

Kodaikanal Observatory

BULLETIN No. CXVIII.

SUMMARY OF PROMINENCE OBSERVATIONS FOR THE YEAR 1939.

Owing to the war in Europe it has not been possible to collect data from all the observatories which usually co-operate with the Kodaikanal Observatory. This bulletin therefore summarises the observations of prominences made exclusively at this observatory during the year 1939. Part I deals with the data of the first half of the year and the data of the second half year are summarised in Part II.

PART I.

SUMMARY OF PROMINENCE OBSERVATIONS FOR THE FIRST-HALF OF THE YEAR 1939.

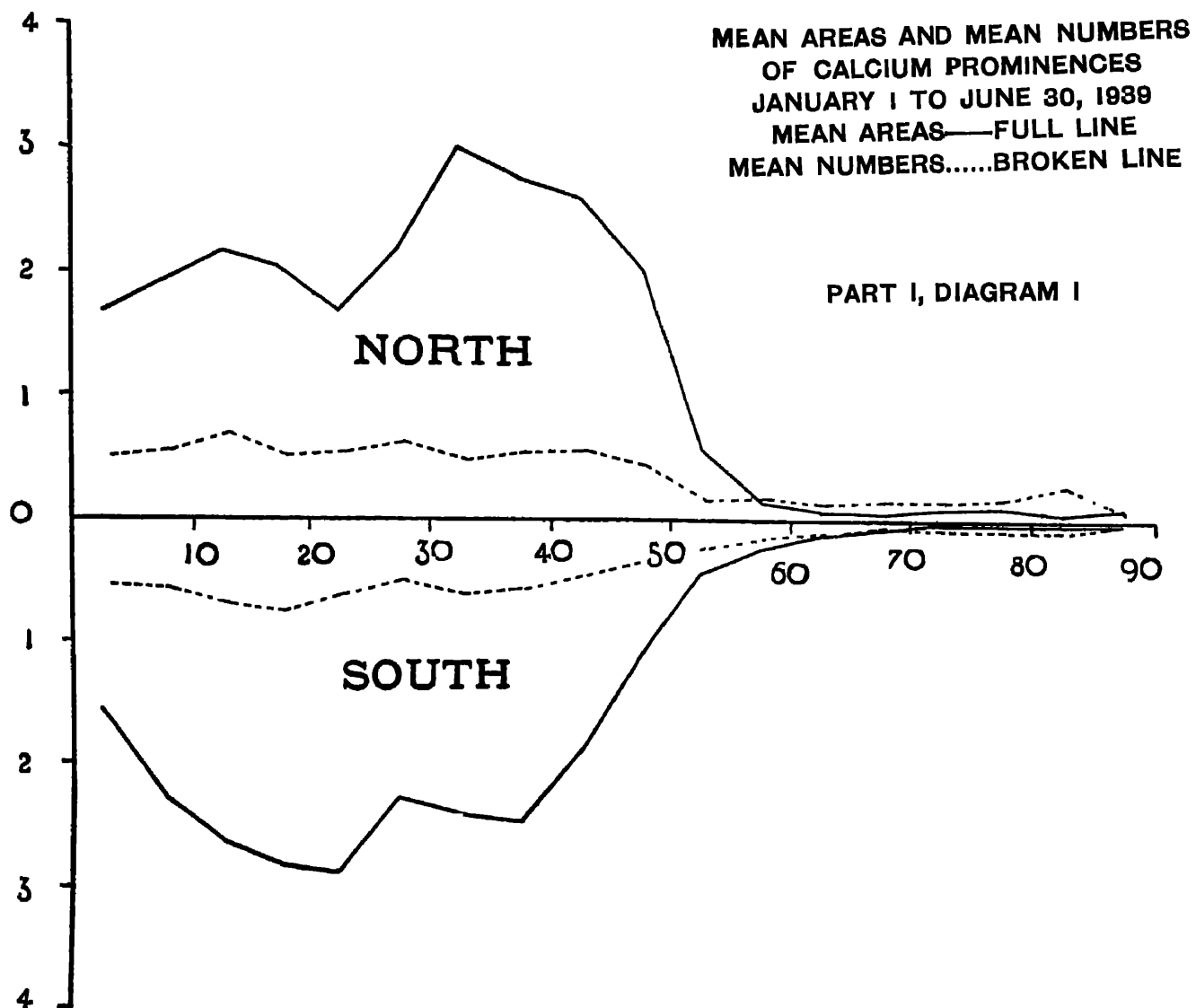
Calcium prominences at the limb.—Photographs of prominences were obtained during the half-year on 164 days which were counted as 147 effective days after giving weightage to the plates taken on days on which only incomplete observations were possible. The mean daily areas and numbers of prominences are given below :—

	Mean daily areas (square minutes).	Mean daily numbers.
North	2.31	6.35
South	2.33	6.20
Total	4.64	12.55

These figures show a considerable decrease of prominence activity since the previous half-year, the decrease in areas and numbers being 46 per cent. and 14 per cent. respectively.

The following diagram represents the distribution of prominences in latitude. The full line gives the mean daily areas and the broken one the mean daily numbers for each zone of 5° of latitude, while the ordinates represent tenths of a square minute of arc for the full line and numbers for the broken line. The diagram shows that the activity is now mainly confined from the equator to about 55° of latitude in both the northern and southern

hemispheres, the peak near the north pole seen during the previous two half-years having completely disappeared.



prominences are given in table I. The unit of area is one square minute of arc. The mean height and the mean extent are derived in the same way as in the previous half-years.

the mean height and the mean extent of

TABLE I.—ABSTRACT FOR THE FIRST-HALF OF 1939.

Months.	Number of days (effective).	Areas.	Numbers.	Daily means.		Mean height.	Mean Extent.
				Areas.	Numbers.		
1939.						"	"
January	22½	134.5	277	6.04	12.45	48.97	7.15
February	25½	122.1	271	4.74	10.52	45.44	7.48
March	30½	137.0	361	4.49	11.84	36.30	6.47
April	21½	82.9	285	3.86	13.26	34.37	5.68
May	25½	116.2	349	4.16	13.69	34.43	6.52
June	21½	88.7	303	4.12	14.09	36.40	6.05
1st Quarter	78½	393.6	909	5.01	11.58	42.89	6.98
2nd Quarter	68½	287.8	937	4.20	13.68	35.05	6.11
1st Half-Year	147	681.4	1,846	4.64	12.56	38.91	6.54

Distribution east and west of the sun's axis.

January to June 1939.	East.	West.	Percentage East.
Total number observed	891	955	48.27
Total areas in square minutes	398.4	343.0	49.67

It is seen from the above table that both the numbers and areas show a slight eastern defect.

Metallic Prominences.

Twenty-two metallic prominences were observed during the half-year and their details are given below.

TABLE II.—LIST OF METALLIC PROMINENCES—JANUARY TO JUNE 1939.

Date.	Time I. S. T.	Base.	Latitude.		Limb.	Height.	Lines.
			North.	South.			
1939.	H. M.	°	°	°		"	
January 2	8 52	4		19	W	15	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
15	10 20	2	13		E	50	1, 2, 3, 4, 5, 7, 8, 9, 10, 11 and 12.
	9 41	1	4.5		E	20	1, 2, 3, 4, 5, 7, 8, 9, 10, 11 and 12.
21	9 21	2		20	W	15	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
23	9 20	3	12.5		E	15	4 and 10.
February 3	9 7			12	W	10	4 and 10.
March 3	8 51	6		9	W	15	4 and 10.
10	8 30	3	9.5		E	15	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.

