

SOLAR DIVISION Bulletin

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Number 93.

We received kind permission by Dr. Seth B. Nicholson to reprint his paper first published in the Publications of the Astronomical Society of the Pacific in April 1954. Mr. Thomas Cragg was most helpful in obtaining the actual copy for us. We are glad to enable all our members here and abroad to read this interesting paper in full, for which we are greatly indebted to Dr. Nicholson.

The graphs bellow are from Dr. Seth B. Nicholson's paper SOLAR ACTIVITY IN 1953. The text is on pages 3 and 4.

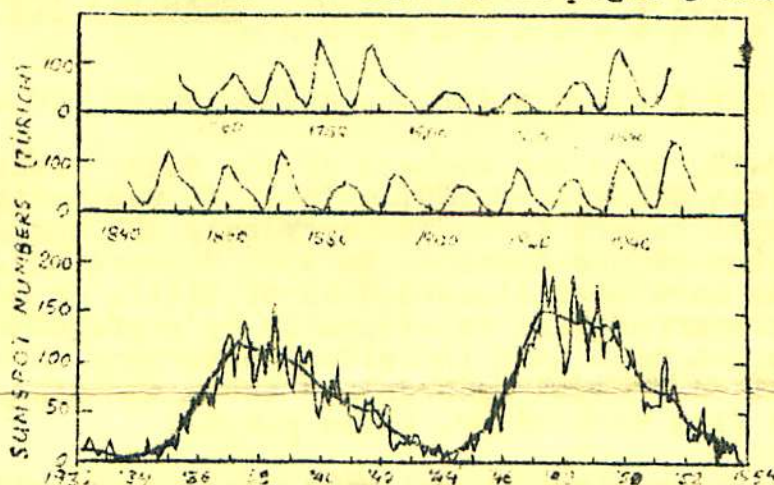


Fig. 1. Relative sunspot numbers, which indicate the sunspot activity, are computed by the formula, $\text{Sunspot Number} = k(n + 10g)$ where n is the number of individual sunspot umbrae; g , the number of groups; and k , a factor depending on the observing conditions. The value of k for Zurich is 0.6.

The upper curves give the yearly means of the smoothed monthly values since 1750; the lower curves the observed monthly mean values (light line) and the smoothed monthly values (heavy line) for the last two cycles. The data are from the "Astronomische Mitteilungen der Eidgenossischen Sternwarte in Zurich."

AMERICAN RELATIVE SUNSPOT NUMBERS RA' for APRIL 1954

Day	RA'	Day	RA'	Day	RA	Day	RA'
1.....	0	9.....	2	17.....	1	25.....	0
2.....	0	10.....	0	18.....	2	26.....	0
3.....	0	11.....	0	19.....	0	27.....	0
4.....	0	12.....	0	20.....	0	28.....	0
5.....	0	13.....	0	21.....	0	29.....	0
6.....	0	14.....	1	22.....	0	30.....	0
7.....	2	15.....	3	23.....	0		
8.....	5	16.....	3	24.....	0		

MEAN RA': 0.6

ZURICH PROVISIONAL SUNSPOT NUMBERS for APRIL 1954

Dependent on observations at Zurich Observatory and its stations in Locarno and Arosa:

Day	RZ	Day	RZ	Day	RZ	Day	RZ
1.....	0	9.....	15	17.....	0	25.....	0
2.....	0	10.....	0	18.....	0	26.....	0
3.....	0	11.....	0	19.....	0	27.....	0
4.....	0	12.....	0	20.....	8	28.....	0
5.....	0	13.....	0	21.....	0	29.....	0
6.....	0	14.....	0	22.....	0	30.....	0
7.....	8	15.....	7	23.....	0		
8.....	8	16.....	7	24.....	0		

MEAN RZ: 1.8

New SUNSPOT REPORT forms for the AAVSO- SOLAR DIVISION.

On December 12-13, when the members of the Solar Division's new council met. (see BULLETIN-No.89;Jan'54), it was decided to simplify our sunspot report forms to carry only the essential data for the reduction of the American Sunspot Numbers RA'. Many of the former data have been discarded as of little or no importance in the solar-terrestrial relationship by professional astronomers. This does not mean that individual observers should discontinue any detailed sunspot records for their own study or other purposes.(see the fine work of Mr. Elias p.5,6).

