

ERRATA FOR KODAIKANAL OBSERVATORY BULLETIN NO. CLXIV

Part I.

Page.	Date	Column	for	read
357	August 1960	3	152.2	152.1
	September	7	38.73	38.74
	October	3	143.4	142.4
	December	3	150.4	150.3
	3rd quarter	3	386.9	386.8
	4th quarter	3	390.0	388.9
	2nd half year	3	776.9	775.7
	July-December 1960	Total areas East	3696.5	369.7
		(Sq. minutes) West	4060.5	406.0
358	1960 August 8.	4	50.05	05.05
361	1960 July-December	Total area East	5940	3,71,250
		West	6760	4,22,500

Part II

Page No.	Date/line	Column No.	for	read.
364	13	12	37.3	37.0
366	7	12	83.3	38.3
366	Mean ††	13	36.3	36.8
366	2	14	38.8	38.3
366	7	14	83.3	38.3
366	7	14	38.1	39.1
369	Mean ††	3	36.3	36.3
375	Mean ††	1	36.3	Hours
375	Mean ††	1	36.3	35.5
376	Mean ††	1	36.3	527
377	Mean ††	44 & 13	36.3	H.M.
378	Mean ††	13	42.3	54
380	Mean ††	13	52.3	623
381	Mean ††	13	59.3	695
385	Mean ††	13	47.4	514
385	Mean ††	13	33.7	383
385	Mean ††	13	33.7	528
385	Mean ††	13	33.7	497
386	Mean ††	13	33.7	549

Part III.
(Ionospheric data)

Page No.	Date/line	Column/Hour	for	Read.
404	23	1030	10.0H	11.1H
	29	0430	3.9	2.4
	30	1030	9.5	5.2
405	21	1430	10.9	10.8
425	4	1330	2.0	3.7
	19	1230	3.4	2.4
428		0930, 1030 &	LM	LH
		1130		
429	31	1230	L	35
	Count	1630	1	-
435	6	17	110	100
437	30	09	2.25	2.25
438	24	05	3.7R	3.7V
462	6	07	8.C	3.0

Page No.	Date/line	Column/Hour	for	read.
466	13	06	1.1	2.1
488	7	0530	4.10	3.10
512	Count	0630	30	29
552	Count	0630	11	14
565	24	1830	V80	380
570	2	07	501	105
	Count	11	260	29
578	11	01	U11.80	U11.60
589	1 to 5	1230	3	A,3.8,A,A,A
590	16	11	7.	7.8
	20	11	8.8	8.4
	22	11	G4	G
592	Count	-	Count	Mean
	Mean		Mean	Count
606	24	09	220	210
618	25	10	5.90	2.90
	29	11	5.60	2.60
634	3	11	9.8	9.0
638	Characteristic	-	foEs	fbEs
	Count	11	99	29
640	30	1030	483	4.3
641	Count	1230	2.7	27
652	5	0630	235	240
655	13	16	106	110
662	19	08	27.1	2.70
	21	08	2.05H	2.60H
	Mean	02,	2.25	3.25

Kodaikanal Observatory

Bulletin No. CLXIV

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PART I

Summary of prominence observations for the Second Half of 1960

The results of observations of prominences made at Kodaikanal Observatory during the second half of 1960 supplemented by data computed from photographs supplied by Mount Wilson and Meudon Observatories for those days on which Kodaikanal had imperfect or no observations are summarised in this Bulletin.