TABLE II.—LIST OF METALLIC PROMINENCES—JANUARY TO JUNE 1939—*contd.*

Date.	Time I. S. T.	Base.	Latitude.		Limb.	Height.	Lines.	
			North.	South.				
	H. M.	°	°	°				
1939.								
March	20	10 15	2		13	E	25	4 and 10.
		10 5	4	29		E	10	4 and 10.
	28	9 4	2	12		W	20	4 and 10.
April	19	9 25		25		E	10	4 and 10.
		9 13			15	E	15	4 and 10.
	26	8 50			20	E	15	4 and 10.
May	2	9 15	3	28.5		W	15	4 and 10.
	3	9 23	1	29.5		W	10	4 and 10.
	4	10 25	1	27.5		W	10	4 and 10.
	11	8 50	1		16.5	E	25	1, 2, 3, 4, 5, 7, 8, 9, 10, 11 and 12.
	23	10 8	1		23.5	E	15	4 and 10.
June	3	9 50	4	10		E	15	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
	27	9 0	3	18.5		E	10	4 and 10.
		8 49	3	11.5		W	10	4 and 10.

NOTE.—The key to the wave lengths of the metallic lines is given below :—

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	5368.0	Fe ⁺
4	b _a , b ₂ , b ₃ , b ₁	Mg, Fe ⁺	10	D ₂ , D ₁	Na
5	5234.8	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°	Mean latitude.	Extreme latitudes.
North	3	5	5	17°.9	4°.5 and 29°.5
South	1	7	1	16°.4	9° and 23°.5

Thirteen were on the east limb and nine on the west limb.

Displacements of the Hydrogen line.

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

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1939.

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		° A	° A	° A	
1939. January	1	9 05	20.5	E	1			At top; 19° to 22°.
		8 50	19	W		1.5		At top.
	2	9 02	7.5	E		1		Do.
		8 52	19	W	1.5			At base; 17° to 21°.
		8 47	1.5	W	1.5			At top; —1° to +4°.
	3	9 04	3	E	0.5	0.5		To red at base and violet at top.
	5	9 02	45	E	1			At top; 44° to 46°.
		9 09	21.5	E		2		At top; 20° to 23°.
		9 11	67.5	E	81			In chromosphere.
	13	10 54	28.5	E	1.5			At top.
	15	9 50	29.5	E	6			At base.
		10 22	27.5	E	1.5			At top; 25° to 30°.
		10 20	13	E		4		In the middle of the prominence; 12° to 14°.
		9 41	4.5	E	1			At base.
		10 05	4	W	0.5			Do.
	21	9 21	20	W	1			At base; 19° to 21°.
	22	8 45	4	E	2			At top; 3° to 5°.
	23	9 12	2.5	E		6		At base.
	26	9 33	24	W	0.5			At top.
		9 30	54.5	W	0.5			At base.
	27	8 30	9.5	W	0.5			Do.
		8 28	33	W	0.5			At top.
	28	9 15	4	W	0.5			Do.
	30	9 00	42.5	E		1.5		At top; 41° to 44°.
		9 12	4.5	W	1			At top.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1939—*contd.*

