent in numbers. The increase in areas was mainly in the southern hemisphere, whereas the decrease in numbers was in the northern.

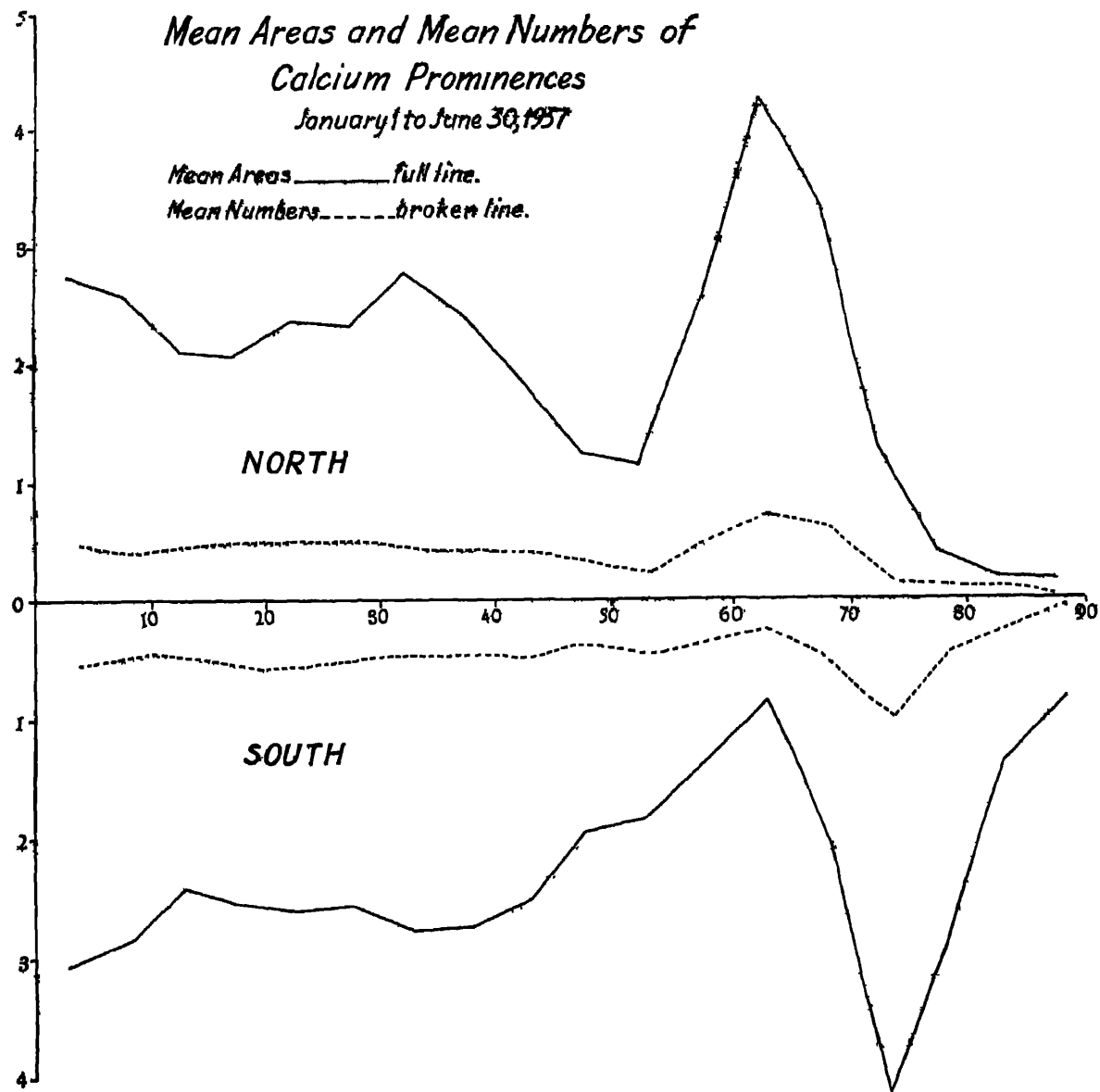
For comparison with bulletins issued prior to 1st January 1923 i.e., before the co-operation of other observatories came into force, the means based on Kodaikanal photographs alone are also given, 173 days of observation being counted as 164 effective days.