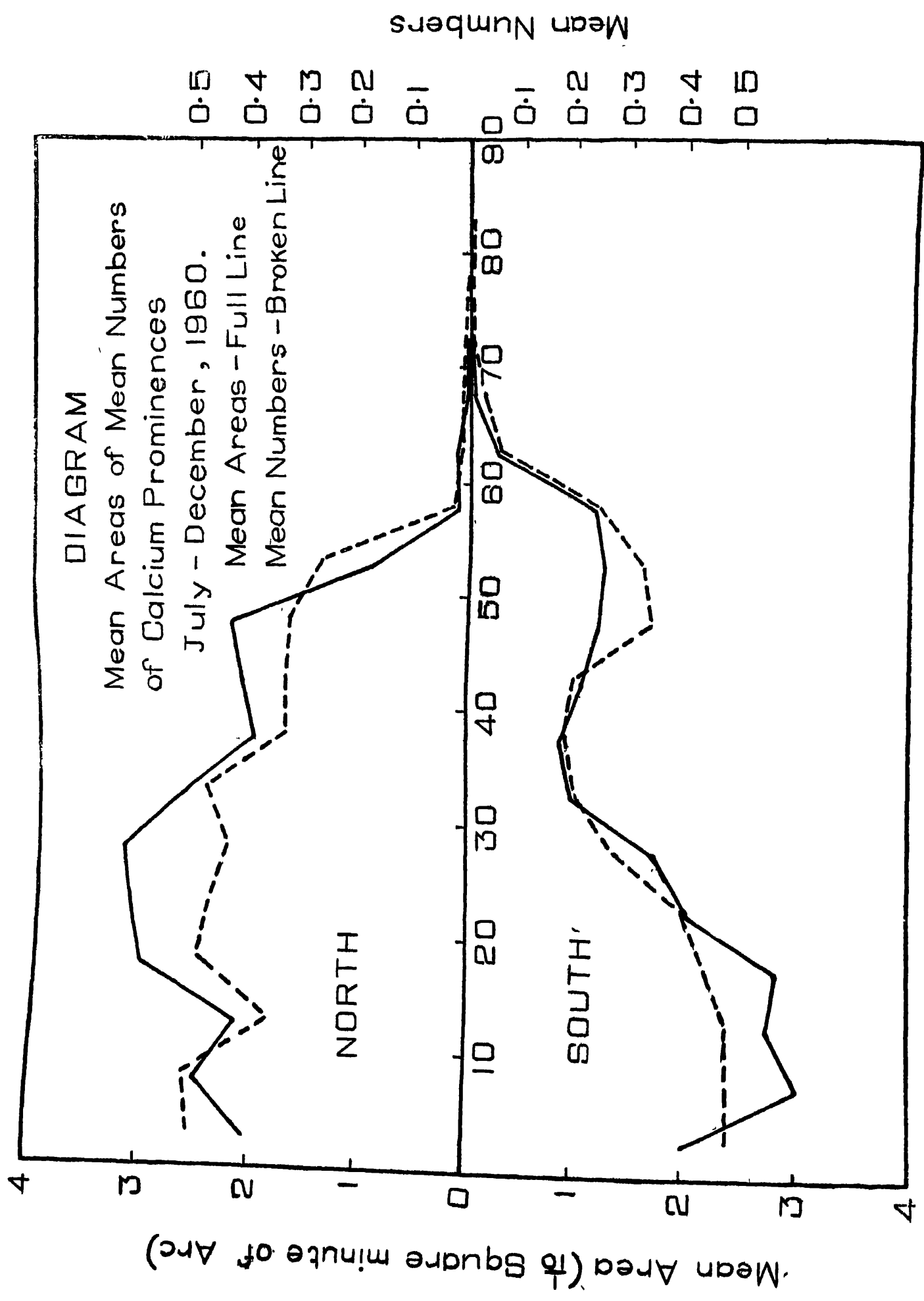
Calcium prominences on the limb.—During the half-year under review photographs of calcium prominences at the limb were obtained at Kodaikanal on 106 days which were counted as 96½ effective days after giving due weightage to the photographs according to their quality. Spectroheliograms for 62 days were obtained from Mount Wilson Observatory and for 56 days from Meudon Observatory. In all, complete observations were available for 161¼ effective days

The mean daily areas (in sq minutes of arc) and the mean daily numbers of prominences derived from the above records are given below :

		Combined data	
		Mean daily areas (in sq minutes of arc)	Mean daily numbers
North	2.67	4.65
South	2.14	4.14
Total	4.81	8.79

The figures, when compared with the corresponding values of the previous half-year show an increase of activity, the increase being 32.5% in areas and 25.03% in numbers.

The distribution of areas and numbers in five-degree ranges of latitude as obtained from the combined data is represented in diagram I.



The peak of activity in the northern hemisphere is centered in the latitude belt 20° — 30° . In the southern hemisphere, the peak of activity is in the latitude belt 5° — 10° .

