Kodaikanal Observatory.

BULLETIN No. LXXXVII.

SUMMARY OF PROMINENCE OBSERVATIONS FOR THE FIRST HALF OF THE YEAR 1929.

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 1929, the Mount Wilson Observatory supplied prominence plates for 10 days and Hα disc plates for 11 days; Meudon Observatory supplied K$_3$ disc plates for 20 days and Hα disc plates for 17 days; the Pitch Hill Observatory (Mr. Evershed's) at Ewhurst, Surrey, England, supplied six prominence plates and eight Hα disc plates; and the Yerkes Observatory supplied two prominence plates and six Hα disc plates.

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 177 days for which plates were available being reduced to 160$\frac{3}{4}$ effective days.

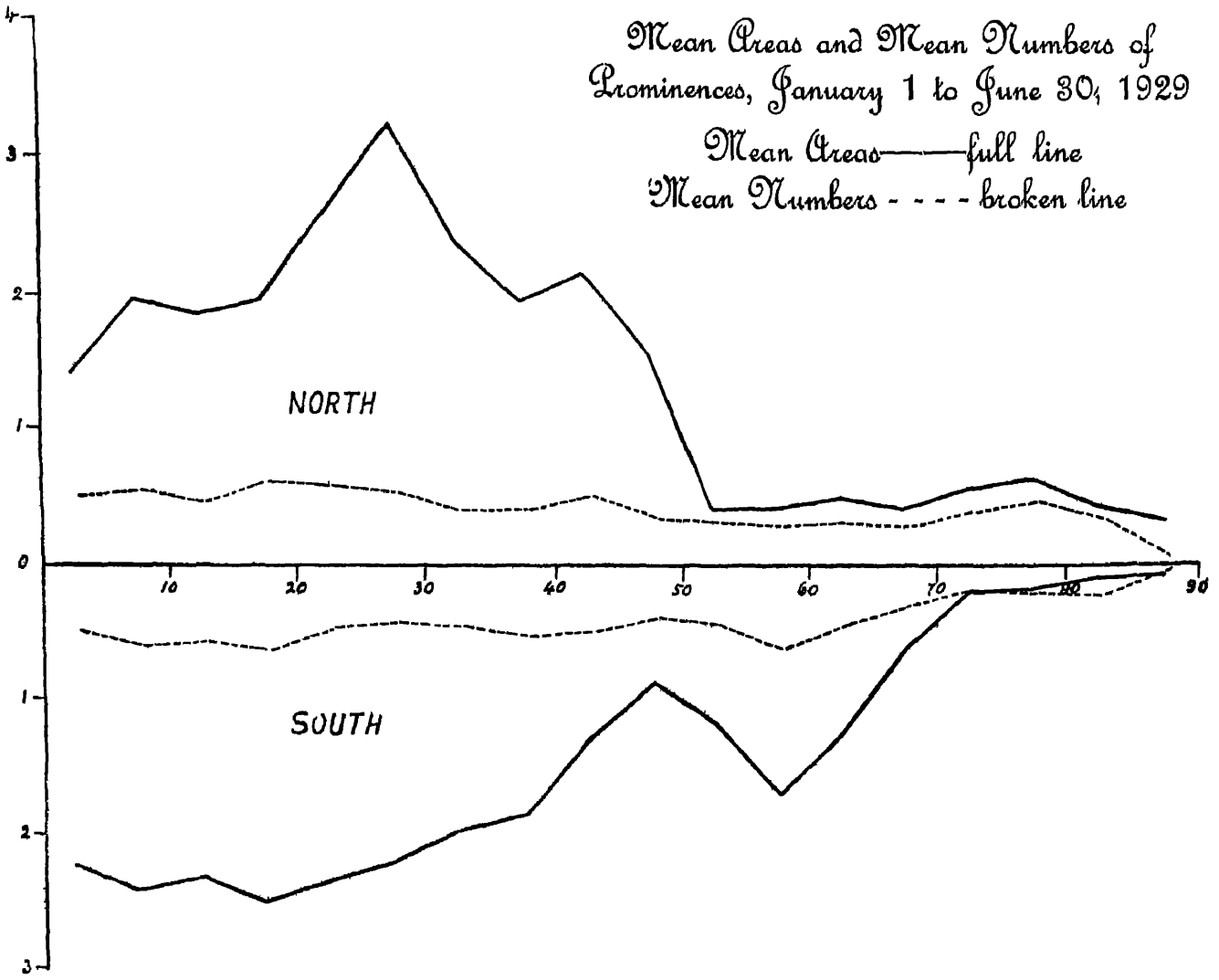
	Mean daily areas (square minutes).	Mean daily numbers.
North	2·46	7·13
South	2·52	7·48
Total ..	4·98	14·61

Compared with the previous half-year areas show a decrease of about 27 2 per cent and numbers a decrease of about 15 3 per cent. The southern hemisphere has now begun to exhibit a slight predominance of activity over the northern.