Date.	Time I. S. T.	latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		° A	° A	° A	
1939.								
February	2	9 17	8	E		0.5		At top; 7° to 9°
		9 08		W	1			At top.
	3	9 02	28	W	0.5			At base.
February	3	9 00	78.5	W	0.5			At base.
	7	8 58		E	1			In the middle of prominence; 17° to 19°.
	9	9 01	12.5	W	2	3		In the middle of prominence; 11° to 14°.
	11	8 50	16	W		1.5		At base; 15° to 17°.
	13	8 51		W	1			At base.
		8 45	70	W		0.5		Do.
	14	9 29	11	E	0.5			Do.
		9 23		W	1			At top.
	15	9 03	40.5	W		1		At base; 39°-5 to 41°-5.
	18	8 45		E		0.5		At base.
	19	9 15		W	1			In the middle of prominence.
		9 15		W	1			Do.
	20	9 21		W	1.5	0.5		To red at top and to violet at base; 14° to 17°.
		9 10		W	2			At top; 18° to 24°.
		9 10		W	2			At top; 13° to 17°.
		8 55	78.5	W		81		In chromosphere.
	21	9 07		E		0.5		At top; 0° to 2°.
		8 50	82	W	0.5			At top; 81° to 83°.
	23	9 18	2	E	1.5			At base.
		8 40	22	W	0.5			At top.
	24	10 57		E		0.5		In the middle of prominence.
		10 42	0.5	W	1			At top; +2° to -1°.
	26	9 03		W		1		At base.
	27	8 42	83	E	0.5			Do.
		10 20	81	W	4	1		To red at top and to violet in the middle of prominence; 30° to 32°.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		Å	Å	Å	
1939.								
February	27	8 47	34.5	W	2			At top; 31°·5 to 37°·5.
	28	8 35	1	E	1	1		To red at top and to violet at base.
		8 49		W	0.5			At top; 16° to 18°.
		8 48		W	0.5			At top.
March	3	8 31	24.5	E		0.5		At base.
		9 05		E	2			In the middle of prominence; 25° to 30°.
		9 05		E		0.5		At base.
		8 51		W	1.5			At top.
		8 51		W		0.5		At base.
		8 51		W	0.5			At top.
		8 48	6.5	W		81		At base.
		8 48	6	W	0.5			At top; 5° to 7°.
		8 41	20	W	0.5			In the middle of prominence.
	4	8 58	4	W	0.5			At top.
		8 58	14	W	0.5			At base.
	5	9 00	60	E	1.5			Do.
		9 05	67.5	W		0.5		At top.
	6	8 55	30	E	3			At top; 28° to 32°.
		9 00	30	E	3			At base; 28° to 32°.
		9 00	30	E	3			In the middle of prominence; 28° to 32°.
		9 00	30	E		1.5		At top; 28° to 32°.
		8 46		W		0.5		At base.
		8 42		W		0.5		At base; 10° to 12°.
		8 42		W	1.5			At top.
		8 35	21.5	W		1		At top; 20° to 23°.
		8 35	24.5	W	1			At top.
		8 35	26	W	1.5	1		To red at base and to violet at top.
	7	9 20	13	W	1			At top; 12° to 14°.
	8	9 02	83	E	1.5			At top.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		°	°	°	
					A	A	A	
1939.								
March 9	9 27	14		E		0.5		At base.
	9 18	22		W	1.5			At top.
10	8 30	14		E	0.5			Do.
	8 30	12		E		0.5		At base.
	8 58		46.5	W	0.5			At top.
	8 50	20		W	1			In the middle of prominence.
	8 50	28		W	0.5			In the middle of prominence; 27° to 29°.
11	8 55	80		E		0.5		At base.
	9 15		22	W		0.5		At top.
	9 5	10		W	0.5			Do.
12	8 58		43.5	W	0.5			Do.
	8 53		16	W		0.5		At top; 14° to 18°.
	8 46	29.5		W	S1			At top.
13	9 00	5		E	1			At base; 4° to 6°.
	9 2		16	E	1.5			At top; 15° to 17°.
	8 52		32	W	1.5			At top.
	8 43		5	W	S1			At base.
14	9 54		32.5	W	1.5			At top.
	8 50	5		W		1		Do.
15	10 00	3		W	3			At top; 1° to 5°.
	10 10	7		W		2		At base.
17	8 50	55.5		E		0.5		In chromosphere.
	8 41	5		E		0.5		In the middle of prominence.
18	8 50	30.5		E		0.5		Do.
20	10 5	29		E	1.5			At base; 27° to 31°.
	10 10		5	E		1		At top.
	10 15		13	E	2			At base; 12° to 14°.
	9 37		13	W	1			In the middle of prominence; 11° to 15°.
21	9 34	78		W	0.5			At top.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		° A	° A	° A	
1939.								
March	22							
	9 25	78		E		1		At base.
	9 40		13.5	W		2		Do.
	9 33	23		W		0.5		Do.
	23							
	9 28	29		W		0.5		At top; 28° to 30°.
	9 26	55.5		W		81		In chromosphere.
	24							
	9 5	28.5		E	0.5	1		At top.
	9 2	18		E		0.5		In chromosphere.
	8 58		14	E		0.5		At top.
	9 21		19	W	1			Do.
	9 20		16.5	W	1	1		To red in the middle of prominence and to violet at top.
	25							
	9 29		13.5	W	1.5			At top.
	26							
	9 18		70.5	W			0.5	At base.
	9 16		21	W	0.5			At top; 20° to 22°.
	27							
	9 12	37		E		0.5		At base.
	28							
	9 12	9		E	1			Do.
	9 4	14		W			0.5	Over the whole prominence; 15° to 18°.
	30							
	8 31		59.5	E	0.5			In chromosphere.
	9 17		7	W	0.5			At base.
	9 17		5	W		1		At top.
	31							
	9 35		73.5	E		1.5		Do.
April	1							
	8 50	35		E		1		At top; 34° to 36°.
	8 40	27		E		1.5		At base; 26° to 28°.
	8 35		16.5	E		0.5		At base.
	9 30		4	E	0.5			In chromosphere.
	9 10		29	W	2			At top; 28° to 30°.
	2							
	8 48	51		E		0.5		At base.
	8 38		41.5	E		0.5		At top.
	8 58		16	W	0.5			Do.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		Å	Å	Å	
1939.								
April	3							
	9 5		2	E	1			At base.
	8 58		2	E	2			At top; 1° to 3°.
	8 50		10	E		0.5		In the middle of prominence; 9° to 11°.
	9 24	26		W	1			At top; 25° to 27°.
	4 8 58	51.5		E		0.5		At base.
	8 55	49.5		E		0.5		Do.
	9 20		19.5	E	1			Do.
	9 7	29		W	1			At top; 28° to 30°.
	9 7	32		W		0.5		In the middle of prominence; 31° to 33°.
	6 9 45		9	E	0.5			At base.
	7 9 10		23.5	E		1.5		At top; 22° to 25°.
	9 25		9	W	0.5			At top; 8° to 10°.
	8 9 00		7	E	1			At top.
	17 9 08	10		E			0.5	At middle.
	8 57		7.5	W	1			At base.
	8 50	48		W	0.5			At top.
	18 9 45		15	E	4			Do.
			15	E	3			At base. } 13° to 17°.
	9 18		21	E		0.5		Do.
	9 45		24	E		1.5		At top.
	9 36		13	W			1	At middle.
	9 34		11	W		0.5		At base.
	19 9 25	25		E		1.5		Do.
	9 08		14	E	3.5			At top; 12° to 16°.
	20 9 20	36		E	2			At top; 35° to 37°.
	9 20	36		E		1.5		At middle.
	9 22	29		E	0.5			At top; 28° to 30°.
	9 30		13	E		1		At top.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		Å	Å	Å	
1939.								
April	20	9 30		17	E	1.5		Over whole height; 16° to 18°.
		9 15		46.5	W		0.5	At top; 45° to 48°.
		9 02	10.5		W	1		At top.
		9 0	21		W	0.5		At base.
	22	9 08	32.5		E		0.5	At top.
		8 55		14	E	1		At base.
	23	9 12	26		E		0.5	Do.
	26	8 48		20	E		0.5	Do.
	27	10 10	14		E	1		At top.
		10 12	7		E	1		Do.
		10 04		19	W	1		Do.
		10 00	18		W	0.5		Do.
	28	9 03	52		E		0.5	In chromosphere.
		9 14		14	W	1		At top.
		9 10	23		W		0.5	At base.
	29	9 05	19		E	3		Do.
		9 05	8		E		1	Do.
		9 05	10		E	1		Do.
		9 20		6	W	1.5		Do.
	30	9 17		5	E	1		Do.
		9 43	84		W	2	1	At top.
May	1	9 40	12.5		E	1		In the middle of prominence; 11° to 14°.
		9 30	11.5		E		1.5	At top.
		9 20		17.5	W	0.5		At base; 16° to 19°.
	2	9 25	8		W	0.5		At top.
		9 25	13		W	0.5		Do.
		9 15	29		W		1	At base; 28° to 30°.
	3	9 12	11.5		E		0.5	At middle.
	4	10 7		18	W			At top.
		10 7		15	W	1		At middle.

PART III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		Å	Å	Å	
1939.								
May	4	10 18	15	W	1			At top.
		10 18	18	W		1		Do.
		10 24	28	W	3			Do.
		10 26	28	W			1	At base.
	5	9 15	29	E		0.5		At base; 28° to 30°.
	11	8 50	16.5	E	1.5			At base.
		8 40	25	W	1			At top; 24° to 26°.
		8 37	12	W		0.5		In chromosphere.
	12	8 57	8.5	W		0.5		At base; 7° to 10°.
	13	9 32	7	W	2	1		At base.
	17	9 45	28	E		0.5		At top.
		9 42	7	E		S1		Do.
	18	8 33	29	W	1.5			At top; 28° to 30°.
	19	8 45	38	E	0.5			At top.
		8 42	27	E	0.5			Do.
		8 40	8	E		1		At base.
		9 47	38	W		S1		Do.
	21	8 58	14	E	0.5			Do.
		8 58	16	E		1		At top.
		9 0	36	E		1		At top; 35° to 37°.
	22	8 42	21.5	W		1		At base.
		8 42	23.5	W	1			At top.
	23	11 0	38	E		0.5		At base.
	24	11 22	28	E		1		Over the whole prominence.
		11 20	58	E		2		At top.
	25	8 40	73	E		0.5		In chromosphere.
	28	10 9	6	E		0.5		At base.
		10 8	8	E		1		Do.
		10 25	15	W		0.5		Do.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JANUARY TO JUNE 1939—*conold.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		Å	Å	Å	
1939.								
May	20							
	10 25	17		W	0.5			At top.
	10 10	87		W		0.5		At base.
	29							
	10 7	16		E		1		At top.
	10 14		17.5	E	0.5	1		At base.
	10 14		24	E	1.5			At base; 23° to 26°.
	9 52	4		W	0.5			At top.
	30							
	9 0	64		W			0.5	In chromosphere.
	31							
	9 30	35		E		1		Over the whole prominence; 34° to 36°.
	9 30	29.5		E		1		Over the whole prominence.
	10 40	23.5		E		3		Over the whole prominence; 22° to 25°.
June	3							
	9 50	10		E			1	Over the whole prominence; 8° to 12°.
	10 11		53	W	1			At top.
	10 23	25		W		2		At base.
	4							
	10 54		17	W	1			At top.
	10 54		20.5	W	1			Do.
	5							
	8 52		50	E	0.5			At top; 40° to 51°.
	11							
	9 10	86		E	0.5			At top.
	10 15	6		E		51		At base.
	10 22		17	E		1		Do.
	10 22		17	E	1			At top.
	10 22		18	E	1			Do.
	15							
	9 2		6	W		51		At base.
	17							
	10 8	24		E		1		At top; 23° to 25°.
	25							
	9 28	71		E	0.5			In chromosphere.
	9 23		15.5	W	51			At base.
	27							
	9 2		7	E		2		At top; 6° to 8°.
	9 2		7	E	0.5			At base.
	8 56		57.5	W	1			At top; 56° to 59°.
	8 49	11.5		W			1	At base.