The monthly, quarterly and half-yearly areas, numbers, heights and extents of prominences as derived from all available records are tabulated below :

1960 months	No. of effective days	Area (sq. minutes)	Numbers	Daily means			Mean Extent
				Area (sq. minutes)	Numbers	Mean height	
1	2	3	4	5	6	7	8
July	28	139.0	226	4.96	8.14	54.01	3.95
August	29½	152.2	297	5.12	9.98	50.10	3.16
September	27½	95.7	238	3.51	8.74	38.73	2.84
October	27	143.4	261	5.31	9.67	49.71	3.59
November	22	96.2	157	4.38	7.13	46.40	3.72
December	27½	150.4	239	5.52	8.77	49.50	4.16
3rd quarter	85	386.9	761	4.53	8.95	47.62	3.32
4th quarter	76½	390.0	657	5.07	8.52	48.54	3.82
2nd half-year	161½	776.9	1418	4.80	8.73	48.08	3.57

The distribution of prominences about the sun's axis of rotation is given below :

1960 July—December

	East	West	Percentage East
Total areas (sq. minutes)	3696.5	4060.5	47.6
Total numbers	657.0	761.0	46.3

Observations with the Hale Spectroheliograph

Details of Doppler displacements in H-alpha line observed in prominences and dark markings are given below :

	North	South	East	West	Displacements To red & violet
1	2	3	4	5	6
Displacements in prominences	14	8	7	15	22
Displacements in dark-markings	2	1	2	1	3

Solar Flares

Details of solar flares observed during the period are given in the following table —

Date 1960	Time in U.T.			Mean Latitude	Mean Longitude from central meridian	Impor- tance	Maximum width of H- alpha line observed A°
	Beg H M.	Max H M	End H M.				
1	2	3	4	5	6	7	8
July 20	*05 30		**05 40	20° N	48° W	1	1.80A°
August 8	*05 00	05 00	05 05	22° N	70° E	2	1.28
11	02 47	03 04	03 15	21° N	33° E	2	2.08
14	*05 35	05 40	**05 47	20° N	13° W	3	1.80
15	*05 25	05 25	05 40	19° N	25° W	1	1.68
September 2	*02 50	02 50	03 05	14° S	54° W	2	1.76
October 11	*05 34	05 41	06 30	13° S	35° W	2	..
December 30	03 52	04 06	04 15	15° N	23° E	3	1.88

*First observation of flare and not the beginning of flare.

**Last observation of flare and not the end of flare.

Surges, Active Prominences etc.

Details of surges and active prominences observed are given below

Date 1960	Pheno- menon	Impor- tance	Time in U T		Position (Hellographic)		Direc- tion of outflow	Remarks
			Beg.	End.	Latitude	Longitude		
19-8-1960	APR	2	04 05	08 44	08° S	90° E	r	K
29-8-1960	BSL	1	05 50	06 25	07° S	90° W	r	
3-9-1960	BSL	2	02 10	05 50	18° N	90° W	rN	Displaced to red 1.6A° and to violet 1.92A at 0525 U.T.
19-11-1960	BSL	1	02 52	03 03	26° N	90° W	r	
19-11-1960	APR	1	05 10	09 00	62° N	90° W	r	J
27-11-1960	APR	2	05 41	06 30	28° N	90° W	r	L
30-12-1960	APR	1	02 50	06 02	15° S	90° E	r	K

Code :

BSL=Bright surge at lumb.

APR=Active prominence region.

Sudden disappearances

Details of sudden disappearances of prominences and dark-markings are given in the following table:

1960 Date and Phenomenon	Time when object last ob- served before activa- tion U.T.	Time when disin- tegra- tion first obser- ved U.T.	Time when object has dis- appea- red U T	Approximate Position of Centre		Greatest exten- sion of promi- nence	Impor- tance	Remarks
				Lat.	Long.			
September 4 Prominence	02 30	..	05 20	17° N	90° W	10°	1	Most of the pro- minence dis- appeared by 05 20 hrs.
November 30 Prominence	03 13	..	05 04	19° N	90° W	7°	1	Most of the pro- minence disappeared by 05 04 hrs.
December 11 Prominence	03 05		03 11	51° N	90° W	8°	1	Prominence dis- appeared bet- ween 03 05 hrs. and 03 11 hrs.

Prominences projected on the disc as absorption markings

During the half-year under review photographs of the sun's disc in H-alpha line were obtained at Kodai-kanal on 98 days. Spectroheliograms for 65 days were obtained from Mount Wilson Observatory and for 59 days from Meudon Observatory. On the whole records were available for 148 effective days.

