Kodaikanal Observatory.

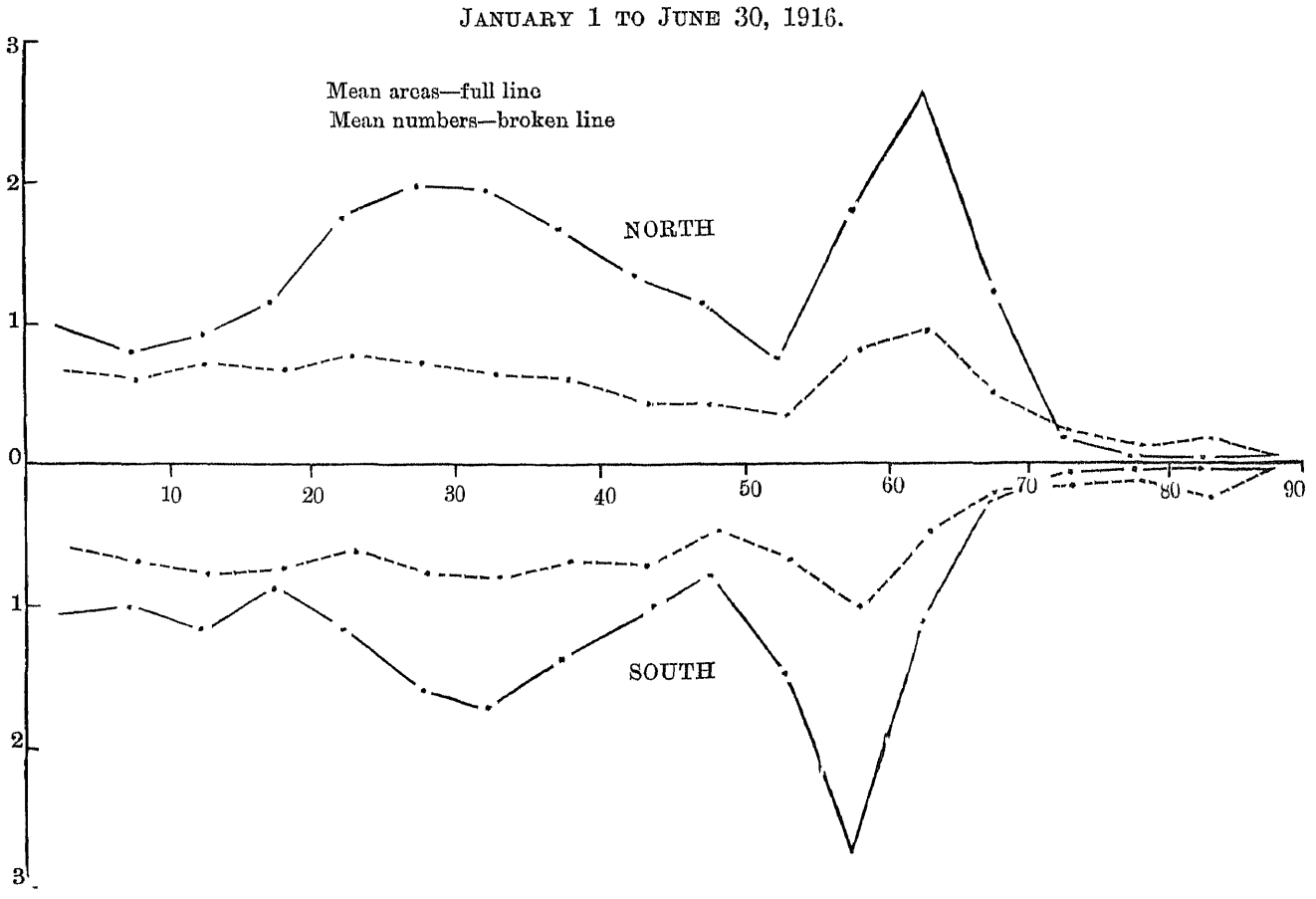
BULLETIN No. LII.

SUMMARY OF PROMINENCE OBSERVATIONS FOR THE FIRST HALF OF THE YEAR 1916.