Members of the Solar Division who have used up the old forms may receive a new set of forms from the Recorder-AAVSO 4 Brattle St. Cambridge 38, Mass. upon request. A new supply of the Gleissberg Foreshortening Report forms is also available from our Recorder.

a	c d	e	f	g		j	k	l	m	
Day	Vis	U.T.	Gr	Sp	R	N-Gr	S-Gr	N-Sp	S-Sp	Remarks
	G4	1330	1	14	24	1	0	14	0	
	F2	1300	1	8	18	1	0	8	0	

Sample
new form

SOLAR ACTIVITY IN 1953

Seth B. Nicholson

Mount Wilson and Palomar Observatories
Carnegie Institution of Washington
California Institute of Technology

During 1953, observations of the sun were made at Mount Wilson on 350 days, on 109 of which no spots were seen. The fifteen completely cloudy days in 1953 were evenly distributed throughout the year, only one month had three such days and four months had none. The previous record for the number of observing days per year was 341 in 1942. The longest continuous sequence of spotless days was from November 8 to December 5 inclusive. The total number of spot groups observed at Mount Wilson was 93 in 1953, compared with 219 in 1952 and 294 in 1951. Only one of the 70 groups for which magnetic polarities were determined was irregular. The northern hemisphere had 42.

The average latitude of the spot groups was 9.9° for the northern hemisphere and 8.6° for the southern. This compares with 10.7° and 10.4° , respectively, in 1952, and 11.6° and 11.3° , respectively, in 1951. The mean latitude of 9.9° in the northern hemisphere is for spots of the waning cycle and excludes one very high-latitude, short lived spot (1) at 52°N . The low average latitude of the groups indicates that the minimum is near and that new spots should be predominant in 1954.

Sunspot activity, which declined noticeably in 1953 (See Fig. 1)/page 1;/, had a small maximum in August and September. This maximum in the short period fluctuations was about thirteen months after a similar one in 1952 (2).

Judged by the mean number of groups observed daily, minimum is very near. The indications are that minimum will be near mid-1954 or a little later. ~~Due to the nature of the solar cycle, that is, the slow fading of the low-latitude activity in the waning cycle and the rapid increase of the high-latitude activity in the new cycle once it starts, the time of minimum is determined primarily by the advent of the new cycle. Activity at the end of 1953 was at minimum level, below that of some minima, and the time assigned to the minimum depends on when the new cycle gets under way.~~

Monthly means of the number of groups observed daily at Mount Wilson for the last three years are listed in Table I./p.4/

Of the 93 groups observed at Mount Wilson in 1953, only one had a maximum area greater than 1,000 millionths of the solar hemisphere (1.174×10^6 square miles).

This group was No. 11107, which had a maximum area of 1381 millionths as measured at the U.S. Naval Observatory. It crossed the central meridian on April 28.2 U.T. in latitude 10° N.

TABLE I

Mean Number of Sunspot Groups Observed Daily at Mount Wilson

Month	1951	1952	1953	Month	1951	1952	1953
January	4.0	2.8	2.4	July	5.4	3.5	0.6
February	4.5	2.0	0.5	August	4.9	5.1	2.0
March	4.2	2.0	1.2	September	6.4	2.7	2.8
April	5.7	2.2	2.3	October	4.3	2.0	0.8
May	7.0	2.2	1.2	November	5.2	1.6	0.2
June	5.5	3.8	1.9	December	3.4	3.1	0.3
Yearly Mean.					5.0	2.8	1.4

Many small roundish faculae were observed within 25 degrees of the sun's poles during 1953, but not as many as in 1952. Some were visible on almost every day when the seeing was fair or better. The majority were of very short duration, but several were seen on two successive days.

No great geomagnetic storm was recorded at Mount Wilson in 1953, but many moderate disturbances occurred. Most of these were in 27-day sequences. One very long series, which ended in May, 1953, started late in 1951. Another 27-day series ran from May 1953 through November.