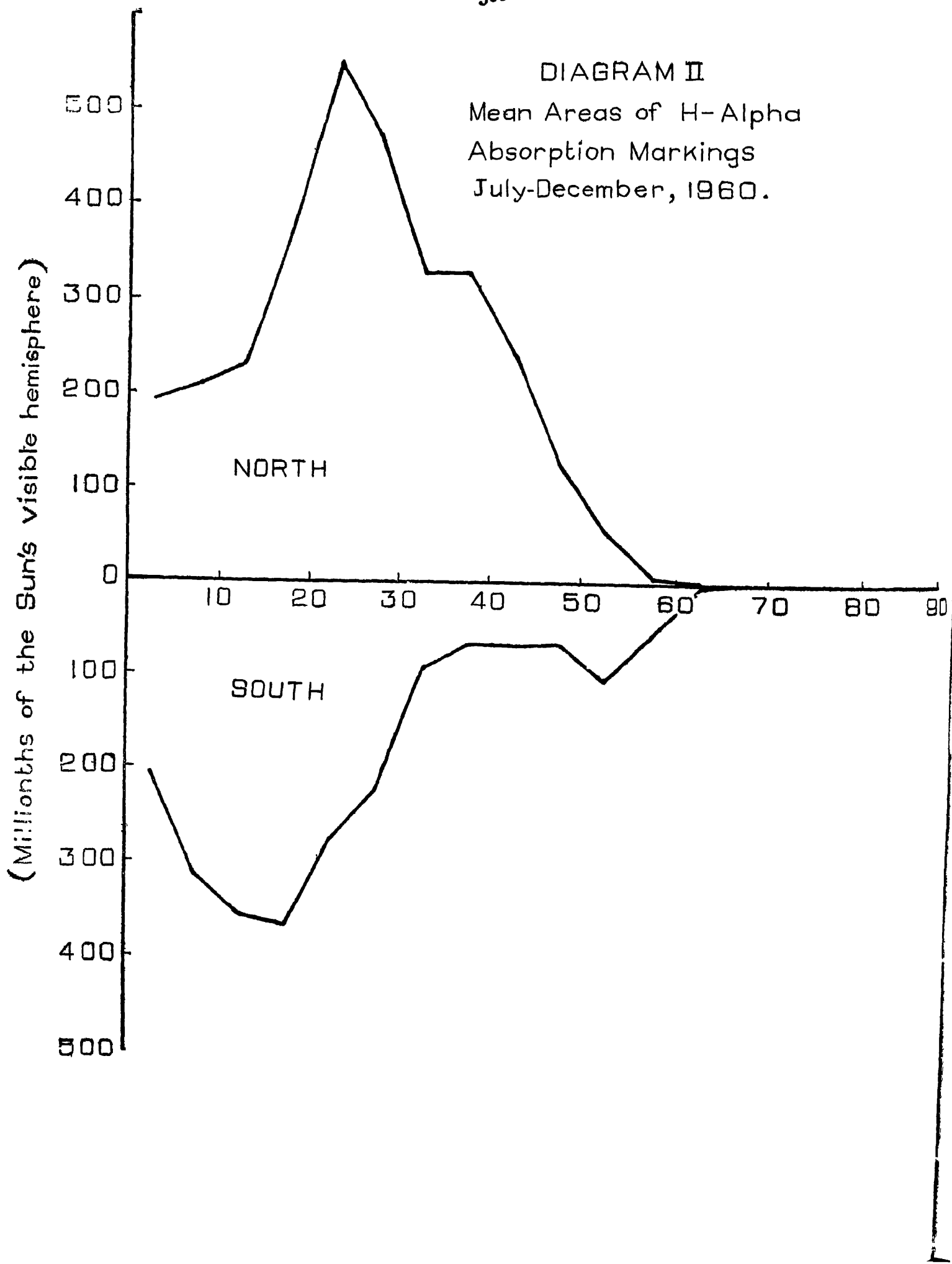
The mean daily areas in millionths of the sun's visible hemisphere (uncorrected for foreshortening) and the mean daily numbers of the H-alpha dark-markings as derived from the combined photographs are given below .—

	Combined data	
	Mean daily area (millionths of the sun's visible hemisphere)	Mean daily number
North	3088	18.71
South	2246	13.23
TOTAL	5334	31.94

On comparing with the previous half-year's values, these figures show an increase in activity in areas, the increase being 8.6% and a slight decrease in activity in numbers, the decrease being 2.2%.