In this bulletin, the prominence observations made at Srinagar by the Kashmir expedition under Mr. J. Evershed, the Director, have been used to supplement those made at Kodaikanal. At Kodaikanal the visual observations were practically confined to displacements of the hydrogen lines and to metallic prominences, as the position angles, heights, and areas can now be much more satisfactorily determined from the photographs. For those days when Kodaikanal photographs of prominences were incomplete, imperfect or wanting, the observations made at Srinagar were substituted when available. Visual observations were made at Srinagar until February 28, none of which were required, but eleven prominence photographs taken at Srinagar were used to supplement the Kodaikanal series. Observations were obtained on 171 days, counted as 166 effective days.

The distribution of prominences observed and photographed during the half-year ending June 30, 1916, is represented in the accompanying diagram. 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.

FIG. 1.—MEAN AREAS AND MEAN NUMBERS OF PROMINENCES, KODAIKANAL AND SRINAGAR. JANUARY 1 TO JUNE 30, 1916.



The distribution, which is practically unaffected by the inclusion of the Srinagar observations, is very similar to that in the previous half year, except that the maximum of the belt between 50° and 70° has shifted 5° towards the poles.

The mean daily areas and daily numbers (corrected for partial observations) are given in the table below, where the data for Kodaikanal observations alone are also given separately for the sake of uniformity with previous bulletins. It is seen that the inclusion of Srinagar observations hardly affects the results.

			Mean daily areas (square minutes)	Mean daily numbers.
Kodaikanal and Srinagar observations (166 effective days).	North	... ...	2·06	9·51
	South	... ..	1·77	9·77
	Total	...	3·83	19·28
Kodaikanal observations (158½ effective days).	North	... ...	2·08	9·68
	South	... ...	1·80	9·97
	Total	...	3·88	19·65

Compared with the previous six months there is a decrease of 22·6 per cent in areas and an increase of 26·1 per cent in numbers, the average area of a prominence having decreased from 0·324 square minutes in the last half of 1915 to 0·199 square minutes in the first half of 1916.

The monthly, quarterly, and half-yearly frequencies and the mean heights and extents of the prominences observed at Kodaikanal are given below in the following table. The frequencies are derived from the number of effective days.

Abstract for the first half of 1916 (*Kodaikanal*).

Month.	Number of days of observation.		Number of prominences.	Mean daily frequency.	Mean height.	Mean extent
	Total.	Effective.				
1916.					"	°
January	31	31	637	20 5	40 0	3 03
February .. .	27	27	529	19·6	34·8	3·16
March	30	30	661	22·0	35 7	2·65
April . ..	29	26½	533	20·1	35 6	3·11
May	29	28	488	17·4	37·5	2·78
June .. .	20	16	267	16·7	34·2	2 76
First quarter ...	88	88	1827	20·8	36 9	2·93
Second quarter ..	78	70½	1288	18 3	36 0	3·69
First half-year ..	166	158½	3115	19 7	36·5	3·25

[illegible] is a decrease in both the mean height and the mean extent which accounts for the decrease in the prominence noted above.

Although the mean height has decreased slightly, an eruptive prominence of unprecedented height was photographed at Kodaikanal and Srinagar on May 26. The prominence had attained its greatest development at 8^h 57^m I.S.T. when it resembled an enormous fountain 7′ in height. At 9^h 3^m rapid dissolution was

taking place, and the highest portion was found to be moving with high velocity away from the sun. The last remnants were photographed at $9^h\ 22^m$ at the enormous height of 18′ above the limb. A full description of this prominence will be published separately.

Distribution east and west of the sun's axis.

In the observations at Kodaikanal and Srinagar combined, areas show a preponderance at the eastern limb and numbers, a slight preponderance at the western limb.

1916 January to June.	East.	West.	Percentage east.
Numbers observed	1595	1605	49·84
Total areas in square minutes	3380	2983	53·12

Metallic prominences.

The following metallic prominences were recorded in the half-year. The two prominences printed in italics were recorded at Srinagar :—

TABLE I.—METALLIC PROMINENCES—JANUARY TO JUNE 1916.