For comparison with bulletins issued prior to the co-operation of other observatories, the means based on Kodaikanal photographs alone are also given, 162 days of observation being counted as 149 effective days.

	Mean daily areas (square minutes).	Mean daily numbers.
North (Kodaikanal photographs only)	2·55	7 49
South (do.)	2·58	7 74
Total ...	5·13	15·23

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 diagram shows some slight changes in the distribution of activity in the various zones. In the northern hemisphere the high peak of activity in the region 25°—35°, is now confined to the zone 25°—30°, the minor peak near 50° has moved 5° towards the equator and the activity in high latitudes has practically disappeared. In the southern hemisphere the distribution is more uniform in low latitudes and the activity in high latitudes has become less marked and shifted 5° downwards.



The monthly, quarterly and half-yearly areas and numbers, and the mean height and mean extent of the prominences on photographs from all 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 1929.

Months.	Number of days (effective).	Areas.	Numbers	Daily Means		Mean height.	Mean extent.
				Areas	Numbers.		
1929						"	°
January	30¼	215 2	538	7 1	17 8	35 1	5 7
February	24½	152 8	431	6 2	17 6	33 1	6 1
March	31	197 7	405	6 4	13 1	40·5	7·0
April	26½	97 2	411	3 7	15 5	34 7	4 6
May	27¾	78 8	329	2 9	12 1	36 1	5 7
June	21¼	57·5	254	2 7	12 0	38·1	4 9
First quarter	85¾	565 7	1,374	6·6	16 0	36 1	6 2
Second quarter	75	233 5	994	3 1	13 3	36 0	5·0
First half-year	160¾	799·2	2,368	5·0	14 8	36 0	5 7

Distribution east and west of the Sun's axis.

As in the previous half-year, both areas and numbers showed an excess at the west limb compared with the east limb as will be seen from the following table :—

1929 January to June.	East.	West.	Percentage East
Total number observed	1,164	1,204	49 2
Total areas in square minutes	387 4	411·9	48 5

Metallic prominences.

Forty-seven metallic prominences were observed during the half-year. Their details are given below :—

TABLE II.—LIST OF METALLIC PROMINENCES OBSERVED AT KODAIKANAL, JANUARY TO JUNE 1929.

Date.	Hour I S T	Base.	Latitude.		Limb.	Height.	Lines
			North	South.			
1929	H. M	°	°	°		"	
January 4	8 50	2	8		W	10	4924 1, 5016, 5018 6, b_4, b_3, b_2, b_1, 5234 8, 5276·2, 5316 8, 5363 0, D_2, D_1
6	9 18	5	9·5		W	20	4924 1, 5018 6, b_4, b_3, b_2, b_1, 5316·8, D_2, D_1
12	10 33	1		30 5	W	10	5018 6, b_4, b_3, b_2, b_1, D_2, D_1
13	9 12	2		32	W	20	5018 6, b_4, b_3, b_2, b_1, 5316 8, D_2, D_1, 6677