There were 266 displacements as against 136 in the previous half-year and they were distributed as follows

	North.	South.
0°—30°	105	98
31°—60°	25	15
61°—90°	19	4
Total	149	117
East limb		130
West limb		136
Total		266

Of these 146 were towards the red, 111 towards the violet and 9 both ways simultaneously.

Reversals and displacements on the sun's disc.

Five hundred and sixty two bright reversals of the H α line, 391 dark reversals of the D₂ line and 29 displacements of the H α line were observed with the spectroscope during the half-year under review. Their distribution is shown below .

	North.	South.	East.	West.
Bright reversals of H	257	305	271	291
Dark reversals of D ₂	182	209	198	193
Displacements of H α	14	15	7	22

The displacements towards the red numbered 12, those towards the violet 8 and those both ways simultaneously 9.

During the half-year eruptive prominences were photographed on February 6 and May 2 and 31. All of these were on the N. E. limb. On February 6, there were two eruptive prominences at latitudes 13° and 24° which rose to heights of about 8' and 10' respectively. The prominence of May 2, rose to a height of more than 6' and was associated with the spot group (Kodaikanal No. 7049). A height of about 7' was measured in the case of the prominence of May 31.

The Hale spectrohelioscope was used daily (except on Sundays and holidays) for observation in the H α line of changing phenomena and displacements on the sun's limb and disc. As in previous years these observations were made normally at the hours allotted by the International Astronomical Union to this observatory for this purpose, but were also continued outside of these routine hours on occasions when there were interesting phenomena in progress.

The displacements observed with the spectrohelioscope in the prominences and in the H α dark and bright markings are summarised below :—

	East limb.	West limb.	Total.		
Displacements in prominences	61	72	133		
	North.	South.	East.	West.	Total.
Displacements in H α dark markings	34	32	34	32	66
Displacements in H α bright flocculi	4	2	4	2	6
	Displacements towards				Total.
	Red.	Violet.	Bothways.	Total.	
Prominences	70	63	..	133	
H α dark markings	39	27	..	66	
H α bright flocculi	4	2	..	6	

The particulars of the bright chromospheric eruptions observed during the half-year are given in the following Table.

TABLE IV.—LIST OF BRIGHT CHROMOSPHERIC ERUPTIONS—JANUARY TO JUNE 1939.

Date.	Time I. S. T.			Mean Latitude.	Mean Longitude from C. M.	Intensities according to area.	Remarks.
	Beginning.	Maximum.	End.				
	H. M.	H. M.	H. M.	°	°		
3rd March 1939 .	8 20	8 30	9 5	—21	26 W	2	
3rd March 1939 .	10 0	10 10	11 0	—15	28 W	..	
5th April 1939 .		9 39		+13	12 W	1	
16th April 1939 .		9 37		+13	4 W	2	From spectroheliogram.
19th April 1939 .	9 7	9 25	9 40	+13	44 W	2	
19th April 1939 .		9 0		+12	14 E	2	
21st April 1939 .		13 46		—17	8 W	2	From spectroheliogram.
21st April 1939 .		14 30		—17	70 E	1	
5th May 1939 .	8 15	9 25	10 0	+14	3 E	2	At 4 different points in the same region (intensities, 2, 1, 1, 1).
24th May 1939 .		10 24		—11	5 E	2	From spectroheliogram.
29th May 1939 .		11 20		+23	28 W	2	
24th June 1939 .		14 52		+13	53 W	2	From spectroheliogram.
25th June 1939 .		8 14		+12	62 W	1	From spectroheliogram. (At two points in the same region. Intensities 1 and 1).

Of these eruptions that of the March 3rd was the brightest and the largest one. Its intensity at maximum was 4 times that of the undisturbed disc and its total area amounted to about 500 millionths of the sun's hemisphere. In addition to following the progress of the eruption with the spectrohelioscope, a series of 43 spectroheliograms in H α light were obtained in rapid succession at intervals of about one minute each.

Prominences projected on the Disc as Absorption Markings.

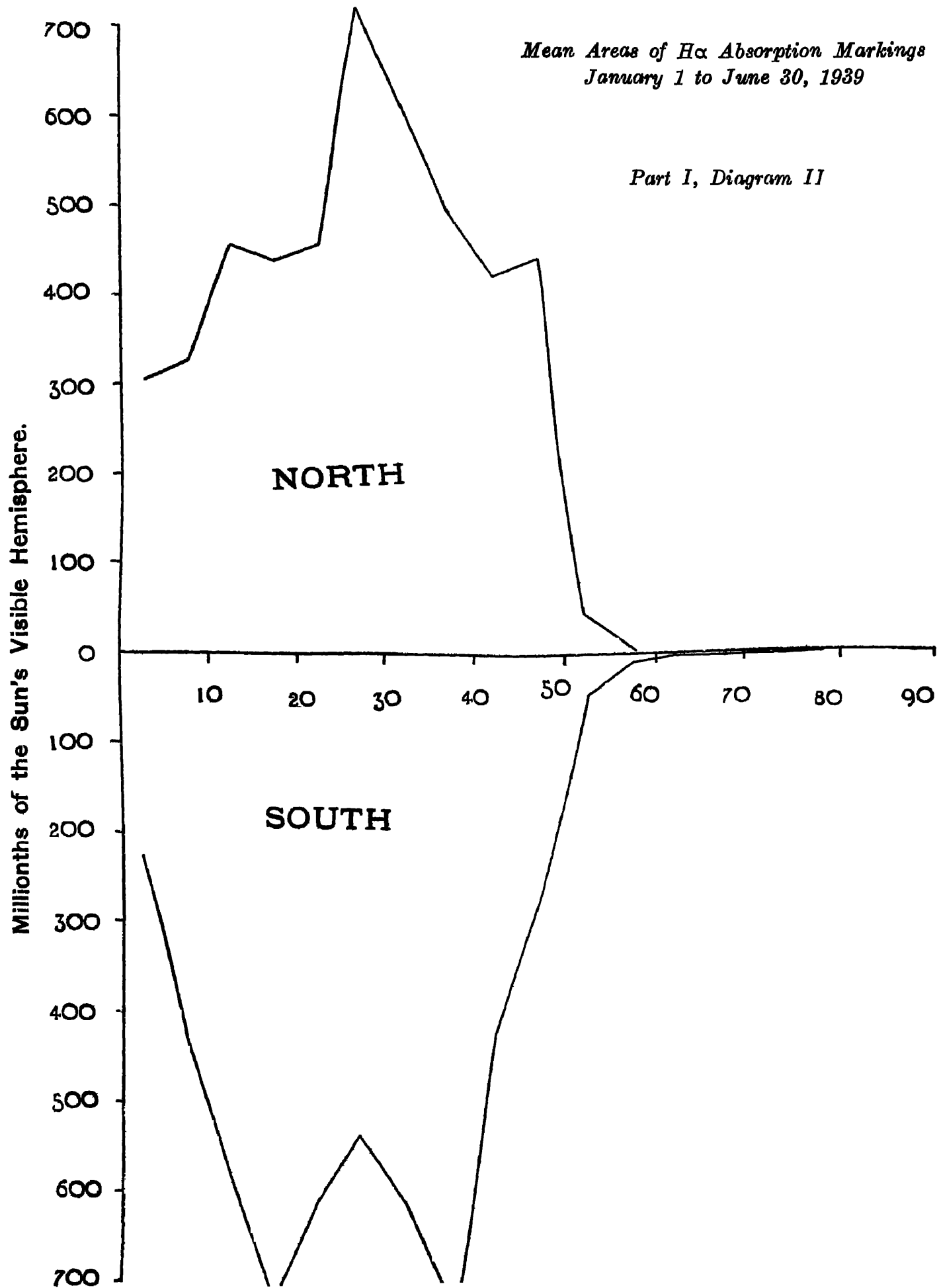
Photographs of the sun's disc in H α light were obtained during the half-year on 155 days which were reckoned as 144 effective days. The mean daily areas of H α absorption markings (corrected for foreshortening in millionths of the sun's visible hemisphere and their mean daily numbers are given below :—