Date.		Hour I S T		Base	Latitude.		Limb	Height.	Lines.
					North.	South			
1916.		H.	M.	°	°	°		″	
January	4	8	45	6		12	E	30	D_1, D_2, b_1, b_2, b_3, b_4.
	6	8	56	9	21·5		E	60	b_1, b_2, b_4 slightly bright.
	7	9	5	5	25 5		E	50	D_1, D_2, b_1, b_2, b_3, b_4 over the whole height at +23° and +26° and over 25″ at other places.
	7	8	55		22		W	35	D_1, D_2, b_1, b_2, b_3, b_4
	8	9	5		21		W	30	6677, D_1, D_2, 5316·8, 5284·2, 5276·2, b_1, b_2, b_3, b_4, 5018·6, 5016, 4924·1.
	13	8	33			17	W	10	4924·1, 5016, b_1, b_2, b_3, b_4, 5234·8, 5276 2, 5284 2, 5316·8, 5325·8, 5337·0, 5363 0, D_1, D_2
	18	*10*	*25*	*2*		*19*	*W*	*25*	*Whole prominence visible in D_1, D_2, b_1, b_2*
	21	8	50	4	39		E	65	D_1, D_2, b_1, b_2, b_3, b_4.
	22	8	37		22		E	15	D_1, D_2, b_1, b_2, b_3, b_4.
	23	8	45			20	E	60	D_1, D_2, b_1, b_2, b_3, b_4.
	24	*13*	*0*		*23·5*		*W*	*20*	*6677, D_1, D_2, b_1, b_2, b_3, b_4.*
	25	8	50	2		42	W	60	D_1, D_2, b_1, b_2, b_3, b_4 5316 8.
	25	8	59	2	24		W	35	D_1, D_2, b_1, b_2, b_3, b_4, 5316 8.
February	5	8	54	3		20·5	W	45	4924·1, 5016, b_1, b_2, b_3, b_4, 5197·8, 5234·8, 5276·2, 5316 8, 5361 8, D_1, D_2, 6677 (the last line only slightly bright)
	13	8	45	1		18 5	W	90	6677, D_1, D_2, b_1, b_2, b_3, b_4, 5316·8, 4924·1.
	13	8	45	1		15	W	30	
	18	8	26	5		66·5	W		No prominence D_1, D_2, b_1, b_2, b_3, b_4, 5316·8 bright over 5°; metallic at $8^h\ 56^m$ also but not at $9^h\ 20^m$.
	24	8	49	1		11·5	E	25	b_1, b_2, b_4.
	26	9	0	3		19	W	55	D_1, D_2, b_1, b_2, b_3, b_4, 4924·1, 5016, 5018·6, 5276·2, 5281·2, 5316·8, 5404·4, 6677.
March	14	8	36			16	W	70	D_1, D_2, b_1, b, b_3, b_4, 4924·1, 5016, 5018·6, 5316·8, 6677.
	14	8	20	2	20		W	25	D_1, D_2, b_1, b_2, b_3, b_4, 4924·1, 5016, 5018·6, 5316·8, 6677.
	17	9	0	7	15·5		W	55	D_1, D_2, b_1, b_2, b_3, b_1, 5316·8.
	23	9	0			28	E	15	4924·1, 5016, 5018·6, b_1, b_2, b_3, b_4, 5316·8, D_1, D_2.
	28	8	44	4	22		E	15	D_1, D_2, b_1, b_2, b_3, b_4, 5316·8. 6677.
	31	8	38	2	15		E	40	4924·1, 5016, 5018·6, b_1, b_2, b_3, b_4, 5197·4, 5234·8, 5276·2, 5284·2, 5316·8, 5363·0, 5425·5, 5535·0, D_1, D_2, 6677, 7065.