Date.		Hour I.S.T.	Base.	Latitude.		Limb.	Height.	Lines.
				North.	South.			
1929.		H. M	°	°	°		"	
January	15	9 10	4	19		W	25	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5270·0, 5276·2, 5316·8, 5363·0, D_2, D_1.
	18	10 25		6		E		b_4, b_3, b_2, b_1, 5316·8, D_2, D_1, 6677, 7065.
	20	9 45	10	10		E	20	4924·1, 5016, 5018·6, 5048, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, 5363·0, D_2, D_1, 6677, 7065
February	11	9 9	1		13·5	E	10	4924·1, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, 5363·0, D_2, D_1, 6677, 7065.
	13	9 45	5	7·5		W	10	4922·0, 4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5197·6, 5234·8, 5276·2, 5316·8, 5363·0, D_2, D_1, 6677, 7065.
	16	10 16	2		7	W	10	5016, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, 5363·0, D_2, D_1, 6677, 7065.
	18	9 11	3		10·5	W	10	5018·6, b_4, b_3, b_2, b_1, 5276·2, 5316·8, D_2, D_1, 6677.
	20	9 30	1		8·5	E	10	4924·1, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, 5363·0, D_2, D_1, 7065
	20	10 9			5	W	5	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, 5363·0, D_2, D_1, 6677, 7065.
	24	9 10	4		32	E	20	5018·6, b_4, b_3, b_2, b_1, 5276·2, 5316·8, 5363·0, D_2, D_1.
	24	9 5	3		13·5	W	15	4924·1, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5270, 5276·2, 5316·8, 5363·0, D_2, D_1, 7065.
	25	8 59	3	32·5		E	30	5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, D_2, D_1.
	25	9 13	3		16·5	W	25	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5270·0, 5276·2, 5316·8, 5363·0, D_2, D_1, 6677, 7065.
March	2	9 7	1		8·5	E	10	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, 5363·0.
	2	9 50	3	7·5		W		b_4, b_3, b_2, b_1, D_2, D_1.
	4	9 7	4		9	E	25	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, 5363·0, D_2, D_1, 6677, 7065.
	5	9 18	2	27		E	20	5018·6, b_4, b_3, b_2, b_1, 5276·2, 5316·8, D_2, D_1.
	6	10 58	3	13·5		W	10	5018·6, b_4, b_3, b_2, b_1, 5276·2, 5316·8, D_2, D_1.
	8	9 54		26		E	15	b_4, b_3, b_2, b_1, D_2, D_1.
	8	9 10	1	12·5		W	10	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5233·0, 5276·2, 5316·8, D_2, D_1, 6677, 7065.
	17	9 12	3	24·5		E	20	4924·1, 5018·6, b_4, b_3, b_2, b_1, 5276·2, 5316·8, D_2, D_1.
	18	8 58	3	28·5		E	15	5018·6, b_4, b_3, b_2, b_1, 5276·2, 5316·8, D_2, D_1.
	18	8 51	3		3·5	E	20	4924·1, 5018·6, b_4, b_3, b_2, b_1, 5276·2, 5316·8, 5363·0, D_2, D_1
	18	9 15	5		10·5	W	15	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5270·0, 5276·2, 5316·8, 5363·0, D_2, D_1, 6677, 7065.
	19	9 4	3		15·5	E	25	b_4, b_3, b_2, b_1, 5316·8, D_2, D_1.
	22	9 50	7		9·5	E	20	4924·1, 5018·6, 5142·0, b_4, b_3, b_2, b_1, 5198, 5270, 5363·0, D_2, D_1, 6677, 7065.
	30	9 17	5		11·5	E	25	4924·1, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, D_2, D_1, 6677
April	1	8 58	3		11·5	W	20	4924·1, 5018·6, b_4, b_3, b_2, b_1, 5276·2, 5316·8, D_2, D_1.
	3	8 51	5		12·5	E	20	5018·6, b_4, b_3, b_2, b_1, 5316·8, D_2, D_1.
	4	10 55	1	11·5		W	15	4924·1, 5018·6, b_4, b_3, b_2, b_1, D_2, D_1, 6677.
	12	9 5	3	13·5		W	15	4924·1, 5018·6, b_4, b_3, b_2, b_1, 5316·8, D_2, D_1, 6677.
	13	9 25	1		11·5	E	10	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5238, D_2, D_1, 6677.
	16	10 20	2	15		E	20	5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, D_2, D_1.
	19	9 0	4	5		E	20	5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, 5363·0, D_2, D_1, 6677.
	20	8 5	4	20		E	30	5018·6, b_4, b_3, b_2, b_1, 5234·8, 5316·8, D_2, D_1.
	24	10 9	4	5		W	15	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, 5363·0, D_2, D_1, 6677, 7065.
	28	9 8			20	E		b_4, b_3, b_2, b_1, D_2, D_1 (thick sky).
	29	8 50	4	6		W		4924·1, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, D_2, D_1.
May	5	8 40	2	11		E	15	4924·1, 5018·6, b_4, b_3, b_2, b_1, 5276·2, 5316·8, D_2, D_1.
	8	8 50	4	19		W	20	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5234·8, 5276·2, 5316·8, 5363·0, D_2, D_1.
	16	9 5	1		7·5	W	15	4924·1, 5016, 5018·6, b_4, b_3, b_2, b_1, 5316·8, 5363, D_2, D_1, 6677, 7065.
	16	9 10	1		11·5	W	10	4924·1, 5018·6, b_4, b_3, b_2, b_1, 5316·8, D_2, D_1, 6677, 7065.
June	27	10 7	1		14·5	W		4924·1, 5018·6, b_4, b_3, b_2, b_1, D_2, D_1, 6677.

The distribution of metallic prominences was as follows :—

	1°—10°	11°—20°	21°—30°	31°—40°	Mean latitude	Extreme latitudes
North ...	9	9	4	1	12 6	5° and 32°·5
South . .	10	11	1	2	13 6	3° 5 and 32°

Twenty-three were on the east limb and 24 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, JANUARY TO JUNE 1929.