	Mean daily areas (square minutes).	Mean daily numbers.
North (Kodaikanal photographs only)	8.61	7.11
South (do.)	4.19	8.08
Total	7.80	15.19

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The distribution of 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° of latitude. The ordinates represent tenths of a square minute of arc for the full line and numbers for the broken line. Compared with the previous half-year the zones of maximum activity have advanced 5° towards the poles in both the northern and southern hemispheres. The activity in the zone 70° — 75° in the southern hemisphere has increased considerably.



The monthly, quarterly and half-yearly areas and numbers and the mean height and the mean extent of the prominences on photographs from all co-operating observatories are given in Table I. The unit of area is one 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 and 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 1937.

Months.	Number of days (effective).	Areas.	Numbers.	Daily means.		Mean height.	Mean extent.
				Areas.	Numbers.		
1937.						"	"
January	28½	217.0	399	8.27	15.20	46.50	7.76
February	27	223.4	365	8.27	13.52	51.60	13.82
March	29½	206.8	455	7.01	15.42	40.51	8.37
April	27½	189.5	454	6.83	16.36	42.21	7.38
May	30	237.3	436	7.91	14.53	44.28	9.10
June	25½	215.2	418	8.44	16.39	46.79	8.26
First quarter	82½	647.2	1,219	7.82	14.73	45.79	9.80
Second quarter	83½	642.0	1,308	7.71	15.71	44.37	8.23
First half-year	166	1,289.2	2,527	7.77	15.22	45.05	8.99

Distribution East and West of the Sun's Axis.

The areas show a slight increase at the east limb and numbers a very slight decrease as will be seen from the following table :—

January to June 1937.	East.	West.	Percentage East.
Total number observed	1,258	1,269	49.78
Total areas in square minutes	6,616	6,277	51.31

Metallic Prominences.

Forty three metallic prominences were observed during the half-year and their details are given below :—

TABLE II.—LIST OF METALLIC PROMINENCES—JANUARY TO JUNE 1937.

Date.	Time I. S. T.	Base.	Latitude.		Limb.	Height.	Lines. (See note at end of table.)	
			North.	South.				
	H. M.	°	°	°				
1937.								
January	9	10 30	2		10	E	20	1, 2, 3, 4, 9, 10, 11 and 12.
	15	9 40	1	12.5		W	15	1, 2, 3, 4, 9, 10 and 11.
	17	10 54	1		27.5	W	15	4 and 10.
	18	9 20	1		17.5	E	10	4 and 10.
	20	10 17	1	19.5		E	10	4 and 10.
		10 20	2	13		E	10	4 and 10.
	24	9 38	5	25		E	50	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12.
		9 12	—	15		W	10	4 and 10.
	25	10 14	2		40	W	10	4 and 10.
	27	9 55	2		19	E	10	4 and 10.
		9 40	4		28	W	15	4 and 10.
	31	9 30	2		16	W	10	4 and 10.
February	6	9 28	3	14.5		W	35	1, 2, 3, 4, 9, 10, 11 and 12.
	7	8 48	5		23.5	W	20	4 and 10.
	9	9 28	8		28	W	20	4 and 10.
	10	9 30	2		21	E	20	1, 2, 3, 4, 5, 6, 7, 8, 10, 11 and 12.
	11	9 36	4		21	E	10	4 and 10.
		9 30	5		30.5	E	15	1, 2, 3, 4, 5, 6, 8, 10, 11 and 12.
	12	9 4	5		30.5	E	15	4 and 10.
	13	9 6	1		30.5	E	15	1, 2, 3, 4, 5, 6, 10, 11 and 12.
	20	9 35	—	21		E	20	4 and 10.
		9 43	1		12.5	E	25	1, 2, 3, 4, 9, 10, 11 and 12.
	24	9 45	2	11		E	15	4 and 10.
March	3	9 26	11	19.5		W	15	4 and 10.
	4	9 1	2	13		E	20	4 and 10.
	9	9 23	3	8.5		W	15	4 and 10.
	17	9 12	1	10.5		W	10	4 and 10.
	23	9 36	2	10		E	20	4 and 10.
	25	9 14	3	4.5		E	10	4 and 10.
	28	9 23	2	8		E	15	1, 3, 4 and 10.