The distribution of the areas of the absorption markings in 5 degree ranges of latitude as obtained from the combined data is shown in diagram II. The zone of maximum activity in the northern hemisphere is in the latitude belt 20°-30° and in the southern hemisphere in the latitude belt 10°-20°.

DIAGRAM II
Mean Areas of H-Alpha
Absorption Markings
July-December, 1960.



The distribution of total areas and numbers of the dark-markings east and west of the sun's axis of rotation is given below :

July—December 1960

	Combined data		
	East	West	Percentage East
Total area (millionths of the sun's visible hemisphere)	5940	6760	46.8
Total numbers	2583	2345	52.4

The areas show a slight eastern deficit whereas there is a slight eastern excess in the numbers

Summary of calcium flocculus observations

During the half-year under review, calcium flocculus photographs were obtained at Kodaikanal on 121 days. Spectroheliograms for 53 days were obtained from Mount Wilson Observatory and for 56 days from Meudon Observatory. On the whole, records were available for 165½ effective days.

The distribution of the areas of calcium flocculus east and west of the sun's axis of rotation is given below :—

July—December, 1960

	Combined data		
	East	West	Percentage East
Total area (in millionths of the sun's visible hemisphere uncorrected for foreshortening)	12,92,187	13,91,000	48.1

The mean daily area in millionths of the sun's visible hemisphere (uncorrected for foreshortening) of the calcium flocculi as derived from the combined photographs is given below :—

	North	South	Total
Mean daily area (millionths of the sun's visible hemisphere)	10,929	5,856	16,185

Compared to the previous half-year there is a decrease in activity, the decrease being 32.3%.

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

PART II

Magnetic observations for the second half of 1960

Brief descriptions of the absolute instruments, the variometers and the system of observations are available in Bulletins Nos CXXXII and CXXXVI of this observatory. The data given in this Bulletin are derived mainly from the records of La Cour instruments, but in case of failure of La Cour records, Watson magnetograms have been used.

The adopted values of the scale coefficients for the Horizontal Force, Vertical Force and Declination magnetographs for the second half of 1960 were 28 γ /Cm., 120 γ /Cm and 14'/Cm respectively.

PART III

Ionospheric Observations for the second half of 1960

A description of the system of ionospheric observations at Kodaikanal with a brief description of the Ionosphere Recorder has been given in Bulletin No. 146 of this observatory. The present Bulletin contains half-hourly values of eleven ionospheric parameters viz, foF₂, foF₁, foE, foE_s, fbE_s, f-min, h'F₂, h'F, h'E, h'E_s and (M₃₀₀₀)F₂ with symbols and terminology as recommended by the Special Committee on Worldwide Ionospheric Soundings to the URSI/AGI in its First Report (Brussels, September 2, 1956).

Kodaikanal Observatory.

March, 1963.

M. K. VAINU BAPPU,

Director.

363

MAGNETIC DATA

363

Characteristic : fmin
 Unit : Mc.
 Month : October 1960.