Date	Hour I S T	Latitude		Limb.	Displacement			Remarks.
		North.	South.		Red	Violet	Both ways	
1929.	H M	°	°		A	A	A	
January 1	9 5	64		W	0 5			At top
2	9 20	21		E	1			In chromosphere
3	9 11		6	W		0 5		At base
3	9 8	38		W	1			At top
3	9 6	64		W		0 5		At base
4	8 58		20	E	0 5			Do
4	8 50	9		W	1			At top
5	9 47		26	W	1 5	1		To red at top , to violet at base.
5	9 44	11 5		W	1			At top
5	9 42	17·5		W	1			Do
6	8 53	42		E		0 5		At base , extends over 6° from 39° to 45°.
6	9 18	11		W	2 5			At top
6	9 18	8		W		1·5		At base.
7	11 13		18	E	0·5			Do
7	11 6	6		W	1			At top.
9	11 33	45		E	1			Do
10	13 41	50		E	1·5			Do
10	13 44	35		E			Slight	
10	13 37		58	W	1			At base
11	11 0	7		W		1		At base ; extends over 2° from 6° to 8°
11	10 55	44		W		Slight		At base
11	10 1	56 5		E			2	At base , extends over 9° from 52° to 61°
11	9 55	22		E	1			At base
11	9 31		78	E	1			At top.
14	9 2	36		W		0 5		Do
15	9 22	10		E	0 5			Do
16	9 56	10		E			1	At base
16	10 23		10	E		1		At top
16	10 34		18	E	1			Do
16	9 46		27	W	1			Do.
16	9 27	16		W	Slight			Do
16	9 24	54		W	Do.			Do
17	10 10	29		E	1·5			At top
17	9 49		41	W	1			Do
17	9 49		37	W	0 5			Do
17	9 39		12	W	1			Do
17	9 35	9 5		W	1			Do.
17	9 10	42		W			Slight	At base
18	10 20	15		E			1	Do
18	10 18	6		E	1·5	2		Do
18	9 20	45		W			Slight	
19	9 48	12		E		1		At top.

Date.		Hour I.S.T.		Latitude		Limb.	Displacement			Remarks.
				North.	South.		Red.	Violet.	Both ways.	
1929.		H.	M.	°	°		A.	A.	A.	
January	19	10	8	10		E	1			At top
	19	9	47	4		E	1			Do
	19	9	43		27	E		1		Do.
	19	9	30		84	W	2	1		In chromosphere.
	20	9	45	14		E	0·5			At base.
	20	9	45	11		E		1		At top
	21	9	29		18	W		0 5		At base.
	21	9	21	10		E	1			Do.
	21	9	26	20		W	Slight			At top.
	22	9	25	57 5		E	Do.			At base.
	22	9	52		19	E	0 5			Do
	22	9	34		22	W	1	0 5		To red at top ; to violet at base.
	23	10	3	42		E	Slight			At base.
	23	10	3	41		E	0·5			At top.
	23	9	45	15		E		2		Do
	26	10	7	15·5		E	1			Do.
	26	10	5	42		E		Slight		Do.
	26	10	16		49	W		1		Do.
	27	9	18	29		E		Slight		Do.
	27	9	20	20		E	1			In chromosphere.
	27	9	2		11	W		0 5		Do.
	28	12	11	18		E		0·5		At top.
	28	12	4		9	W		0 5		At base.
	29	11	0		13	W	1·5	1		To violet at base.
	29	10	50	21		W		Slight		At base
	31	10	45	46.5		E	1			At top ; extends over 7° from 43° to 50°.
	31	10	47	32		E	1			At top.
	31	10	48	25·5		E		1		At base.
	31	10	18	8		W			Slight	Do.
February	1	9	35	12		E		Slight		At top.
	1	9	16	13 5		W		1		Do.
	6	11	52	17 5		E		1		At top ; extends over 3° from 16° to 19°.
	6	11	52	18		E		2		At top.
	6	11	0		85	E	Slight			
	9	10	5		4	E		3		At top.
	9	10	10		10	E	1			Do.
	9	11	17	3		W	1	2		To red at top ; to violet at base.
	10	9	47		11	E		Slight		At top.
	10	9	46		14	E		1		Do.
	11	8	47		11	E		1		Do.
	11	8	47		16	E	2			Do.
	12	9	29	24·5		E	0 5			Do.
	12	9	41		35 5	E	0 5			At base ; extends over 3° from 34° to 37°.
	12	9	43		58	E	Slight			At base.
	12	8	50	41·5		W	Do.			Do.
	13	9	25	60		E		1		
	13	10	7	7		W	2			At base.
	14	9	35	14·5		E	1·5			At top.
	14	9	40		23	E	Slight			At base.
	14	9	45		43	E	Do.			Do.
	14	9	15	4		W	1·5			Do.
	14	9	14	12·5		W	1			At top.
	14	9	12	19		W	Slight			At base
	14	9	10	34		W			Slight	Do.
	15	8	50	75		E	Slight			At top.
	15	9	45	6		E		0·5		At base.
	15	9	54		30	E		1 5		No prominence.
	15	9	15	10		W	1			At top.
	16	10	5	27		E	2			No prominence.
	16	9	50	13·5		E	4			At top, extends over 7° from 10° to 17°.
	16	9	51	15		E		2		At top.
	16	9	51	11		E	5	2		Both at top.
	16	9	40		86	E		1		At top.