	Mean daily areas.	Mean daily numbers.
North	4706	22.95
South	5203	23.08
Total	9909	46.03

The above figures show a decrease of 6 per cent. and 10 per cent. in areas and numbers respectively over those of the previous half-year.

The distribution of the mean daily areas in latitude is shown in the following diagram. Compared with the previous half-year, the peak of activity in the northern hemisphere has advanced 5° towards the pole, while the

two peaks in the southern hemisphere have advanced 5° towards the equator. As in the case of prominences on the limb, the activity is mainly confined from the equator to about 55° of latitude in both the hemispheres.



Both areas and numbers show an eastern defect, the percentage east being 47.58 for areas and 49.78 for numbers.

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

	Mean daily areas.
North	2571
South	3013
Total .	<hr/> 5584 <hr/>

The uncorrected areas amount to 56 per cent. of the corrected ones. The curve of distribution in latitude is as usual similar to that of the corrected areas.

PART II.

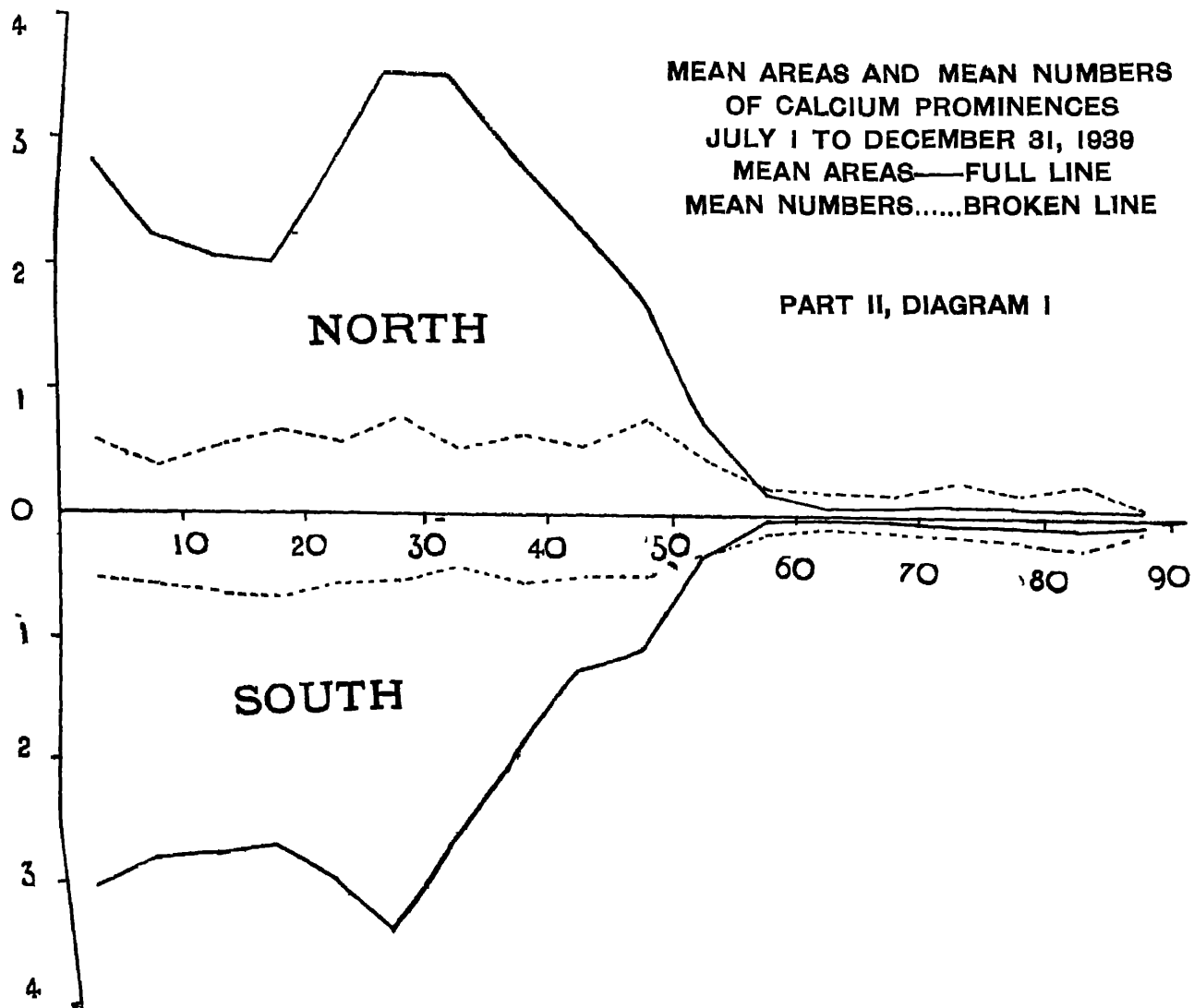
SUMMARY OF PROMINENCE OBSERVATIONS FOR THE SECOND-HALF OF THE YEAR 1939.

Calcium prominences at the limb.—The mean daily areas and numbers of prominences for the second-half of 1939 are given below. These means are corrected as usual for incomplete or imperfect photographs, the total of 142 days for which photographs were available being reduced to 124 effective days.

	Mean daily areas (square minutes).	Mean daily numbers.
North	2.76	7.62
South	2.66	7.04
Total	5.42	14.66

When compared to those of the first-half of the year, these figures show an increase of 17 per cent. both in areas and numbers.

The distribution of prominences in latitude is represented in the following diagram. When compared with the previous half-year, the peak of activity has moved 5° towards the equator in the northern hemisphere and that in the southern hemisphere has advanced 5° towards the pole and has become more prominent.



The monthly, quarterly and half-yearly areas and numbers and the mean height and the mean extent of prominences are given in Table I.

TABLE I.—ABSTRACT FOR SECOND-HALF OF 1939.

Months.	Number of days (effective).	Areas.	Numbers.	Daily means.		Mean Height	Mean extent.
				Areas.	Numbers.		
1939.						"	"
July	16½	85.9	247	5.29	15.20	37.83	5.94
August	22	116.7	355	5.31	15.21	39.58	5.87
September	25½	147.1	395	5.77	15.49	34.49	5.64
October	19½	110.3	300	5.66	15.38	36.90	6.51
November	15½	90.8	220	5.86	14.84	42.39	6.76
December	25½	120.7	321	4.78	12.71	39.45	6.49
3rd Quarter	63½	349.7	977	5.49	15.33	37.08	5.79
4th Quarter	60½	321.8	841	5.34	13.96	39.31	6.57
2nd Half-Year	124	671.5	1818	5.42	14.66	38.11	6.15

Distribution east and west of the sun's axis.