Date		Hour I S T		Base	Latitude		Limb	Height	Lines
					North	South			
1916.		H	M	°	°	°		″	
April	1	9	20	4	13		W	25	D_1, D_2, b_1, b_2, b_3, b_4, 6677 Prominence well visible in b_1, b_2, b_3, b_4
	3	8	56		19		E	30	D_1, D_2, b_1, b_2, b_3, b_4, 6677 at base only
	6	8	37	10		31	W	50	D_1, D_2, b_1, b_2, b_3, b_4, 5316 8, 4924 1, 5018·6, 5197·8, 5234 8, 5276·2, 6677.
	26	8	40		11		E	35	D_1, D_2, b_1, b_2, b_3, b_4.
	29	8	36	4	12		E	130	4924 1, 5018 6, b_1, b_2, b_3, b_4, 5197 8, 5234·8, 5276·2, 5316 8, D_1, D_2
May	6	8	35	1		20 5	E	15	4924·1, b_1, b_2, b_3, b_4, 5197·8, 5234·8, 5276 2, 5284 8, 5316·8, 5363·0, D_1, D_2, 6677.
	16	8	43	5		25·5	E	25	D_1, D_2, b_1, b_2, b_3, b_4, 6677.
June	7	8	34	4	11		W	30	b_1, b_2, b_3, b_4

There is an increase on the previous half-year in the number of metallic prominences observed.

Displacements of the hydrogen lines.

The displacements observed at Kodaikanal are given in Table II. A and those observed at Srinagar up to February 28 in Table II. B.

TABLE II. A.—DISPLACEMENTS OF THE C LINE IN PROMINENCES OBSERVED AT KODAIKANAL, JANUARY TO JUNE 1916.

Date.		Hour I S T.		Latitude.		Limb	Displacement.			Remarks
				N	S.		Red.	Violet	Both ways.	
1916		H.	M.	°	°		Å	Å	Å	
January	1	8	55	63 5		E		Slight		At north end.
	2	8	48		19	E		Slight		
	3	8	49		49	W	Slight			
		8	45	61		W	Slight			At top.
	4	8	45		12	E		Slight		
		8	45		9	E		0·5		
	5	8	48	11		E	Slight	Slight		To red at base ; to violet at top.
	6	8	48		86	W	Slight			
	7	9	10	18		E		Slight		Over lower portion.
		9	0		58 5	W	Slight			Over upper half.
		8	55	22		W	2			
	8	9	5	21		W	1	1		
	9	8	54		53	W	Slight			At south end.
		8	48	22		W		0·5		Over jets
	12	8	42		39	E		0·5		
		8	40		69 5	E		0·5		
		8	50		34	W	Slight			
	13	8	55		35	E		2		
		9	0		44·5	W	Slight			At base
		8	29	26		W	0·5			
		8	22	83 5		W	Slight			
	15	8	49	62 5		E		1		At top.

Date.		Hour I.S.T		Latitude.		Limb.	Amount of displacement			Remarks.
				N.	S.		Red	Violet.	Both ways	
1916		H	M.	°	°		Å	Å	Å	
January	15	8	54		31	E	2			
		8	39	63		W	Slight			At base.
	16	8	56		8	W	Do.			
	17	8	48	85		E	1 5			At top, not seen at 9h 5m
	19	8	42	23		E	1 5			
		8	32		55	E		0·5		At base.
		8	32		65	E		Slight		
		8	30		77	E		Do.		
		8	48	10		W		1		Over lower part
	21	8	56	6 5		E	Slight			
	22	8	35	36		E		0 5		
		8	35	42		E	1	Slight		To red at top, to violet at base
	23	8	49		30	E	Slight			
	25	8	59	24		W	1	2		To red at top; to violet at base
	27	9	5		23	W	Slight	1		
	28	9	10		24	W	Do.			At base.
	29	9	0	71		E	0·5	1·5		To red at base; to violet at top. No displacement at 9h 2m.
		8	37		55 5	W			Slight	Symmetrically widened.
		8	36		44 5	W		Slight		
		8	50	17		W	Slight			
		8	51	32		W	1			
		8	56	66 5		W		1		
	30	8	32	79		E			Slight	
		8	27	71		E	Slight			
		8	47		82	W			Slight	To red only for 0·5 Å at 8h 49m.
		8	51		79	W		Slight		At top.
		8	44		34	W		0 5		At base.
		8	37		3	W	Slight			
February	1	9	55	51·5		E	2			
		9	50	15·5		W		Slight		At top.
	3	8	55	26		E	Slight	Do.		The violet displacement a little to the north of the other.
		9	2		55·5	W	Slight			At base; not seen at 9h 6m.
		8	22		0·5	W	0 5			At top.
	4	9	40		17	W	1			
	5	8	43	62		E		0·5		At top.
		9	16	34·5		E	0·5			
		9	20		37	E	2			
		8	54		20·5	W	0·5	Slight		To red at top; to violet at base
		9	9		14 5	W		2		
		8	49		5	W	Slight			
		8	47	59		W			Slight	
	6	8	54	25		E			Do.	
		8	50		9	E	Slight	Slight		To red at base; to violet at top.
		9	0	20		W		Slight		
	8	8	55	25·5		W	Slight	Do.		To red at top; to violet at base.
		8	53	63·5		W		Slight		
	10	8	55	12·5		E	0·5			Two bright points on chromosphere.
		8	46		82	E	Slight			
		8	45		66	W	Do.			
	12	8	43		28	E	0·5			At base. 4 Å to violet
	13	8	45		15	W		3		and 1 Å to red at 8h 47m. No displacement a 8h 55m.
		8	45		19	W		0·5		3 Å to violet at top at 9h 12m.
		8	39	59		W	Slight			
	14	8	47		82·5	W		Slight		
		8	31	43		W			Slight	