Date.		Hour I.S.T.		Latitude		Limb.	Displacement.			Remarks
				North.	South.		Red.	Violet.	Both ways	
1929.		H	M	°	°		A	A.	A.	
February	16	10	14		44	W		0 5		No prominence
	16	10	16		14	W		2		At top
	16	10	16		7	W		2		The whole prominence from 6° to 8° was displaced, displacement seen in D_2, D_1, D_3 and b_4, b_3, b_2, b_1
	17	9	46	15		E	1			
	18	9	13	25		E	1			At top
	18	9	8	10		W	Slight			Do
	19	8	50	48		E	0·5	1 5		To violet at top, to red at base
	19	9	13		44	E	0 5			At base
	19	9	2		54	W		1		At top.
	19	8	55		12	W		0·5		At base
	20	9	25		5	E	1			At top
	20	9	25		3 5	E		0 5		Do
	20	9	25		16	E	0 5			No prominence
	20	10	9		5	W	1			At top.
	21	9	53	4		E		1 5		At base
	21	9	10	6		W	3	1		Both at base
	22	9	36	11·5		E	1			At base.
	22	9	17		1 5	W			1	Do
	22	9	15	5		W	Slight	1		To violet at base
	22	9	7	50·5		W	Do			At top
	23	9	57	36·5		E		2		At base.
	23	9	39		6·5	E		1		Do.
	23	9	39		8 5	E	1			At top
	24	8	55	49 5		E		Slight		
	24	8	53	17		E		1		At top.
	24	9	5		14	W		1·5		Do
	25	8	59	32		E		0 5		At base
	25	8	48	19		E	0 5			At top
	26	9	2	38		E		0·5		At base
	26	9	2	23 5		E	1 5			At top
	27	9	24	12		E		2		Do
	28	9	35		10	E	0·5			At base.
	28	9	13	10 5		W			0 5	
March	1	9	25	58		E	2			At top, extends over 4° from 56° to 60°
	1	9	7	8		W	0·5			At base
	2	9	7		8·5	E	3	2		
	3	9	53	46·5		W	1			At top.
	4	8	51	59 5		E	0·5			Do
	4	9	7		9	E	1	2·5		To red at base, to violet at top.
	4	9	12		13	E		0·5		At top.
	4	9	2		4	W		Slight		At base.
	5	9	23	69		E	Slight			At top
	5	9	7		7	E	0·5			At base
	5	9	28	39		W	1 5			At top.
	5	9	28	38·5		W		1		At base.
	5	9	25	82·5		W		Slight		No prominence.
	6	10	14	14		E	1			At top
	6	11	3		23	W	1			Do
	6	10	45	8		W	1 5	1		To red at top, to violet at base
	6	10	58	13		W	0·5			At top.
	7	9	18	25 5		E		0 5		No prominence.
	7	9	25	12		E	1 5			At top.
	7	9	32		11	E	2			Do.
	7	8	55	18		W	0 5			Do.
	8	9	54	26		E	0·5			Do.
	8	10	16		55·5	E		1		Do
	8	9	4	12 5		W	2			At base
	8	8	54	26 5		W	1 5			Do.
	10	8	48	78		E		Slight		
	10	9	0		53·5	W	Slight			At top
	12	9	38	10		E	0·5			At base.
	12	8	44	33·5		W	Slight			At top.
	13	8	59	65		E		Slight		