July to December 1939.	East.	West.	Percentage East.
Total number observed	922	896	50.72
Total areas in square minutes	321.1	350.4	47.52

The areas show a decrease at the east limb and the numbers a slight increase, as is seen from the above table.

Metallic Prominences.

The details of the 37 metallic prominences observed during the half-year are given in the following table. The key to the wavelengths of the metallic lines is the same as that given in Part I.

TABLE II.—LIST OF METALLIC PROMINENCES—JULY TO DECEMBER 1939.

Date.	Time I. S. T.	Base.	Latitude.		Limb.	Height.	Lines.
			North.	South.			
1939.	H. M.	°	°	°		"	
August 1	9 37			35	W	20	4 and 10.
2	10 0	1		19.5	W	10	4 and 10.
20	9 35	1	14.5		E	20	4 and 10.
28	8 44		11		W	20	4 and 10.

TABLE II.—LIST OF METALLIC PROMINENCES—JULY TO DECEMBER 1939—*contd.*

Date.	Time I. S. T.	Base.	Latitude.		Limb.	Height.	Lines.
			North.	South.			
1939.	H. M.	°	°	°		'	
September	1	9 07	3	17.5	E	25	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
	2	9 5	2	24	E	15	4 and 10.
	3	9 32	5	12.5	E	15	4 and 10.
	4	9 15	3	14.5	E	15	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
	5	9 10	2	7	W	10	4 and 10.
	7	9 50	5	14.5	W	55	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
	8	10 0	4	4	E	15	1, 2, 3, 4, 5, 6, 8, 10, 11 and 12.
		9 35	7	26.5	W	60	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
	9	9 55	1	5.5	E	10	4 and 10.
		9 55		11	E	10	4 and 10.
	15	10 55	2	18	E	10	4 and 10.
		10 55	2	20.5	E	20	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
		11 0	2	33	E	15	4 and 10.
	22	8 52	2	4.5	E	10	4 and 10.
		8 52	2	8	E	10	4 and 10.
		9 0	6	26	E	10	4 and 10.
		8 37	2	8	W	10	4 and 10.
	24	8 55	3	16.5	E	20	4 and 10.
		8 55	2	12	E	10	4 and 10.
October	5	9 15	3	0.5	W	20	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
	6	9 35	11	0.5	E	15	4 and 10.
		9 35	2	9	E	20	4 and 10.
		9 22	4	9	W	10	4 and 10.
	9	8 43	5	22.5	W	15	4 and 10.
	20	10 33	2	8	E	10	4 and 10.
October	24	9 10	1	23.5	E	20	4 and 10.
		9 7	3	20.5	W	10	4 and 10.
November	21	10 18	3	11.5	W	10	4 and 10.
December	6	9 15	1	14.5	W	10	4 and 10.
		9 15	1	10.5	W	10	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.
	17	9 30	1	19.5	E	10	4 and 10.
	19	9 7		13	W	10	4 and 10.
		8 56	6	19	W	20	1, 2, 3, 4, 5, 6, 8, 9, 10, 11 and 12.

The distribution of metallic prominences was as follows :—

	1°—10°	11°—20°	21°—30°	31°—40°	Mean latitude.	Extreme latitudes.
North	1	8	14°·6	0°·5 and 23°·5
South	10	11	5	2	14°·8	0°·5 and 35°

Of these, twenty-one were on the east limb and 16 on the west limb.

Displacements of the Hydrogen line.

Particulars of displacements observed in the chromosphere and the prominences are given in Table II below.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JULY TO DECEMBER 1939.