TABLE 39
 Ionospheric Data
 75 0° E Mean Time

Latitude : 10° 2' N
 Longitude : 77° 5' E

Date	00	01	02	03	04	05	06	07	08	09	10	11
1	1.8	1.4	1.6	1.6	1.4	1.6	2.3	1.8	2.2	2.4	2.4	2.9
2	1.5	1.4	1.7	1.3	1.3	1.5	2.1	1.9	2.2	2.5	2.7	2.7
3	1.6	1.5	1.3	1.3	1.4	1.4	1.8	1.7	2.0	2.4	2.5	2.7
4	1.8	1.6	1.8	1.4	1.5	1.5	2.0	1.9	2.0	2.4	2.7	3.0
5	1.3	1.7	1.7	1.5	1.8	1.5	2.0	1.4	1.8	2.4	2.5	2.7
6	1.4	1.3	1.4	1.6	E	1.5	2.1	1.6	2.2	2.4	2.6	2.6
7	1.3	1.4	1.6	1.4	1.6	1.6	2.1	2.0	2.3	2.6	C	2.9
8	1.2	1.3	1.8	1.9	1.6	E	1.9	2.2	3.4	2.6	2.9	3.4
9	1.6	1.4	1.3	1.8	1.8	1.4	2.4	1.9	2.4	2.7	2.9	2.9
10	1.9	1.7	1.6	1.8	2.2	1.5	2.2	1.9	2.5	2.4	2.8	3.1
11	2.1	1.6	1.8	1.6	1.9	1.7	2.3	2.7	2.2	2.9	3.0	5.7
12	2.1	2.7	1.7	2.0	1.8	2.2	2.6	3.2	2.6	3.0	3.0	3.2
13	2.4	2.0	2.3	2.4	2.0	2.1	2.6	2.5	2.3	3.2	3.2	3.5
14	1.6	1.5	1.6	2.1	1.8	1.6	2.6	2.1	2.3	2.6	2.8	3.0
15	2.2	2.2	1.6	1.6	1.6	1.7	2.2	2.1	2.5	2.8	3.4	3.3
16	1.7	1.7	1.5	1.5	1.6	1.6	2.3	2.0	2.3	2.8	2.9	3.2
17	1.6	1.6	1.8	1.9	1.9	2.5	1.8	1.7	2.2	2.3	2.8	2.7
18	1.6	1.5	1.4	1.4	2.0	2.1	2.4	2.2	2.2	2.5	3.0	3.2
19	2.1	1.6	1.4	1.7	1.3	2.1	2.3	2.1	2.3	2.9	3.0	3.1
20	1.6	1.4	1.3	1.3	1.4	1.4	2.0	2.0	2.4	2.8	2.6	3.1
21	1.4	1.2	1.3	1.3	1.3	1.5	2.2	2.3	2.3	2.6	2.8	2.8
22	2.0	1.8	1.5	1.7	1.6	1.4	2.1	1.6	2.2	2.4	2.8	2.8
23	C	C	C	C	C	C	2.0	1.5	2.3	2.6	2.6	2.8
24	1.7	1.3	1.1	1.3	1.5	1.6	2.0	2.0	2.1	2.4	2.6	2.6
25	1.6	1.6	1.5	1.3	1.4	1.2	2.0	1.7	2.0	2.4	2.6	2.6
26	1.1	1.7	1.5	1.5	1.2	1.9	1.5	1.6	1.7	2.0	2.2	2.6
27	1.5	1.7	C	E	1.3	1.3	C	2.1	C	C	C	C
28	C	C	C	C	C	C	C	1.7	1.9	2.2	2.4	2.6
29	E	1.1	E	1.1	1.3	1.4	2.1	1.8	2.0	2.3	2.5	2.6
30	1.1	1.2	1.1	1.2	1.3	1.2	1.5	1.4	1.9	2.2	2.3	3.0
31	1.6	1.1	1.2	1.0	1.6	1.5	2.0	1.8	2.0	2.4	2.4	2.3
Mean	1.7	1.6	1.5	1.6	1.6	1.6	2.1	1.9	2.2	2.5	2.7	3.0
Median	1.6	1.5	1.5	1.5	1.6	1.5	2.1	1.9	2.2	2.4	2.7	2.9
Count	29	29	28	29	29	29	29	31	30	30	29	30

Sweep 1.0 Mc. to 25.0 Mc. in 27 seconds.

Characteristic : h'E
Unit : Km.
Month : October 1960

TABLE 42—cont'd
Ionospheric Data
75° E Mean Time

Latitude 10°2' N
Longitude 77°5' E.

Date	0030	0130	0230	0330	0430	0530	0630	0730	0830	0930	1030	1130
1								A	A	A	A	A
2							..	A	A	A	A	A
3							125	A	A	A	A	A
4							A	A	A	A	A	A
5							120	A	A	A	A	A
6							120	A	A	A	A	B
7							..	A	A	A	C	A
8						125	130	B	120	A	A	A
9							120	120	110	A	A	A
10								120	A	A	A	A
11								110	A	A	B	B
12								B	115	A	A	A
13								115	A	A	A	A
14								A	A	A	A	A
15								A	A	A	A	A
16								A	A	A	A	A
17							120	120	120	120	A	120
18								120	120	120	120	120
19								A	A	A	A	A
20								120	A	A	A	A
21							A	120	A	120	120	A
22								110	110	A	A	A
23							130	120	120	A	A	A
24							120	120	A	A	120	120
25							120	120	120	A	A	A
26							A	A	A	A	A	A
27							..	C	C	C	C	C
28							..	120	115	C	120	A
29							120	120	110	115	A	A
30							120	115	A	A	A	120
31							130	120	120	A	A	A
Mean							125	120	115		.	.
Median							..	120	120	120	..	.
Count							1	12	16	11	4	4

Sweep 1.0 Mc. to 25.0 Mc. in 27 seconds.

