KODAIKANAL SOLAR, GEOMAGNETIC AND IONOSPHERIC DATA JANUARY—MARCH 1954

Curves showing (a) Kodaikanal daily relative sunspot numbers, (b) daily areas of calcium prominences and (c) daily areas of H-alpha dark markings are given on page 287. Tables 1 to 4 below summarise the data of solar and geomagnetic phenomena. The hourly median values of critical frequency and virtual height for the ionospheric layers are given in Table 5.

TABLE 1

Prominent sunspot groups

Kodaikanal Serial No. of spotgroup	Mean Latitude	Date of central meridian passage	Total area (millionths of the Sun's visible hemisphere) at central meridian passage
9972	7° S	March 17	390

TABLE 2

Solar Flares

Date	Time in GMT				Co-ordinates		Estimated maximum intensity	Maximum width of H-alpha line observed
	Beg.		Max.	End.	Mean latitude	Mean longitude		
	h	*m*	*h* *m*	*h* *m*				*A*
March 15	02	58	—	03 02	7° S	30° E	1	—

TABLE 3

Sudden disappearance of prominences and H-alpha dark markings

No sudden disappearance of prominences or H-alpha markings were observed during the period

TABLE 4

Principal magnetic storms

Greenwich date 1954	Storm-time				Sudden commencement				Degree of activity[4]	Maximal activity Greenwich day	Ranges		
	GMT of beginning		GMT of ending[1]		Type[2]	Amplitude[3]							
						D	*H*	*Z*			*D*	*H*	*Z*
	h	*m*	*d*	*h*		′	γ	γ			′	γ	γ
February 14	16	30	17	19	...	...	...	...	m	15	4	133	50
February 26	04	30	27	16	...	...	...	...	m	26	3	150	54
March 14	16	00	15	19	...	...	...	...	m	15	3	135	33

The following symbols and conventions have been used according to recognised practice—

1. Approximate time of ending of storm construed as the time of cessation of reasonably marked disturbance movements in the traces
2. s. c. = Sudden commencement ... = Gradual commencement
3. Signs of amplitudes of *D* and *Z* taken algebraically :
   (*D*—reckoned negative being westerly)
   (*Z*—reckoned positive being vertically downwards)
4. Storm described by three degrees of activity :
   m—for moderate (when range is less than 250γ)
   ms—for moderately severe (when range is between 251 γ and 400γ)
   s—for severe when range is above 400 γ)

TABLE 5

Ionospheric data

(Median values)

Beginning from January 1952, systematic ionospheric observations are being made at Kodaikanal with the Automatic Multi-frequency Ionosphere Recorder (Type C-3) made by the National Bureau of Standards, U. S. A. The general electrical characteristics of the instrument are given below :

(*a*) Supply voltage—90 to 260 volts AC single phase

(*b*) Supply frequency—50 to 60 cps

(*c*) Power load—approximately 30 amperes at 115 volts

(*d*) Pulse recurrence frequency—from 10 to 90 pps

(*e*) Frequency sweep time—$7\frac{1}{2}$, 15 or 30 seconds and 30, 60 or 120 seconds

(*f*) Frequency sweep range—1 to 25 megacycles

(*g*) Frequency sweep interval—5, 15, 30 or 60 minutes

(*h*) Height ranges—0-500, 0-1000, 0-4000 kilometres

(*i*) Peak-pulse power—approximately 10 kilowatts

The meanings of the symbols are as follows—

(1) foE .. Ordinary-wave critical frequency for the E layer

(2) foF1 .. Ordinary-wave critical frequency for the F1 layer

(3) foF2 .. Ordinary-wave critical frequency for the F2 layer

(4) h′E .. Minimum virtual height on the ordinary-wave branch for the E layer

(5) h′F1 .. Minimum virtual height on the ordinary-wave branch for the F1 layer

(6) h′F2 .. Minimum virtual height on the ordinary-wave branch for the F2 layer

(7) fEs .. Highest frequency on which echoes of the sporadic type are observed from the lower part of the E layer

(8) (M3000)F2 Maximum usable frequency factor for a path of 3000 km for transmission by the F2 layer

Kodaikanal (10·2°N 77·5° E) January 1954

Time (hrs)	h′F2	foF2	h′F1	foF1	h′E	foE	fEs	(M3000) F2
07	255	5·2	230		115	2·2		3·3
08	300	6·3	210		105	2·7	7·7	2·9
09	335	6·7	200	4·1	105		9·0	2·7
10	360	6·1	200	4·2			9·9	2·7
11	375	6·1	200	4·3			10·7	2·6
12	380	6·4	185	4·3			11·0	2·6
13	360	6·9	180	4·2	105		10·6	2·6
14	355	6·8	190	4·1	105		10·0	2·7
15	320	7·1	200		105	3·6	8·4	2·8
16	300	7·5	215		105	2·6	6·7	2·9
17	255	7·3	225		120	2·2	4·0	3·0