TABLE II.—LIST OF METALLIC PROMINENCES—JANUARY TO JUNE 1937—*contd.*

Date.	Time. I. S. T.		Base.	Latitude.		Limb.	Height.	Lines. (See note at end of table).
				North.	South.			
	H.	M.	°	°	°			
1937								
March— <i>contd.</i>								
31	9	30	2	23		E	20	4 and 10.
April	2	9	19	3		E	15	1, 2, 3, 4, 9, 10 and 11.
May	1	9	27	3	16.5	W	15	1, 2, 3, 4, 9, 10, 11 and 12.
	6	10	47	5		W	15	4 and 10.
	8	9	10	1	20.5	E	10	1, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
	27	10	50	2		W	10	1, 2, 3, 4, 9, 10, 11 and 12.
	28	9	35	5	27.5	W	20	1, 2, 3, 4, 5, 7, 8, 9, 10, 11 and 12.
	29	9	18	3	12.5	E	15	1, 2, 3, 4, 7, 8, 9, 10, 11, 12 and line 5389.6.
June	1	9	50	3	13	W	25	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
	2	9	15	7	13.5	E	10	1, 3, 4, 7, 8, 9, 10, 11, 12 and line 5143.1.
	3	8	45	5	10.5	W	30	1, 2, 3, 4, 5, 8, 9, 10, 11 and 12.
	9	9	57	6	21	E	15	4 and 10.
	11	9	55	14		E	15	4 and 10.

Note—The key to the wavelengths of metallic lines is as follows:—

No.	λ	Element.	No.	λ	Element.
1	4924.1	Fe+	7	5276.2	Fe+
2	5016.0	He	8	5316.8	Fe+
3	5018.6	Fe	9	5363.0	Fe+
4	b_4, b_3, b_2, b_1	Mg. Fe+	10	D_2, D_1	Na
5	5284.8	Fe	11	6677	He
6	5276.0	Cr	12	7065	He

The distribution of metallic prominences was as follows:—

	1°—10°.	11°—20°.	21°—30°.	31°—40°.	Mean latitude.	Extreme latitudes.
North	6	13	5	Nil	15°.1	4°.5 and 27°5.
South	1	7	10	1	22°.9	10° and 40°.

Twenty-five were on the east limb and eighteen on the west limb.

Displacements of the Hydrogen Line.

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

TABLE III.—DISPLACEMENT OF THE HYDROGEN LINE—JANUARY TO JUNE 1937.