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both-ways.	
	H. M.	°	°		Å	Å	Å	
1939.								
July	6	9 50	46	E	0·5			In chromosphere.
		9 44	1·5	W		1		At top; +4° to -1°.
		9 42	22	W	0·5			At base.
	7	9 28		39	W		0·5	Do.
	16	9 55		17	W		0·5	At top.
	18	9 5	30	W			1	At base; 29° to 31°.
		9 5	30	W	2			At top; 29° to 31°.
	22	11 57	85	E	1			At top.
		11 57	85	E			0·5	At base.
	25	9 17		14	E		1	In the middle of prominence; 13° to 15°.
		9 17		14	E		1·5	At base; 13° to 15°.
		9 17		14	E		1	At top; 13° to 15°.
		9 7		35·5	W		81	In the middle of prominence.
	26	9 23	82	W	1			At base.
		9 23	82·5	W			1·5	At top.
	27	8 50	17·5	W	1·5			Do.
		8 50	21	W			0·5	At base.
	31	8 41		7·5	W		1·5	At top.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JULY TO DECEMBER 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		Å	Å	Å	
1939. August	1	9 42	15.5	E		1		At top.
		9 42	14	E	1.5			At base; 12° to 16°.
		9 37		35	W	1	0.5	To red at top and to violet at base.
	2	9 18		25	W		0.5	At base.
		9 20		19.5	W	2		Do.
		9 30	17.5		W		1	At top.
	3	9 0	24		E		1	Do.
		8 52		22	W	1		Do.
		8 42	48		W	0.5		Do.
	4	8 57	14		E		0.5	In the middle of prominence; 1 to 15°.
		8 47		5	W	0.5		At base.
		8 43	20		W	0.5		At top.
	6	11 16	13		E	1		At base.
	10	10 32		18	E		3	At top; 14° to 18°.
	20	9 35	14.5		E	2.5	1.5	To red at top and to violet at base.
	22	8 37	75		E		0.5	In chromosphere.
		8 46		18	W		S1	At base.
	23	9 45		10	E	1		At top; 9° to 11°.
		10 10		81	W		S1	At base.
	24	8 50		9	W		1	At top; 7° to 11°.
		8 45	24		W	1		At base; 23° to 25°.
		8 45	31		W		2	In the middle of prominence.
	25	9 40		21	E		1	Do.
	26	9 45		16	E		1	At top.
		9 24		19	E	S1		At base.
	27	9 9		8	E		2	Over the whole prominence.
	28	9 0		36	E	1	1.5	To red at base and to violet at top; 35° to 37°.
		8 44	11		W	1.5	2.5	To red at top and to violet at base.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JULY TO DECEMBER 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		Å	Å	Å	
1939.								
August 28	8 44	13		W	1.5			At top.
29	11 16		21	E		1		At base; 20° to 22°.
	11 16		26	E	1			At base.
	9 24	14		W			0.5	Do.
31	8 55	11.5		E		1		At top.
	9 9		48	E	51			In chromosphere.
	8 48		24.5	W		1.5		At top; 23° to 26°.
	8 48		20	W	0.5			At top.
	8 42	29		W			1	At top; 23° to 30°
September 1	8 42	67		E	51			At top.
	9 7		16	E		1		Do.
	9 7		18	E	4			At base.
	9 7		17	E	2			Do.
	9 7		19	E		1.5		At top.
	10 0		19	E		2.5		Do.
	9 17		21	E		1		Do.
	9 13		18.5	E		2		At top; 17° to 20°.
	9 13		18	E	2			In the middle of prominence.
	9 20		19	E		4		Do.
	9 25		20	E		9		At top.
	9 25		19	E	6			At base.
2	9 1		18.5	E		51		At top.
	9 0		23.5	E	2	1		To red at base and to violet at top.
3	9 32		13	E	1			At base.
	9 32		11	E	0.5			Do.
	9 32		12.5	E		1		At top.
4	9 15		14.5	E	1.5			At base; 13° to 16°.
	9 16		18.5	E	1			At top; 17° to 20°.
5	9 10		7	W		1		In the middle of prominence; 6° to 8°.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JULY TO DECEMBER 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		Å	Å	Å	
1939.								
September	5	9 0	4	W		0.5		At base.
	6	9 55		E	1			Do.
		9 55		E	1			Do.
	7	10 5		E	1			At top; 16° to 18°.
		9 50		W			2	Over the whole height of promi- nence.
		9 45	3	W	1			At top.
	8	10 0		E	1			At base; 2° to 4°.
		10 0		E		1		At top; 3° to 6°.
		10 5		E		0.5		At top.
		10 5		E	0.5			At base.
		9 38		W		2		At base; 28° to 30°.
		9 36		W		4		At base; 28° to 30°.
		9 36		W		2		In the middle of prominence 28° to 30°.
		9 36		W		1.5		At top.
		9 28		W	1	2		To violet at base and to red at top.
		9 27		W		1		At base.
	11	9 57	1	E	1			Do.
	14	10 9		W			1	At base; 26° to 28°.
	15	10 55		E		1		At top; 19° to 21°.
		11 2		E	1			At base; 18° to 21°.
		10 30		W	0.5			At top.
	16	10 55		E			1	Do.
		10 40		W	2.5			Do.
		10 40		W	1.5			Do.
	22	8 52	7.5	E		0.5		At top; 6° to 9°.
		8 52		E		2.5		At top; 5° to 7°.
		8 37		W	0.5			At top.
	24	8 55	16.5	E		1		At top; 15° to 18°.
	26	11 22	57.5	E		1		At top.
		11 23	36.5	E	0.5			At base; 35° to 38°.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JULY TO DECEMBER 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both ways.	
	H. M.	°	°		Å	Å	Å	
1939. September	26		86	W		0.5		At base.
	11 20							
	11 16		15.5	W	1			At top.
	27	10		E			1	Do.
	10 6	12		E	2			Do.
	30		12	E			81	At base.
October	1		30	E	2	1.5		To red at base and to violet at top; 29° to 31°.
	10 9	4		W	0.5			In chromosphere.
	5	9.5		W	1	2		At base; -1° to +2°.
	6	65		E	1			At base.
	9 24		14	W	2.5			At top.
	9 22		12	W		2.5		At base.
	9 22		9	W		2		At middle.
	9	8 58	21	E		1		At top; 20° to 22°.
	8 43	24		W			0.5	23° to 25°.
	10	9 12	31	W	1			At top.
	13	9 46	27	W	0.5			Do.
	20	10 22	26	E		0.5		At base.
	10 27	8.5		E		1		At middle; 7° to 10°.
	10 3	83		W	1			At top.
	22	9 24	17	W	0.5			At base.
	24	9 23	83	E			1	
November	4	9 53	77	E	0.5			At top.
	21	10 7	84	E	0.5			At base.
	10 14	40		W	0.5			In the middle of prominence.
	24	8 56	32	E	0.5			At base; 31° to 33°.
	9 48		0.5	W	1			At base.
	25	9 20	31.5	E	2	1		To red at base and to violet at top.
	9 15	16.5		E	4			Over the whole prominence; 14° to 19°.
	26	8 45	54	E	0.5			At base.
	27	9 12	19	W	0.5			At top.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JULY TO DECEMBER 1939—*contd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		Å	Å	Å	
1939.								
November 28	8 32	52		W	0.5			In the middle of prominence.
29	9 0	9		E		1		At top.
	8 57		16	E			S1	In chromosphere.
	9 15		22.5	W	1			At top.
30	8 50		48	E	S1			At base.
December 1	9 20	39		W	0.5			At top.
4	8 47		20.5	W	0.5			At top ; 19° to 22°.
6	9 15		14.5	W	1			At top.
7	8 42	5		E		2		At top ; 3° to 7°.
8	8 50	45		E		0.5		At base.
	9 10	6		E		1		In the middle of prominence.
10	8 55	50		E	0.5			At base ; 49° to 51°.
	8 56	32.5		E	1.5			At top.
	8 58		16	E		1		Do.
	9 0		33	E		1		At top ; 32° to 34°.
11	8 56	25		E		1		At top.
14	8 33	22		W		1		At top ; 21° to 23°.
16	8 55	15		E	1			At top.
	8 55	9		E		S1		In chromosphere.
17	9 16		5	W	1			At top.
19	9 3	11		W	2			Do.
	8 52	17		W		1		At base ; 16° to 18°.
	8 52	17		W		4		At base ; 16° to 18°.
	8 52	17		W	2			At top ; 16° to 18°.
	8 52	21		W		2		At base ; 20° to 22°.
	8 47	40		W	0.5			At top.
20	9 10		19	E		0.5		Do.
	9 29		16	W	S1			Do.
21	8 43		18	W	1			Do.
24	8 53		6	W	1			At top ; 5° to 7°
26	9 13	9.5		E		2		At top.

TABLE III.—DISPLACEMENTS OF THE HYDROGEN LINE—JULY TO DECEMBER 1939—*concl'd.*

Date.	Time I. S. T.	Latitude.		Limb.	Displacement.			Remarks.
		North.	South.		Red.	Violet.	Both- ways.	
	H. M.	°	°		Å	Å	Å	
1939.								
December. 26	9 8		35	E		51		At top.
	9 30		5	W		1		At base; 4° to 6°.
27	9 5		28.5	W	2			At top; 27° to 30°.
	9 5		35.5	W	3			At top; 34° to 37°.
29	9 45	36		E		0.5		At top.
	9 30	44		W	1			Do.
30	10 16	36		E	0.5			At base.
31	9 2		27	E		1.5		At top; 26° to 28°.
	8 50	1		W	1			At top; 0° to 2°.
	8 50	18		W		1		At base.

The total number of displacements was 185 as against 266 in the previous half-year and their distribution was as follows:—

	North.	South.
0°—30° : : : : : : : : : : : : : : : : .	54	84
31°—60° : : : : : : : : : : : : : : : : .	19	14
61°—90° : : : : : : : : : : : : : : : : .	9	5
	Total	103
East limb : : : : : : : : : : : : : : : : .		98
West limb : : : : : : : : : : : : : : : : .		87
	Total	185

Ninety-two were towards the red, 84 towards the violet and 9 bothways simultaneously.

Reversals and displacements on the sun's disc.

Four hundred and one bright reversals of the H α line, 329 dark reversals of the D₂ line and 35 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 : : : : : : : : : .	154	247	205	196
Dark reversals of D ₂ : : : : : : : : : .	121	208	179	50
Displacements of H α : : : : : : : : : .	7	28	17	18

Twenty-two displacements were towards the red, 5 towards the violet and 8 bothways simultaneously.

An eruptive prominence was photographed on September 1 on the S. E. limb at latitude 18°. Though the prominence attained a maximum height of only 5', yet it showed very large Doppler displacements of 9 Å to violet and 6 Å to red at the top and base respectively. The prominence was connected with the active spot group (K. K. L. No. 7157). A prominence of very large extent and area was photographed on December 1. Its base extended from 36° N to 38° S on the west limb. Its height was only 80", but the area it covered was nearly 10 square minutes of arc.

Other important phenomena noted during the period are the breaking up of H α dark markings. Instances of breaking up of markings were observed on August 26 and September 2 and 12. The last of these was remarkable in as much as a big marking which was observed for a number of days, completely disappeared with great suddenness leaving a bright marking in its place.