Date.		Hour I.S.T.		Latitude.		Limb.	Displacement.			Remarks.
				North.	South.		Red.	Violet	Both ways.	
1929.		H.	M.	°	°		A	A.	A	
March	13	9	1	77		W	0·5			At top
	14	8	58		57·5	W		1		At base.
	15	9	37	10·5		E	2·5	0·5		To red at top ; to violet at base.
	15	8	55	42 5		W	Slight			At top.
	16	9	38	39 5		E			Slight	Do.
	16	9	49		11·5	E	1·5			
	16	9	16		3	W		0·5		At base.
	16	9	15	1·5		W	Slight			Do
	17	9	7		10	W		1		Do.
	18	8	58	28		E	Slight			At top.
	18	8	55	20		E		1 5		Do.
	18	9	15		11	W	2·5	1 5		To red at top; to violet at base.
	18	9	15		7	W	1			At top.
	19	8	48	52 5		E		0 5		At base.
	19	9	4		11	E		1·5		At top.
	20	10	0	19·5		E		1		Do.
	20	10	8		25·5	E			Slight	
	21	10	5	52		E	2·5			At top.
	21	9	35		23	W	1·5			Do.
	21	9	12	33		W	Slight			Do.
	22	9	38	14·5		E	0 5			Do.
	22	9	50		9 5	E	1			Do.
	23	9	30		3	E	1·5			At base.
	23	9	43		78 5	E			2	At top.
	23	9	13	18		W		0·5		At base
	24	8	50	35·5		E	Slight			At top.
	24	9	00		19	W		0·5		
	24	8	57		4	W		Slight		
	25	8	46	46·5		E	1			At base.
	25	8	49	43		E	1·5			At top.
	25	9	00		33·5	E	0·5			At base.
	26	9	00	35·5		E		1		Do.
	26	9	15		72·5	W	0·5			Do
	27	8	58	9		W		0·5		No prominence
	28	9	5	16 5		E		1·5		At base.
	28	8	51		3 5	W	0·5			At top.
	29	9	2	21·5		E	1			Do
	29	9	9	2 5		E	0 5			Do
	29	9	13		20	E	0·5			Do.
	29	8	47	3		W	1			At top.
	30	9	2	44·5		E	1	1		At base
	30	9	14	28		E	Slight			Do.
	30	9	17		17	E		1 5		At top
	30	9	18		24	E		1		Do.
	31	9	1	7		E		1		At base
April	1	9	4	29		E		1		At top.
	1	8	58		10	W		1·5		Do.
	2	8	50	46		E		0 5		At base.
	2	9	1	28		E		1		At top
	2	8	55		83	E	1			Do
	3	9	00	9		E	Slight			At base.
	4	10	55	11 5		W	0·5			Do.
	5	9	30		28	E		1 5		Do
	5	9	12	28		W	0·5			At top.
	6	9	43		19	E	1			Do.
	6	9	30	20		W	Slight			Do.
	7	9	00	18		W	1	1·5		To red at top ; to violet at base.
	8	8	56	30		E	0 5			At top.
	8	8	50	11		E	0·5			At base.
	8	8	50	10		E		1·5		At top.
	8	8	58	8		E	2			Do.
	8	8	48	82		W		Slight		At base.
	12	8	47	83		E	Slight			At top.
	12	9	26	16		E	2			Do
	12	9	5		16	W	1			Do.
	12	8	56	66·5		W	0·5			Do.