Date.	Hour I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both ways.	
	H. M.	°	°		A	A	A	
1937.								
January 3	10 14		20.5	E			1	At top.
	9 37		10	W	0.5			At base.
	9 23	29.5		W	0.5			At top.
	9 23	33		W		0.5		Do.
4	9 25	40		E	1			At base.
	9 7	45		W	1			At top.
5	9 36	9		W	0.5			At top; from +7° to +11°.
	9 36	7.5		W		0.5		At base.
	9 28	37		W	0.5			At top; from +36° to +38°.
6	9 45		21	E		1		At top.
8	10 51		32	E		SI		In chromosphere.
	9 52	45.5		E	SI			At top.
9	10 4	34.5		E	1			At base; from +33° to +36°.
	10 30		10	E	4	1.5		Do; from -9° to -11°.
	9 30	25		W		0.5		At top; from +24° to +26°.
10	9 35		16.5	E	0.5			Do.
15	10 7	36.5		E		1		Do; from +34° to +39°.
	9 40	12.5		W	1.5			Both at base.
17	9 27		18.5	E		1		At base.
	9 19		37.5	W		0.5		Do.
	10 54		27.5	W		0.5		Do.
18	9 20		17.5	E		SI		Do.
19	9 51	59.5		E	0.5			At top.
20	10 17	19		E		1		Do.
	10 36		25.5	E		1		Do.
	9 13	Equator		W		0.5		At base.
	9 5	17		W	1.5			At top.
21	9 37		5	E	0.5			At base; from -4° to -6°.
	9 23		39	E		0.5		Do.
	9 55		30	W	0.5			At top.
22	9 40	24		E	1			Do; from +22° to +26°.
	9 38	18		E		0.5		At base; from +17° to +19°.
	9 37		23.5	E	0.5			Do; from -22° to -25°.
22	8 49		7.5	W	0.5			At top.
24	9 38	30		E	4			Do.
	9 38	23		E			6	At middle.
	9 13	15		W			1	At top.
25	10 14		40	W	0.5			Do.
	9 17		9	W		0.5		Do.
26	9 35	25		E	0.5			At base; from +24° to +26°.
	9 19		15	E			0.5	From -14° to -16°.
	9 44		39.5	W	SI			At top; from -38° to -41°.
	9 59	25.5		W		SI		At base; from +24° to +27°.
27	9 55		19	E	0.5			Do; from -18° to -20°.
	9 40		28	W		0.5		At top.
	9 20	24		W		0.5		At base.
	9 20	26		W	0.5			At top; from +25° to +27°.
28	9 40		34.5	W	1			Do.
	9 55	26		W	1			Do; from +24° to +28°.
	10 0	41		W	0.5			Do; from +40° to +42°.
29	9 21	24		E	SI			Do.
	9 28		35	W	0.5			Do.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1937—*contd.*

Date.	Hour I. S. T.		Latitude.		Limb.	Displacement.			Remarks.
			North.	South.		Red.	Violet.	Both ways.	
1937	H.	M.	°	°		A	A	A	
January— <i>contd.</i>									
30	9	24	81		E	SI			In chromosphere.
	10	5	86		E	1.5			At base; from +35° to +37°.
	10	15		63.5	E		1		At top.
	9	55		7	W	2	3.5		To red at base, to violet at top; from -6° to -8°.
	9	46	4.5		W		1		At top.
	9	46	5		W	1			At base; from +2° to +8°.
	9	35	42.5		W		2		At top; from +41° to +44°.
	9	27	78		W	2.5			Throughout the prominence.
31	9	40		20	E	0.5	0.5		To red at base, to violet at top.
	9	30		16	W	0.5			At top; from -15° to -17°.
	9	27		10.5	W	1	1		To violet at base, to red at top.
	9	19	14.5		W	0.5			At top.
	9	11	21.5		W	1			Do.
	9	11	23.5		W	1			Do.
February									
3	9	24		20	W	SI			At top.
	10	5	15.5		W	1			Do.; from +15° to +16°.
	10	8	42.5		W	0.5			Do.; from +41° to +43°.
4	9	30	22		E		0.5		In chromosphere.
	9	23		27.5	W	1			At top; from -27° to -28°.
	9	15		6.5	W	0.5			Do.; from -6° to -7°.
5	10	2	65		E	SI			In chromosphere.
	9	23		65.5	E		SI		In chromosphere.
	9	19		81.5	E	SI			At top; from -66° to -68°.
	9	16		67	W		1		Do.
	9	47		27.5	W		1		Do.; from -26° to -28°.
6	10	4		27	E	1			At base.
	9	24	21.5		W	2			At top; from +19° to +20°.
	9	24	19.5		W		1		At base; from +13° to +16°.
	9	24	14.5		W			2.5	Do.
	9	22	27		W	SI			Do.
7	9	38	34.5		E	0.5			Do.
	9	34	Equator		E		SI		At top.
	9	27		8.5	E		1		Do.
	9	16		67.5	E		1		Do.; from -66° to -68°.
	8	11		63.5	W		0.5		Do.
	8	48		31	W	1			Do.; from -30° to -32°.
8	9	5	77.5		E	1			At base.
	9	0	30		E		0.5		At top; from +29° to +31°.
	8	45		37.5	W	1			In the middle of prominence.
	9	8		9.5	W	1			At base.
9	9	12	11		W			SI	
	9	44	66		E	1			At top; from +65° to +67°.
	9	15	40		E			SI	In chromosphere.
	9	0		34	E	0.5			At base.
	9	5		34	E		1		At top.
	8	54		68.5	W		0.5		At base; from -67° to -70°.
	8	50		57.5	W		0.5		Do.; from -53° to -60°.
	9	24		27.5	W	1			At top.
10	9	30		21	E	1			Do.
	10	0		29.5	W		1		Do.
	10	0		24.5	W	1			Do.
	10	0		20	W	1			Do.
	9	58	30		W	1			Do.
	9	5	64		W	0.5			Do.
11	9	30		31	E	SI			At base.
	9	59		69	W		2		At top.
12	9	19	39		E		2		Do.
	9	14	18		E		1		Do.; from +17° to +19°.
	9	16	13.5		E	0.5			At base.
	8	52		69	W		SI		At top.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1937—*contd.*