Date.		Hour I.S.T.	Latitude.		Limb.	Amount of displacement			Remarks
			N.	S.		Red.	Violet.	Both ways.	
1916.		H. M	°	°		Å	Å	Å	
February	17	8 55	12		W	Slight	1		To red at base, to violet at top
	18	8 31		82·5	E	Do.			
		8 28		55	W	Do.			At base
		9 8	48 5		W	Do			
	20	8 24	63		W	Do			
	22	8 25		67	E		Slight		
		8 48	10		W		1		
	24	8 49		11·5	E	Slight			
		9 4		68	E	Do			
		8 35		8	W		Slight		Over lower half
	25	8 24	27		E		2		Over chromosphere
		8 37		20	E	1·5			At base.
		8 58		15	W		1		
	26	8 53	62		E			Slight	
		8 45		20	E	Slight			
		9 14		18	W	Do.	1		
	27	8 44		58	E	Do			
		8 27		21	W		0·5		
		8 26		10	W		Slight		
	29	8 22	10 5		E		Do.		At top.
		8 17		15	E	Slight			
March	1	8 55		17	E	2	1·5		At two different points.
	2	8 49		22	E	Slight	Slight		To red at top; to violet at base.
		8 56		62–76	E	Do	1 5		Changing, at 8^h 56^m whole prominence bodily displaced to violet for 1·5 Å at northern end and C slightly displaced to red at 74° E. Southern half of prominence displaced to violet for 1·5 Å at 9^h 15^m
		8 36	34		W	Slight			At top.
	4	9 3	82 5		E		Slight		
		8 50	18		E	Slight	Do		To red at base; to violet at top.
		8 44		57·5	E	Do			
	5	8 28	61		E		Slight		
		8 32	25–27		E		Do.		Over streamers
		9 3	18		E		1		At top.
	6	9 0	70		W	0 5			
	8	8 28	20		E	2 5	2		In different places.
		8 30		70	E	Slight			
	9	8 35		57·5	E			Slight	
	10	8 35		67	E	Slight			
	12	8 27	82·5		E		Slight		
		8 20		24	W	Slight			
	13	8 45	28		E	1			Over chromosphere
	14	8 36		16	W	Slight	Slight		At different points.
		8 20	20		W	0 5			At top
		8 27	21		W	0 5	1		
	15	8 55		20·5	W	1	0·5		
	16	8 15		32	E	Slight			Over chromosphere.
		8 25		24	W	Do.			At top.
	17	8 30	15 5		W			2	To violet only for 1·5 Å at 9^h 0^m.
	20	8 55	42·5		E		2		
	21	8 39		62	W	Slight			At top
	23	8 35	76 5		E	Do.	Slight		To red at top; to violet at base.
		8 55	26		E	Slight			
		9 0		28	E			Slight	
	26	8 30		34·5	W		Slight		
	28	8 36	82		E		Do.		At top
		8 44	22		E			Slight	
		8 46		10 5	E	Slight			
		8 48		19·5	E	Do.	Slight		To red at base, to violet at top.