Date		Hour I S T.		Latitude.		Limb	Displacement.			Remarks
				North	South		Red.	Violet	Both ways	
1929.		H	M.	°	°		A.	A	A	
April	13	9	10	59·5		E		1		At top
	13	9	12	49 5		E			1	
	13	9	25		11 5	E	2·5			
	13	9	00		9 5	W		Slight		At base
	13	8	52	26 5		W	Slight			At top
	13	8	41	77 5		W		Slight		At base
	14	9	34		12	W	1			At top.
	15	8	57	46·5		E		1		At base
	15	9	3		7	W	1			At top
	16	10	2	23		E	1			Do
	16	10	20	15		E		0 5		At base.
	18	9	41	83 5		W	Slight			Do
	19	9	00	6		E	1			At top
	20	8	5	15		E		1		At base
	20	9	7		13	E	0 5			Do
	21	8	51	21		E	1 5			Do
	22	11	30	3		W	1			At top
	24	10	9	2		W		0 5		At base
	24	10	9	6		W	1 5	0 5		To red at top , to violet at base
	25	9	8	3		W	2			At top
	25	9	8	5		W		1 5		At base
	26	9	7	18·5		W	Slight			At top.
	27	10	10	16		E	1			Do.
	27	10	18		11	E		2		Do.
	28	9	8		20	E	1 5			At base.
	28	9	10		28	E	1	1 5		To red at base , to violet at top
	29	9	0	6		E	1			
	29	8	52		13	E	0 5			At base
	29	8	50	7		W	1	0·5		To red at top , to violet at base
	30	8	50		11	E	1·5	1		To red at base , to violet at top
	30	8	46		78 5	W		0 5		At base
	30	8	43		9	W		1		Do
	30	8	41	16		W	1			At top
May	1	8	36	49		W		Slight		At base
	5	8	33	35		E	1			At top
	5	8	40	15		E	1 5			At base
	5	8	40	12		E		1 5		At top
	5	8	40	6		E	1			At base
	6	9	10	9		E	0·5			At top
	7	8	34	8		W		0 5		At base.
	8	8	56	7		E	0·5			Do
	8	8	45		26	W	6	0 5		To red at top, to violet at base
	10	9	37		14 5	W	1			At top
	10	9	27	18		W	Slight			At base.
	13	9	15	1		E	0 5			Do
	13	9	15		4	E		1		At top
	14	8	53	33		E		Slight		At base.
	14	8	58	23		E	1			Do
	14	8	59		1	E	0 5			Do
	15	8	42	45		E		1		Do
	15	9	2		25	W	1	0 5		To red at top , to violet at base
	15	9	0		16	W	1			At top
	16	9	4		7 5	W	1			
	16	8	41	24 5		W			Slight	At top
	17	9	24	87 5		W		Slight		
	18	8	54		4	W	Slight			At top
	18	8	47	51 5		W	1	0 5		To red at base , to violet at top
	19	9	16	25		E	0 5			At top
	20	9	22	46		E	0·5			At base.
	21	8	44	36		E	1			Do.
	21	8	34	9		W	Slight			Do
	22	8	46	14		E	1			Do
	24	9	18	70		W	Slight			Do.
	25	10	22	11		W			1	Do.
	25	10	21	19		W	1	0 5		To red at top ; to violet at base
	25	10	17	59		W	0 5			At top.

Date.		Hour I.S.T.		Latitude.		Limb.	Displacement			Remarks.
				North.	South.		Red.	Violet.	Both ways.	
1929.		H.	M.	°	°		A.	A.	A.	
May	26	9	3		8	W		1		At base.
	26	9	1	1		W	2			At top.
	31	9	3		15·5	W			0 5	
	31	8	58	11		W	0·5			At top
June	9	9	33	25		E	1			At top.
	10	9	37	13		E	Slight			At base.
	10	9	40		18	E	0·5			Do.
	13	9	30	2		E	1			At top
	13	9	28		37	E	1	0·5		To red at top ; to violet at base.
	13	8	58	28		W		1		
	17	9	20	21		E	0·5			
	17	9	22		8	E	1·5			At top.
	17	9	16		16	W		1		At base.
	18	8	51	19		E		1		At top.
	18	8	51	13		E	0·5			At base.
	18	8	54		2	E		1		At top.
	18	8	54		5	E	1			At base.
	18	8	48	16		W		0·5		Do.
	18	8	45	25		W	0·5			At top
	23	8	52		20	E	0 5			At base
	24	8	50	26·5		E		0·5		At top.
	27	10	17		14·5	W			1	At base.
	27	10	14		0 5	W	0 ·5			Do.

The total number of displacements was 348 as against 281 in the previous half-year and their distribution was as follows :—

Latitude.	North.	South.
1°—30°	150	100
31°—60°	58	16
61°—90°	15	9
Total ...	223	125
East limb		194
West limb		154
Total ...		348

Reversals and displacements on the Sun's disc.

Four hundred and forty-eight bright reversals of the H*a* line, 436 dark reversals of D_3 line and 98 displacements of the H*a* line were observed during the half-year. Their distribution is given below :—

	North.	South.	East.	West.
Bright reversals of H*a*	238	210	218	230
Dark reversals of D_3	236	200	215	221
Displacements of H*a*	50	48	46	52

Seventy-two displacements were towards the red, 25 towards the violet and 1 both ways simultaneously.

Prominences projected on the disc as absorption markings.

Photographs of the Sun's disc in H*a* light were available from Kodaikanal and the co-operating observatories for a total of 176 days, which were counted as 171½ effective days. The mean daily areas of H*a*

absorption markings (corrected for foreshortening) in millionths of the Sun's visible hemisphere and their mean daily numbers are given below —