Time : 75·0° E
Sweep : 1·0 Mc. to 25·0 Mc. in 30 seconds

February 1954

07	255	5·4	230		110	2·2		3·3
08	295	6·9	215		105	2·7	7·6	3·1
09	325	7·7	200				9·2	2·7
10	335	7·2	200	4·2			10·0	2·7
11	360	6·7	195	4·3			11·0	2·7
12	360	6·9	180	4·4			11·0	2·6
13	345	7·3	185	4·3			10·3	2·7
14	335	7·5	195	4·2	105		9·8	2·7
15	320	7·8	200		105	3·1	9·1	2·7
16	300	8·1	220		105	2·7	7·4	2·8
17	270	8·1	230		110	2·3	5·9	2·9

Time : 75·0° E
Sweep : 1·0 Mc. to 25·0 Mc. in 30 seconds

March 1954

07	260	6·2	230		105	2·4	6·0	3·2
08	300	7·3	215		105	2·8	8·0	2·8
09	325	7·2	200		105		10·0	2·7
10	345	6·8	200	4·3			11·0	2·7
11	345	7·1	200	4·4			11·6	2·7
12	345	7·6	190	4·4			11·6	2·7
13	335	7·9	200	4·3	105	3·4	10·8	2·7
14	325	8·1	200		105	3·2	9·1	2·7
15	315	8·5	200		105	3·0	7·2	2·9
16	285	9·0	220		105	2·7	7·3	2·9
17	265	9·0	235		115	2·3	6·0	3·0

Time : 75·0° E
Sweep : 1·0 Mc. to 25·0 Mc. in 30 seconds

Kodaikanal
28 April 1954

A. K. DAS
Director, Solar Physics Observatory

MAGNETIC OBSERVATORY, ALIBAG (BOMBAY)

Three-hourly indices of Geomagnetic Activity

(K 9 = 300 γ)

(Scale values of variometers in γ/mm : D = 11·3 ; H = 4·4 ; Z = 2·5)

Greenwich day	JANUARY 1954 K-indices		Sum	Character of the day*	FEBRUARY 1954 K-indices		Sum	Character of the day*	MARCH 1954 K-indices		Sum	Character of the day*
1	2222	1122	14	Ca	2323	4243	23	S	1222	1123	14	Ca
2	3333	4432	25	Sa	2212	3222	16	S	3323	1232	19	S
3	2222	1101	11	Ca	3243	4333	25	Sa	2211	3322	16	S
4	0211	0111	7	Ca	1322	1221	14	Ca	2132	3223	18	S
5	2121	1245	18	S	0221	2233	15	Ca	2223	3322	19	S
6	1232	3311	16	Ca	1221	1011	9	Ca	2322	2322	18	Ca
7	1220	2342	16	S	1121	1232	13	Ca	2213	3332	19	S
8	2232	2222	17	S	1112	2133	14	Ca	2112	2233	16	S
9	2212	2111	12	Ca	2232	3321	18	S	2223	2441	20	S
10	1221	2232	15	Ca	1221	3232	16	S	1231	3232	17	S
11	2333	2223	20	S	3212	2444	22	S	2212	3434	21	Sa
12	2223	3232	19	Sa	2121	1212	12	Ca	2222	3232	18	S
13	2222	2223	17	Ca	1122	2221	13	Ca	1122	4443	21	Sa
14	1311	1233	15	Ca	1123	4432	20	S	2342	4542	26	Sa
15	2222	2223	17	S	1436	5432	28	M	4344	4232	26	Sa
16	2222	2221	15	Ca	2222	3454	24	Sa	2233	3332	21	S
17	1211	1232	13	Ca	3234	4543	28	Sa	1122	2443	19	S
18	1222	4434	22	Sa	1224	3452	23	Sa	2322	3341	20	S
19	4232	3423	23	Sa	1332	3332	20	S	1322	4222	18	S
20	3222	2342	20	Sa	1222	2221	14	Ca	3343	3342	25	Sa
21	2221	2332	17	S	1114	5554	26	Ma	3222	1242	18	S
22	2232	2331	18	S	3423	4343	26	Sa	1223	2355	23	Sa
23	2232	2332	19	S	3332	2433	23	Sa	3244	5464	32	M
24	2221	1211	12	Ca	2123	4432	21	Sa	3344	2443	27	Sa
25	2221	2321	15	S	1222	3333	19	S	3232	2342	21	S
26	1211	1221	11	Ca	2236	4443	28	M	3333	3442	25	S
27	2222	2231	16	S	3243	3423	24	Sa	3212	1121	13	Ca
28	1111	2211	10	Ca	2222	3432	20	S	2211	1122	12	Ca
29	1111	1222	11	Ca					2232	2122	16	Ca
30	2221	2322	16	Ca					3223	5435	27	M
31	2102	2323	15	S					2332	2243	21	Ca