Date.	Hour. I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both ways.	
1937.	H. M.	°	°		A	A	A	
February— <i>contd.</i>								
13	9 18 9 7 9 6 9 16 8 58		13.5 28 30.5 30.5 33.5	E E E E E		1.5 0.5 1	1	At top. Do. ; from -27° to -29° . Do.
14	9 5 8 59 9 18	12	26.5 27.5	E W	1 1 0.5			At top. Do. At base. In chromosphere.
15	9 1 9 5 9 4		32 21.5 22.5	W W W	0.5 2	1		At top. Do. At base ; from -21° to -24° .
16	9 1 8 52 8 50 9 11	30	7.5 21 29.5	E E W	0.5 SI	0.5 1		At top. Do. In the middle of the prominence
17	10 5 9 40	9	30.5	E W		0.5 2		At top ; from $+7^{\circ}$ to $+11^{\circ}$. At base.
19	9 11 9 6 8 58	28.5 13	21.5 18.5	E E W	2 1 SI			At top. At base. At base.
19	9 25	21	18.5	W	0.5	1.5		At top.
20	9 35			E				At base.
21	8 40		15.5	E	0.5			At top.
24	9 45 9 37 9 25	12	55	E W W	1 0.5 1			At base. At top. Do.
25	11 5 10 10 10 10	21 28.5 28.5		E E E	2	1.5	1	Do. ; from $+28^{\circ}$ to $+31^{\circ}$. At base ; from $+27^{\circ}$ to $+30^{\circ}$. At middle of prominence ; from $+27^{\circ}$ to $+30^{\circ}$.
	9 8 9 37		26	E W		SI		At base ; from -25° to -27° . Do.
27	10 19 10 14 10 10	42 17.5	14 48	E E E	1 2.5 SI			At top. At base.
28	9 17		3	W	0.5			Do. ; from -45° to -48° . At top ; from -8° to -10° .
March								
2	9 4	19.5		W	0.5			At top.
3	9 28 9 20	15 63.5		W W	1 0.5			Do. Do.
4	9 0 9 15 9 17	13.5 14.5 16		E W W		1	0.5	At base. At top.
6	9 25	18.5		W	1.5			At base.
7	9 42	8.5		W	0.5	1		Do. ; from $+17^{\circ}$ to $+20^{\circ}$.
9	8 57 9 17 9 19		30	E W W	0.5 0.5			At top. Do.
	9 19 9 31 9 21	4 8.5 21.5		E W W			SI	Do. ; from $+3^{\circ}$ to $+5^{\circ}$. From $+7^{\circ}$ to $+10^{\circ}$.
11	9 21 9 10		52	E W	1.5		0.5	At base. At top.
12	9 40 9 41 9 55	47.5	13 15.5 20.5	E E W		1 SI 1.5		Do. ; from $+45^{\circ}$ to $+50^{\circ}$. At top.
	9 41 9 55		15.5 20.5	E W		1.5		Do. ; from -14° to -17° .
21	8 45 9 5	23	15.5	E E	1 1	1		Do. At base.
22	9 15		41	E	1	0.5		At top.
23	9 34	10		E	1			Do.
25	9 19 9 14 8 58 9 28	40.5 9.5	32.5 33	E E W W		1 0.5 0.5		Do. ; from $+9^{\circ}$ to $+11^{\circ}$. At top. At base. At top.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1937—*contd.*