Date.		Hour I S T	Latitude N	Latitude S	Limb	Amount of displacement. Red	Violet.	Both ways	Remarks.
1916.		H M	°	°		Å	Å	Å	
March	29	9 40	14		E		Slight		Over whole prominence
		9 43		19 5	E	0 5	Do.		To red in the southern half, to violet in the northern.
		9 23		20	W	1			Over whole prominence
	30	8 40	6		E	0 5			
	31	8 38	16		E		Slight		At north end
		8 37	8		E		Do.		At top.
		8 32		59	E	Slight			At south end.
April	1	9 5	13		W	2 5	1	1	C bulged out 1 Å on the lower mass and displaced at 6 or 7 points on the upper part 2 5 Å to red and 1 Å to violet
	3	8 56	26		E		Slight		At northern end of prominence
		9 0	11		E	Slight			At base.
		9 14		72	E	Do.			
	4	8 35	62 5		E	1			
		9 5	19 5		E		Slight		
		9 14		72	W		Do.		
		8 45	28		W	Slight			
	6	8 50		81	W		Slight		
		8 37		31	W	Slight			At two or three points.
		8 33	21		W	Do.			
	7	9 32		15 5	E		Slight		Over whole prominence.
		9 40		53 5	W	4			
		9 20	29		W		Slight		
	10	8 53		15	W		1		
	11	8 29	6		E	1·5			
		8 48	35		W		1 to 5		Whole prominence displaced, amount ranging from 1 to 5 Å.
	18	8 53	29		E		Slight		
		8 53	23		E		Do.		
	22	8 32	82		E		Do.		
	23	9 2	65		E	Slight			At base
		9 0	23		E		Slight		
	24	8 41	22		E		Do.		At top.
		8 43		25	E	Slight	0 5		
		8 49		84	E	Do.			
	25	8 33	59 5		E	Do.			At northern end.
		8 39		34	E	Do.			At top.
		8 35		75·5	E	Do.			
	26	8 40	11		E		1		
		8 32		66	E		0·5		At top.
	27	8 40	25		E		Slight		
		8 45		81	E		Do.		
	29	8 58	79		E		0·5		
		8 40	32		E	0·5			At base.
		8 36	12		E	Slight	Slight		To red at base, to violet at top.
		8 32		16	E	Slight			
		8 32		18	E		Slight		
	30	8 44	14		E	Slight			
May	2	8 30		17 5	E		1		At top.
		8 25		57	E	Slight			
	4	8 19	82		E		Slight		
		8 40		17	E	Slight	Do.		To red at base; to violet at top.
		8 21	57		W		Slight		
	6	8 31		28 5	E	Slight			At top.
	7	8 35		19·5	E	Do.			
		8 40		36	E		Slight		At top.
		8 26	29		W	Slight			At top.

Date.	Hour I.S T.	Latitude. N	Latitude. S.	Limb	Amount of displacement. Red.	Amount of displacement. Violet.	Amount of displacement. Both ways.	Remarks.
1916.	H. M.	°	°		Å	Å	Å	
May 11	8 26		45	E	Slight	Slight	Slight	Symmetrically widened.
	8 42		17	W				The violet displacement a little to the north of the other.
13	9 0		45	E	Slight			At base
	8 49	8		W	Do.			
14	8 41	69		E	Do.			
15	8 40		17	W	Do.			
16	8 23	80·5		E		Slight		
	8 37	17		E		Do.		
	8 43		25 5	E	0 5			Over the streamer at top.
21	9 12		13 5	E		Slight		At top
	9 12		12	E	Slight			
22	9 52	37		E	1			
	10 19		17·5	E	1			
23	9 34	22		E	Slight	Slight		To violet over lower and to red over upper part of prominence.
24	8 23	56		W		Do.		
25	8 39		23	W		Do.		
	8 35	15·5		W		0·5		
26	8 23	64		E		Slight		An extraordinarily tall prominence over 15′ in height. At 8h 50m C was displaced 3 Å to red over lower half and slightly to violet over upper half.
27	8 59	25		E	Slight			At northern end
	8 58	19		E		Slight		Do.
	9 9		10	W	1	Do.		To red at top ; to violet at base.
30	10 0		71	W	0·5			
31	8 47	22 5		W	Slight			
	8 40	73·5		W		Slight		At base
June 1	8 46		32 to 45	E	Slight	1 5		Slightly to violet at top over northern half and for 1·5 Å to violet over southern half ; slightly to red at base at southern end. At 8h 52m C was displaced 3 Å to violet over top of southern half
	8 29		12	W	2			
	8 20	88 5		W		Slight		
2	10 20		61 5	E		Do.		At top
	9 27		12	W	3	1		Not seen at 9h 29m.
	9 29		14	W	Slight			
7	8 34	11		W	Do.			At top
8	9 35		26	E	Do.			
	9 46	13·5		W		Slight		
9	9 18		14 5	E			Slight	
10	9 9	11·5		W		1		Over whole prominence.
14	11 6		11 5	W			Slight	
17	8 35		10 5	E	Slight			
23	8 35	14·5		W		Slight		
30	9 20		11	W	1			