*At Bombay, since 1883, a day is classed as (1) a quiet day, or a day of (2) small, (3) moderate, (4) great or (5) very great disturbance, the letters distinguishing the respective classes being C,S, M, G and VG. For representing intermediate conditions of activity of the smaller period movements, sub-classifications Ca, Sa and Ma are used. Roughly speaking a storm having a range over 225γ in the variations of the horizontal force during the first twentyfour hours after its commencement is classed as " Very Great ". It is " Great " if the range is between 150γ and 225γ, " Moderate " if the range is between 65γ and 150γ, " Small " if the range is less than 65γ. The range is however not the only criterion used in assigning the character of a storm. The oscillations in the magnetograms are duly taken into account in determining the class to which a particular storm should belong.

The corresponding international character figures can be determined from the following—

Bombay Character	International Character	Bombay Character	International Character
C, Ca	0	M, Ma	2
S, Sa	1	G, VG	2

Colaba, Bombay
14 May 1954

S. L. MALURKAR
Director, Colaba and Alibag Observatories

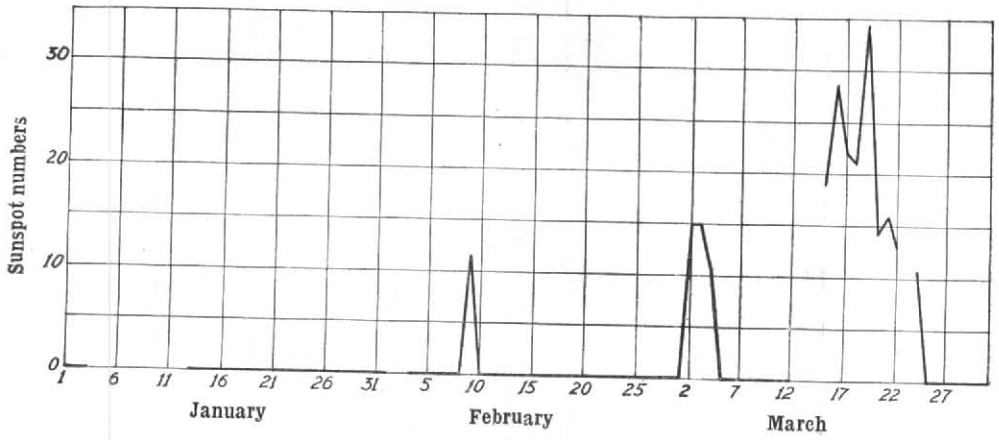

Fig. 1 (a) Kodaikanal daily relative sunspot numbers

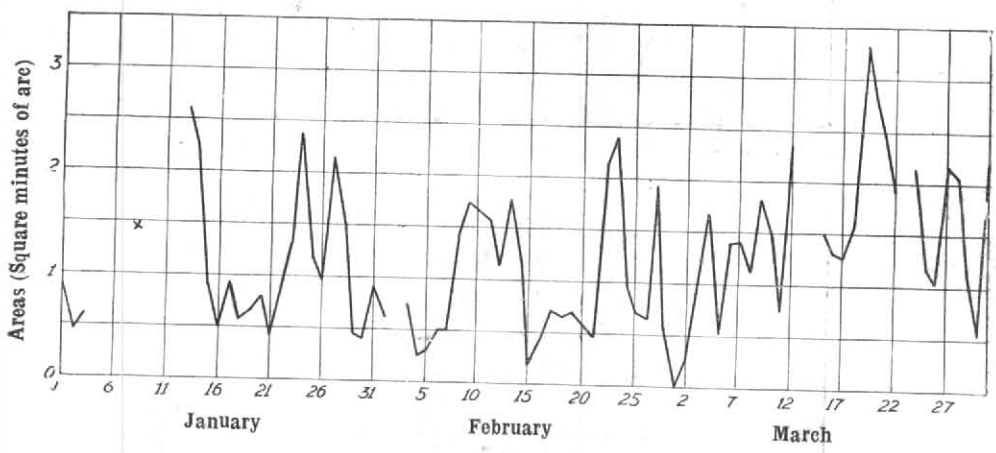

Fig. 1 (b) Daily areas of calcium prominences

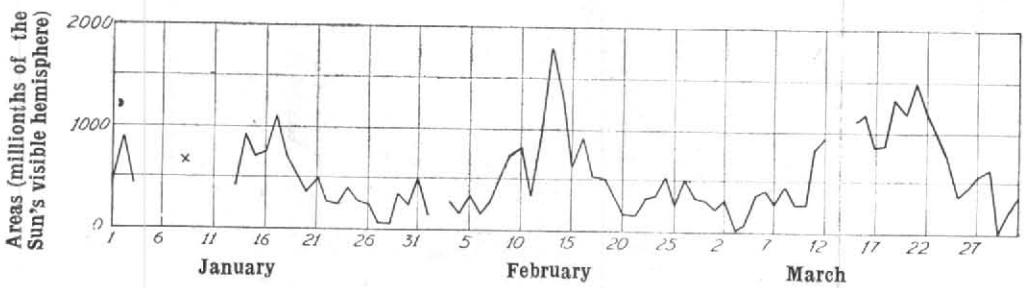

Fig. 1(c) Daily areas of H-alpha dark markings
Note: Breaks in the graphs are due to lack of observations

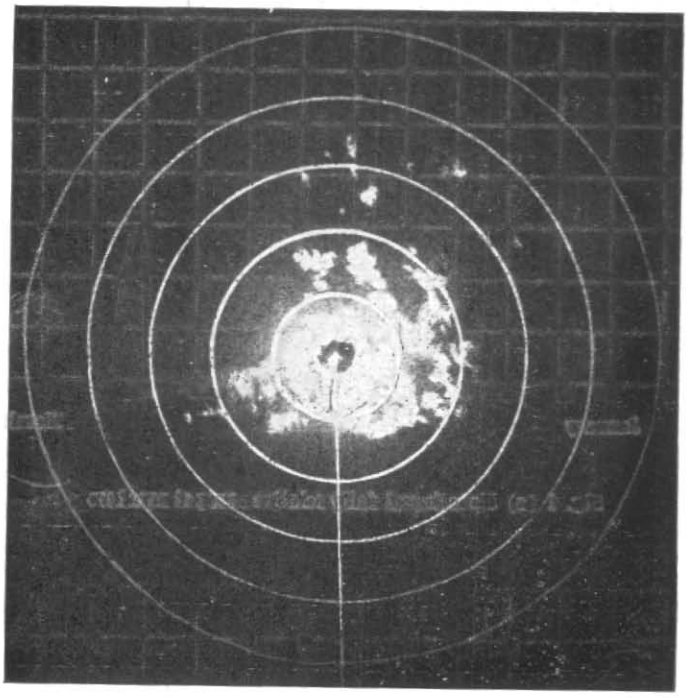

Fig. 1 (1210 IST) (50; 10; 0°)

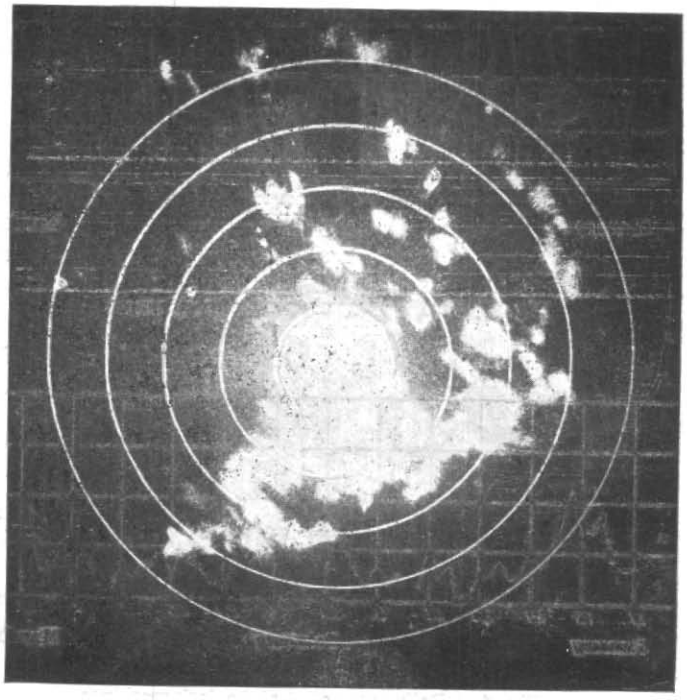

Fig. 2 (1225 IST) (25; 5; +3°)

Figs.1-2. PPI pictures of monsoon rain at Dum Dum on 25 June 1954