Date.	Hour L. S. T.		Latitude.		Limb.	Displacement.			Remarks.
			North.	South.		Red.	Violet.	Both ways.	
1937.	H.	M.	°	°		A	A	A	
March— <i>contd.</i>									
27	9	40	83		E	1			In chromosphere.
	9	45	36.5		W		0.5		At middle of prominence; from +36° to +38°.
28	9	23	8		E			0.5	At base.
29	8	50	71		E	1			At top.
	9	10		25.5	E	0.5			At middle of prominence.
	9	56	21		W	1			At top.
30	8	58	52.5		E	0.5			Do.
April									
2	9	16		23.5	E	1			Both at top.
	9	12		34.5	E	0.5			At top.
	9	43	16		W	1			Do.
	9	44	18		W	0.5			Do.
5	9	14		76.5	W		0.5		Do.
8	10	5		17.5	E	0.5			In chromosphere.
	10	18		18.5	W	1			At base.
10	9	29	31		W		0.5		At top.
13	9	28	20.5		E	0.5			Do.
14	8	48	23		E			0.5	Do.
	8	55	6		W	0.5			Do.
15	10	7	24		E			0.5	At base; from +23° to +25°.
	10	3	17		E	1			At top; from +16° to +18°.
	9	59		28	E		Sl		At base.
19	8	52	41		E	Sl			Do.
30	9	3		28.5	E	1			Do.
	9	15	26		W		1		Do.
May									
1	9	34		13	W		1.5		At top.
	9	26	13		W	1.5			Do.
2	9	9	13		W	1			Do.
	9	8	17		W	1	1.5		To red at top, to violet at base.
	9	5	41		W	1			At top.
5	9	45	21		E		1		At base.
	8	45	20.5		E	1.5			At top.
6	10	54		18	E		0.5		Do.
	10	47		18	W		0.5		At base.
8	9	10	21		E	Sl			Do.
12	8	33	27		E		0.5		Do.
14	9	45	25		E		Sl		Do.
15	9	20		39	E	Sl	0.5		To red at base, to violet at top.
22	9	41		21	W	1			At base.
27	10	45	4		W	1			At top.
28	9	50		30	W		0.5		At base; from -27° to -33°.
	9	50		21.5	W	1			Do.; from -20° to -23°.
	9	35	21		W		1		Do.;
	9	35	25		W		0.5		Do.
29	9	18	12.5		E		2		Do.; from +11° to +14°.
30	9	31		21	E		Sl		At top; from -20° to -22°.
31	9	10	23		E	1			Do.
	9	14		26.5	E				At base.
	9	5	10.5		W		0.5	0.5	At top; from +8° to +12°.
June									
1	9	50	12.5		W	1		2	To violet at base, to red at top.
2	9	10	13		E	1			Do.
	9	5	8		E		1		At top.
	11	37	Equator.		E		3		Do.
	11	37	13		E	7			Do.
	9	25		45	W	1			Do.
	11	45	11		W	2			At base.
	11	45	13		W	1			At top.
	11	45	15		W	1			Do.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1937—*concl.*

Date.	Hour I. S. T.		Latitude.		Limb.	Displacement.			Remarks.
			North.	South.		Red.	Violet.	Both ways.	
	H.	M.	°	°		A	A	A	
1937.									
June	3	8 40	10.5		W	3.5	2		At base ; from + 8° to +13°. At top ; from -11° to -15°. At base ; from -19° to -23°. At top. Do. ; from +0° to +2°. At base.
	11	9 55		13	E		0.5		
		9 55		21	E	0.5			
	18	9 17	20		W	0.5			
	26	9 25	1		W	51			
	29	9 30	19		W		0.5		

The total number of displacements was 245 as against 133 in the previous half-year and their distribution was as follows :—

	North.	South.
1°—30°	100	75
31°—60°	23	24
61°—90°	9	14
	Total	133
East limb	121
West limb	124
	Total	245

Of these displacements 138 were towards the red, 91 towards the violet and 16 both ways simultaneously.