TABLE II. B.—DISPLACEMENTS OF THE C LINE IN PROMINENCES OBSERVED AT SRINAGAR.
1ST JANUARY TO 28TH FEBRUARY 1916.

Date	Hour. I.S.T.	Latitude		Limb.	Amount of displacement			Remarks.
		N.	S.		Red	Violet.	Both ways.	
1916.	H. M	°	°		Å	Å	Å	
January 2	9 45		7	E	1 to 3	1 to 3		Prominence 5'·5 broad. C displaced 1 to 3 Å to violet at the southern end and the same amount to red over the rest of the prominence. Displacement to violet same as before but only 0·5 Å to red at 9h 52m. Displacements in both directions very slight at 10h 45m.
4	10 30		8	E		2		
5	14 30	9·5		E	Slight			At base.
7	16 10	71		W		0 5		
8	12 20		20·5	W	Slight			
8	12 24	31·5		W	Do	Slight		Near base.
10	11 2	70·5		E		Do		At base.
17	15 33	22		W		1		Near base at northern end.
21	14 10		23·5	W		0·5		Over whole prominence.
22	11 18	16		E	2			
24	13 0	23 5		W			1	1 to 2 Å to red at 15h 0m.
25	11 15	28 5		W	0 5			
February 18	14 33	27·5		W		Slight		
22	9 57		69	W		1		

There was a large increase on the previous half-year in the number of displacements observed at Kodaikanal. There were 127 in the northern hemisphere and 133 in the southern; there were 148 or 56·9 per cent in the eastern and 112 in the western. One hundred and fifteen were to the violet, 129 to the red and 16 both ways simultaneously. Between 0° and 30° of latitude there were displacements observed in 152 prominences, between 31° and 60° in 47, and between 61° and 90° in 61.

Reversals and Displacements of the C line on the Disc.

Three hundred and five reversals of the C line, 34 darkenings of the D_3 line, and 103 displacements were recorded. Each of these is an increase on the second half-year of 1915. Their distribution east and west of the central meridian is given below :—

		East.	West.
Kodaikanal.	Reversals of C near spots	161	144
	Darkenings of D_3	17	17
	Displacements of C	58	45

There was, as usual, a large preponderance of displacements towards the red, 70 being to the red, 25 to the violet, and 8 both ways simultaneously.

Prominences projected on the Disc as Absorption Markings.

The grating spectroheliograph for photographing the absorption markings in H_a light was in regular use during the six months. Photographs were obtained on 147 days, counted as 133 effective days. The

mean daily areas in millionths of the sun's visible hemisphere, corrected for foreshortening, and the mean daily numbers are given below :—

	1916 Jan —June	
	Areas	Numbers.
North	406·1	5·0
South	439·9	5·7
Total ...	846·0	10·7

The daily number is the same as for the previous six months, but there is again a diminution in areas. The distribution in latitude is given in the accompanying diagram. The diminution in the mean daily areas is seen to be largely due to the decrease in activity in the belt between 50° and 70°.