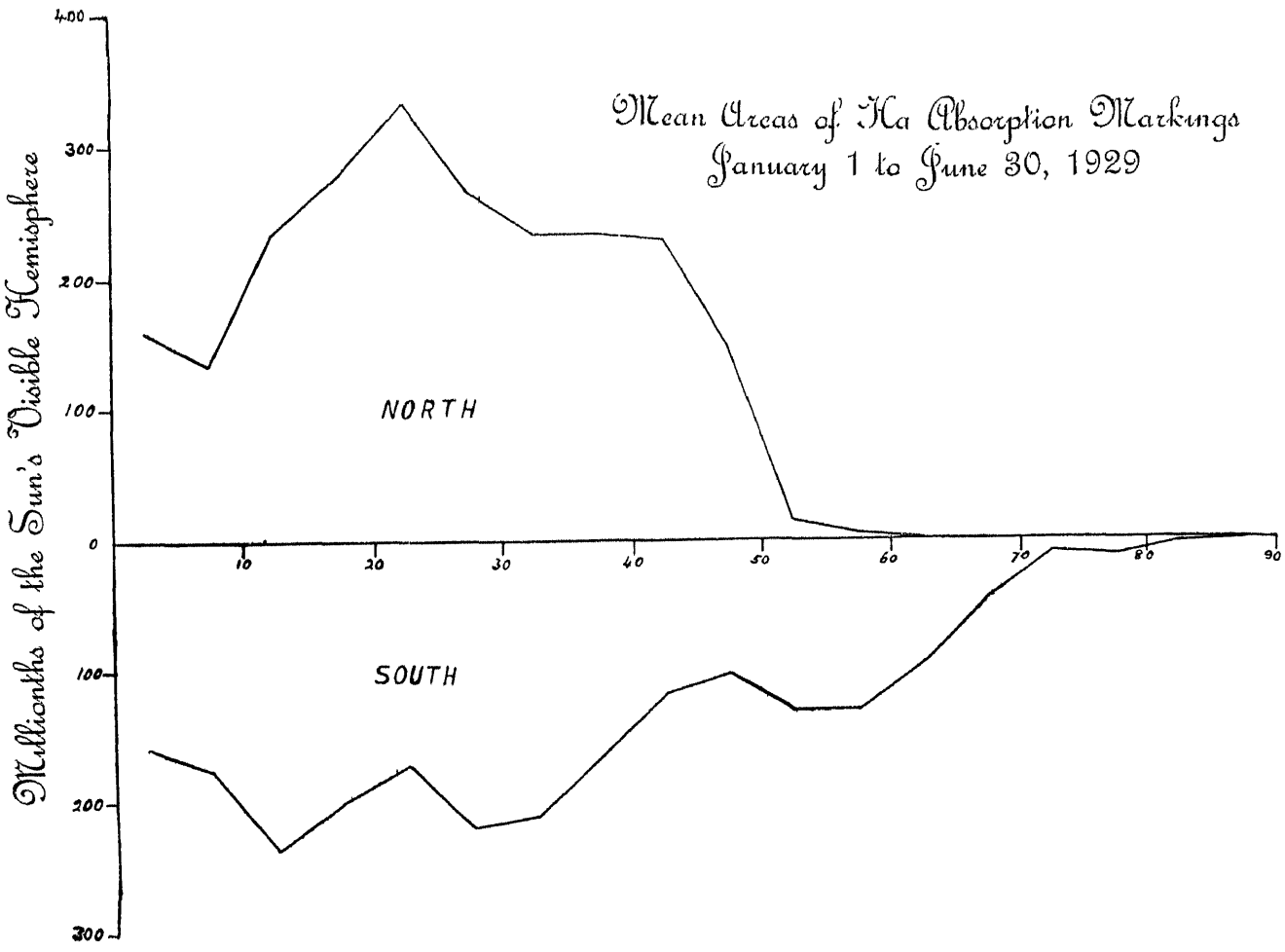
	Mean daily areas.	Mean daily numbers.
North	2,277	12 5
South	2,192	12 8
Total ..	4,469	25·3

The above show a decrease of about 6·5 per cent in areas and of 17·6 per cent in numbers compared with the previous half-year. The preponderance of activity is now in the northern hemisphere

For comparison with bulletins issued prior to the co-operation of other observatories, the means based on Kodaikanal photographs alone are also given, 156 days of observation being reckoned as 150 effective days.

	Mean daily areas	Mean daily numbers.
North (Kodaikanal photographs only) ..	2,359	12 95
South (do.)	2,101	12 60
Total ...	4,460	25·55

The distribution of the mean daily areas in latitude is shown in the following diagram. The maximum of activity which existed near 30° in the northern hemisphere has shifted 5° towards the equator, and the high peak in the southern hemisphere has disappeared, leaving the distribution more uniform than in the previous half-year.



The excess of activity with regard to areas and numbers still persists in the western hemisphere, the percentage east being 48·61 for areas and 49 71 for numbers.

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

THE OBSERVATORY, KODAIKANAL,
19th April 1930.

A. L. NARAYAN,
Officiating Director, Kodaikanal and Madras Observatories.

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