Reversals and Displacements on the Sun's Disc.

Five hundred and sixty bright reversals of the H α line, 505 dark reversals of the D $_2$ line and 52 displacements of the H α line were observed with the spectroscope during the half-year. Their distribution is given below :—

	North.	South.	East.	West.
Bright reversals of H α	344	216	273	287
Dark reversals of D $_2$	307	198	245	260
Displacements of H α	31	21	26	26

Twenty-seven displacements were towards the red, 13 towards the violet and 12 both ways simultaneously.

The Hale spectrohelioscope was used daily (except on Sundays and holidays) for observation in H α line of changing phenomena and of displacements which cannot be readily photographed. The observations were made normally at the hours allotted by the International Astronomical Union to this Observatory for spectrohelioscope observations, namely 2-30 to 3-00, 4-00 to 4-30, 5-30 to 6-00 G.M.T. or 8-00 to 8-30, 9-30

to 10-00, 11-00 to 11-30 I.S.T., but they were made at other times as well whenever interesting developments were expected. The observations *made during the first half of 1937 are summarised below :—

	East limb.		West limb.		Total.
Displacements in prominences	95		86		181
	North.	South.	East.	West.	Total.
Displacements in H α dark markings	52	24	54	22	78
Displacements in H α bright flocculi	5	2	4	3	7
	Displacements towards				Total.
	Red.	Violet.	Both ways.		
Prominences	69	75	7	151	
H α dark markings	39	36	1	76	
H α bright flocculi	3	3	1	7	

Eruptive Prominence.

Mention may be made of the active prominence which appeared on the east limb in position angle $+9^\circ$ to -5° on 2nd June 1937. It became active at 11h.20m I.S.T. and had reached a height of $8' \cdot 25$ or 360,000 kms. at 11h 48m I.S.T. when clouds intervened. An outstanding feature of this prominence was the large Doppler displacement which amounted to 7A to the red and 3.4A to the violet.

Prominences Projected on the Disc as Absorption Markings.

Photographs of the sun's disc in H α light were available from Kodaikanal and the co-operating observatories for 180 days which were counted as $171\frac{1}{2}$ effective days. The mean daily areas of H α absorption markings (corrected for foreshortening) in millionths of the sun's visible hemisphere and their mean daily numbers are given below :—

	Mean Daily areas.	Mean daily numbers.
North	5,185	29.06
South	5,233	27.77
Total	10,418	56.83

The above figures show that there has been an increase of 21 per cent in areas and 12 per cent in numbers when compared with those of the previous half-year.