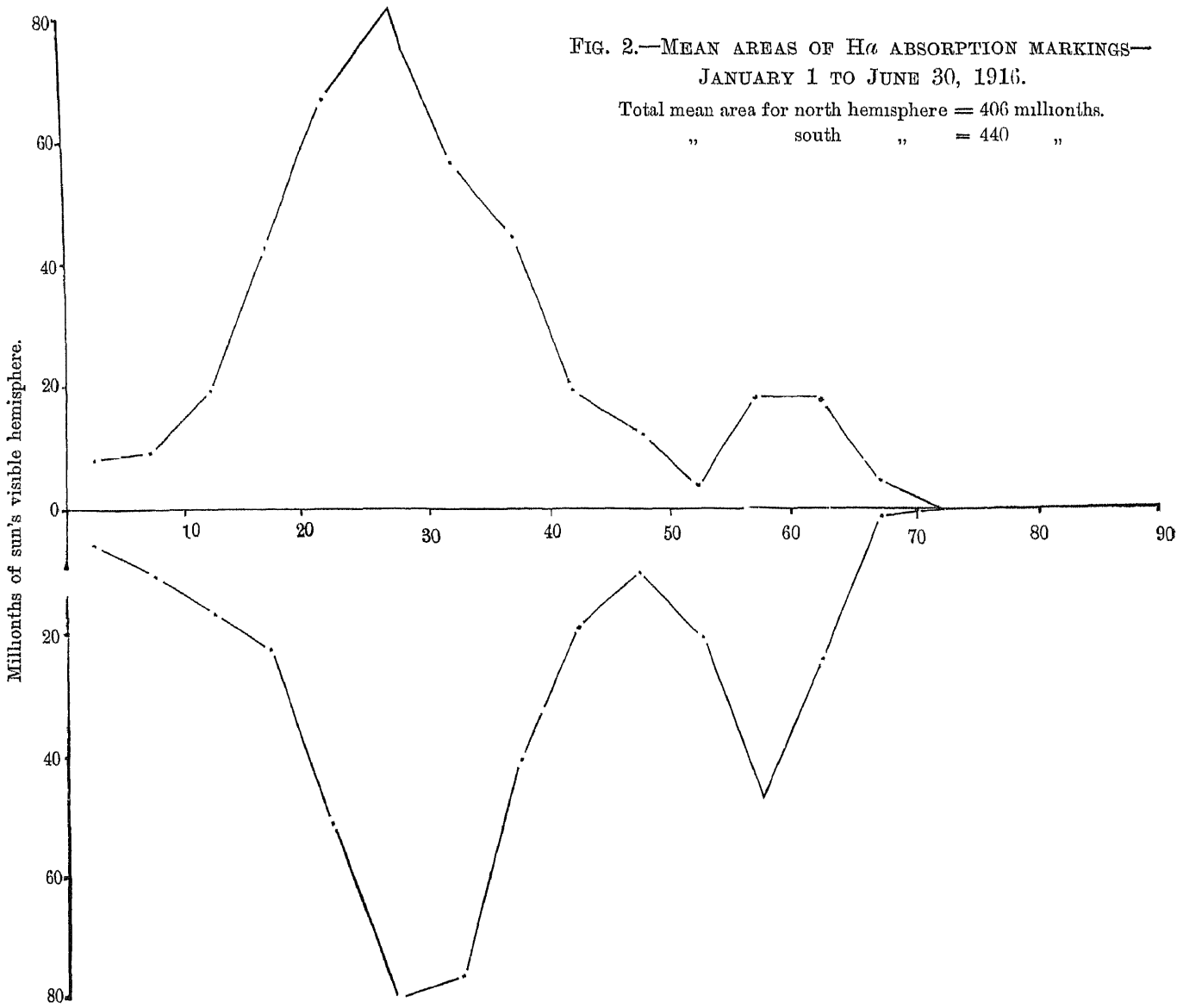


FIG. 2.—MEAN AREAS OF Hα ABSORPTION MARKINGS—JANUARY 1 TO JUNE 30, 1916.

Total mean area for north hemisphere = 406 millionths.
" south " = 440 "

Hitherto there has been a persistent excess of Hα markings on the eastern side of the central meridian, but for this half-year there is a defect in both areas and numbers; the percentage on the eastern side of the central meridian is 48·56 in areas and 48·77 in numbers.

THE OBSERVATORY, KODAIKANAL,
29th August 1916.

T. ROYDS,
Assistant Director.

MADRAS. PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS—1917

PRICE, EIGHT ANNAS.