Observations with the Hale Spectroheliograph.

The displacements observed with the spectroheliograph during the second-half of 1939 are summarised below.

	East limb.		West limb.		Total.
	North.	South.	East.	West.	Total.
Displacements in prominences	75		74		149
Displacements in H α dark markings	53	99	81	71	152
Displacements in H α bright flocculi	8	23	18	13	31

	Displacements towards.			Total.
	Red.	Violet	Bothways.	Total.
Prominences	84	64	1	149
H α dark markings	90	62	..	152
H α bright flocculi	18	13	..	31

The following table gives the particulars of the bright chromospheric eruptions observed during the half-year :—

TABLE IV.—LIST OF BRIGHT CHROMOSPHERIC ERUPTIONS—JULY TO DECEMBER 1939.

Date.	Time I. S. T.			Mean Latitude.	Mean Longitude from O. M.	Intensities according to area.	Remarks.
	Beginning.	Maximum.	End.				
	H. M.	H. M.	H. M.	°	°		
10th July 1939 .		15 56		+7	36 W	1	From spectroheliogram.
Do. .		15 56		—6	19 W	1	Do.
17th July 1939 .		7 58		+20	41 E	1	Do.
8rd August 1939 .		7 57		+15	53 E	1	Do.
23rd August 1939 .		10 13		+10	12 W	1	Do.
							At two points in the same region, (Intensities 1 and 1).
24th August 1939 .		8 28		+11	26 W	1	From spectroheliogram.
26th August 1939 .		9 54		—12	38 E	1	Do.
Do. .		8 35		+15	6 W	1	
28th August 1939 .	11 8	11 25	11 40	—16	46 E	1	
29th August 1939 .		10 49		—15	38 E	1	From spectroheliogram.
30th August 1939 .	11 30	11 55	12 23	—13	26 E	3	
31st August 1939 .		7 48		—16	13 E	1	From spectroheliogram. At two points in the same region, (Intensities 1 and 1).

TABLE IV.—LIST OF BRIGHT CHROMOSPHERIC ERUPTIONS—JULY TO DECEMBER 1939—*contd.*

Date.	Time I. S. T.			Mean Latitude.	Mean Longitude from C. M.	Intensities according to area.	Remarks.
	Beginning.	Maximum.	End.				
	H. M.	H. M.	H. M.	°	°		
1st September 1939	8 25	8 45	9 30	-15	1 W	2	
2nd September 1939	8 10	8 28	8 35	-15	13 W	1	
Do.	10 5	10 12	10 30	-15	13 W	2	
Do.	—	10 50	11 0	-15	13 W	2	
3rd September 1939		8 38		-12	22 W	1	From spectroheliogram. At two points, (Intensities 1 and 1).
5th September 1939	9 45	9 50	10 15	-15	75 E	1	
6th September 1939	8 17	8 27	9 0	-14	70 W	2	
Do.	8 32	8 37	9 0	-13	57 E	2	
Do.	9 28	9 36	9 40	-13	57 E	2	
Do.	9 45	9 50	11 50	-13	57 E	2	
7th September 1939		7 54		-13	45 E	2	From spectroheliogram.
Do.		8 0		-12	80 W	1	
9th September 1939	8 17	8 32	9 40	-15	15 E	2	
Do.	9 47	9 53	10 0	-12	17 E	1	
10th September 1939		9 32		-14	C. M.	2	From spectroheliogram.
11th September 1939		10 5		-14	12 W	1	Do. At two points in the same region, (Intensities 1 and 1).
15th September 1939	—	10 55?	11 30	-15	68 W	1	
23rd September 1939	..	11 0?	11 25	-21	15 W	2	
30th September 1939	—	8 35?	8 50	+17	30 E	1	
Do.		10 0?		-7	32 W	2	
Do.		10 30?		-13	65 E	1	
1st October 1939		9 57		-5	42 W	1	From spectroheliogram.
Do.		9 57		-8	22 W	1	Do.
Do.		9 57		-18	37 W	1	Do.
8th October 1939		8 11		-5	55 E	2	Do.
9th October 1939		7 54		-5	45 E	1	Do.
Do.		7 54		-15	32 E	1	Do.
Do.		7 54		-20	65 E	1	Do.
10th October 1939	11 20	11 25	11 40	-20	50 E	1	
12th October 1939		13 42		+20	30 E	1	From spectroheliogram.
Do.		13 42		-5	4 W	1	Do.

TABLE IV,—LIST OF BRIGHT CHROMOSPHERIC ERUPTIONS—JULY TO DECEMBER 1939—*conold.*

Date.	Time I. S. T.			Mean Latitude.	Mean Longitude from C. M.	Intensities according to area.	Remarks.
	Beginning.	Maximum.	End.				
	H. M.	H. M.	H. M.	°	°		
22nd October 1939 .		8 2		+13	30 E	1	From spectroheliogram.
23rd October 1939 .	—	8 31	8 50	+15	18 E	1	
Do.	—	9 30	9 45	—7	42 E	2	
Do.	—	11 15	11 24	—15	70 E	1	
24th October 1939 .		8 6		—8	30 E	2	From spectroheliogram.
Do.		8 6		+15	3 E	1	Do.
25th October 1939 .		8 27		—7	16 E	2	Do.
27th October 1939 .		13 15		—10	15 W	2	Do.
28th October 1939 .		9 12		—10	25 W	1	
29th November 1939	—	9 50	10 53	—7	2 E	1	
30th November 1939		8 7		—7	9 W	2	From spectroheliogram.
1st December 1939		9 13		—7	23 W	2	Do.
16th December 1939	—	9 45	10 10	—29	12 E	1	
19th December 1939		8 36		+22	24 W	1	From spectroheliogram.
21st December 1939		9 35		+20	50 W	1	Do.
Do.		9 35		—21	37 E	1	Do.
25th December 1939		8 10		—22	15 W	1	Do.
Do.		8 20		—12	17 E	1	Do.

It will be seen from the above list that the period from the 26th August to 15th September was very active, no less than 23 eruptions having been recorded during the interval. The activity was mainly confined to the neighbourhood of Latitude 15° S and was associated with the three spot groups, Kodaikanal Nos. 7152, 7157 and 7159. Large Doppler displacements amounting to as much as 2·4 Å were frequently observed in the eruptive areas.

Prominences projected on the Disc as Absorption Markings.

Photographs of the sun's disc in H α light were obtained during the second-half of 1939 on 129 days which were counted as 116½ 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	4656	24·66
South	4867	27·82
Total	9523	52·48

The above figures show that there has been a decrease of 4 per cent. in areas and an increase of 14 per cent. in numbers when compared with those of the first-half of the year.

The distribution of mean daily areas in latitude is shown in the following diagram. When compared with the diagram for the first-half of the year, it is seen that the peak in the northern hemisphere in the latitude zone 25°-30° has now become less prominent. In the southern hemisphere a single peak of very high activity is shown at latitude 15° in the place of the two peaks exhibited in the previous half-year.

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

		Mean daily areas.
North	: : : : : : : : : : : : : : : : :	2551
South	: : : : : : : : : : : : : : : : :	2693
	Total	<u>5244</u>

The uncorrected areas amount to 55 per cent. of the corrected ones. The curve of distribution in latitude is as usual, similar to that of the corrected areas.

*Mean Areas of H α Absorption Markings
July 1 to December 31, 1939*

Part II, Diagram II