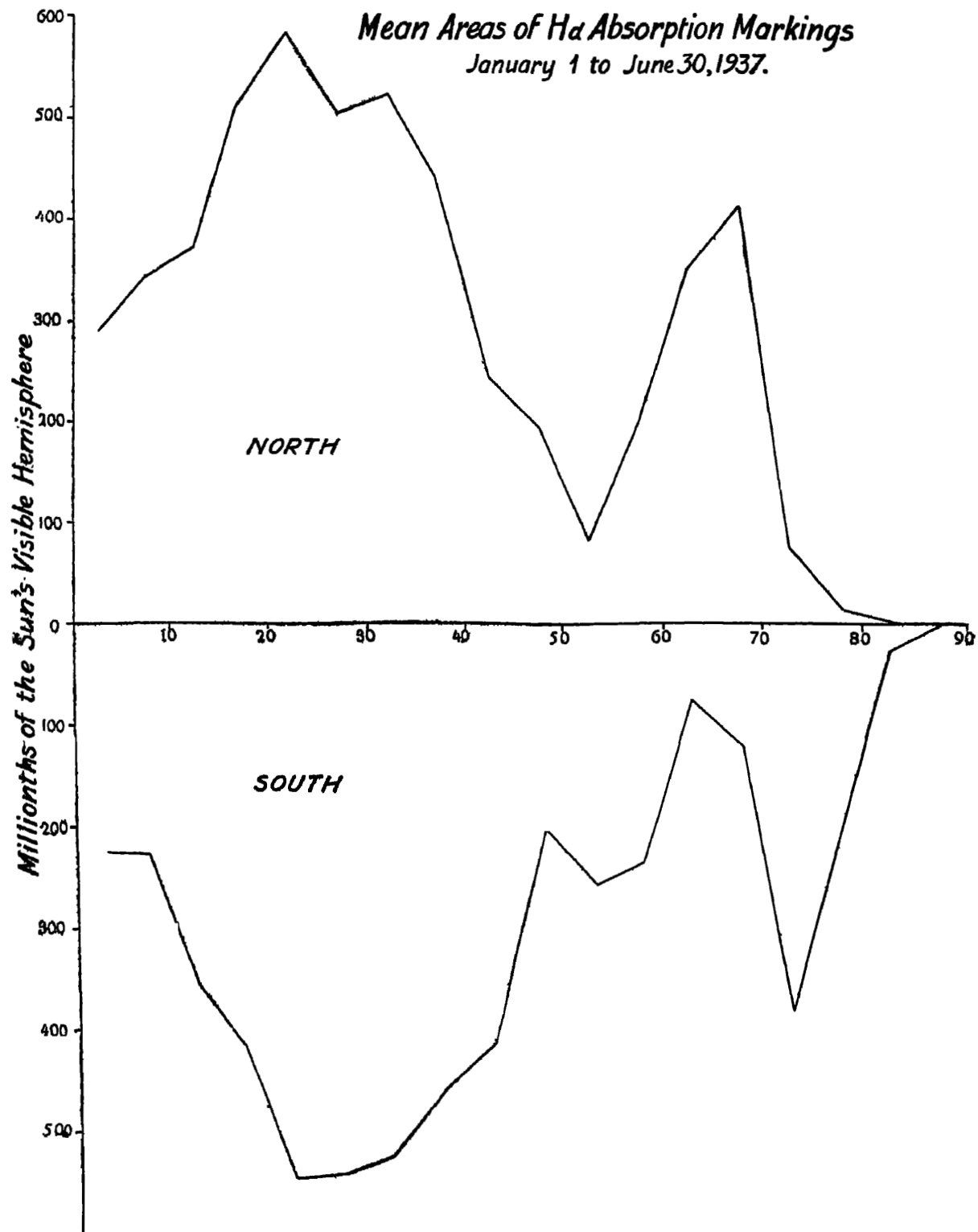
For comparison with bulletins issued prior to the co-operation of other observatories the means based on Kodaikanal photographs alone are also given, 167 days of observation being reduced to $160\frac{1}{2}$ effective days.

	Mean daily areas.	Mean daily numbers.
North (Kodaikanal photographs only)	5,174	28.45
South (do)	5,304	27.71
Total	10,478	56.16

The distribution of mean daily areas in latitude is shown in the following diagram. Compared with the previous half-year the high latitude zone of maximum activity has advanced about 10° towards the pole in the nor-

* Observations of bright chromospheric eruptions are sent to the Director, Meudon Observatory, Paris, and the Director, Mount Wilson Observatory, Pasadena, U. S. A. and are published in the Bulletin for Character Figures of Solar Phenomena.

thern hemisphere and 5° in the southern. The secondary maxima observed in the previous half-year have become slightly more pronounced and occupy practically the same position.



Both areas and numbers show an eastern defect, the percentage east being 47.64 for areas and 48.26 for numbers.

The mean daily areas of H α absorption markings uncorrected for foreshortening are given below :—

	Mean daily areas.
North	2,705
South	2,831
Total .	<u>5,536</u>

The uncorrected areas amount to 53 per cent of the corrected ones. The curve of distribution in latitude is similar to that of the corrected areas as usual.

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

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Director, Kodaikanal Observatory.

KODAIKANAL,
2nd June 1938.