Two flares of intensity 2 and none of intensity 1 or 3 were observed at Mount Wilson in 1264 hours of observing. The average number of flares per 100 hours of observing was 2.3 in 1951, 1.6 in 1952, and 0.2 in 1953.

References: (1) Pub. A.S.P., 65, 256, 1953
(2) Pub. A.S.P., 65, 78, 1953

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OUT OF OTHER PUBLICATIONS :

SCIENCE NEWS LETTER, April 17, 1954 carries a report that the so-called yellow coronal line has been confirmed by Dr. Walter O. Roberts, Donald E. Billings and Charlotte Pecker to belong to Ca XV as originally suggested by Edlen. This line appears only in the most active regions above very large sunspots. The new Astrophysical Journal/Jan'54/ carries another paper on this line and flare incidence, but skip the "Objections to Edlen's identification..."

THE NEW YORK TIMES, April 29, 1954 (no comments): "The eruption.. was the biggest on the sun so far observed. It was taken with the apparatus named the coronoscope, which makes it possible to observe and photograph the corona of the sun at all hours of the day and night, whereas formerly..."

We are delighted to present in our BULLETIN Mr. Demetrius P. Elias' summary of his sunspot observations in 1953. This is by far the most complete report received from one of our members. Our thanks and hearty congratulations go to Mr. Elias.

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SOLAR ACTIVITY IN 1953

by

Demetrius P. Elias
Athens, Greece

The present report is based upon observations secured, as usually, through the 82 mm x 43 Merz equatorial refractor of the National Observatory. The method of observation is visual, through a Wilson Filter and by projection on a 200 mm disc.

The total number of observations amounts to 295. Overcast days in 1953 were 27. On the remaining 43 days no observation was secured. There were 79 consecutive days on which observation was effected i.e. from June 20 to September 6.

SPOTLESS DAYS: The spotless days in 1953 were 111 against 295 observational days.

STATISTICAL DATA: Total number of groups 72; 43 in the northern and 29 in the southern hemisphere.

13 (18.1%) groups came from and disappeared to the invisible hemisphere.

12 (16.7%) groups came from the invisible hemisphere and died on the disc.

7 (9.7%) groups were born and died on the disc.

40 (55.5%) groups were born on the disc and disappeared in the invisible hemisphere.

HELIOGRAPHIC LATITUDE OF GROUPS:

Distribution of groups in latitude
North Hemisphere South

deg.		
10 - 5	10	4
6 - 10	9	15
11 - 15	21	9
16 - 20	3	1
Total:	43	29

Average latitude for the 43N groups was 9.8° ; for the 29S groups -9.6° ; the average latitude for the 72 groups was 2.0° . Frequency of groups was at maximum between latitude: 8° to 15° N 28 groups
 7° to 15° S 23 groups

GROUPS OBSERVED IN MORE THAN ONE ROTATION:

Rot.#	Ser.No.	Lat.	Long.	Type
1327	7	169*	20 24	B
1328	9	1	19 24	D
1328	3	168*	-10 294	E
1329	6	5	-9 289	C
1329	1	2	2 353	J
1330	1	9	3 354	J
1331	6	17	-9 4	B
1332	6	23	-8 2	A

GROUPS OF EXTREME LATITUDE:

North:				
No.	Rot.	Lat.	Long.	Type
9	1328	19	24	D
1	1332	1	346	E
South:				
6	1335	-19	138	A
2	1320?	-0	30	B

Groups observed in 2 rotations eight.

Note: * means last year's ser. number

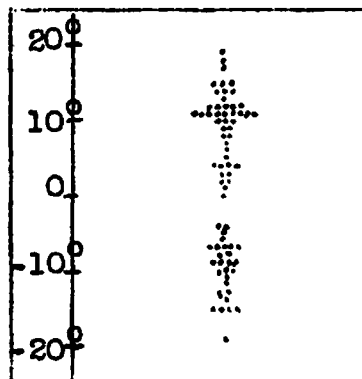
continued:

Groups observed in more than one rotation:

Rot. # Ser.No.Lat.Long.Type

1332	4	21	11	32	F
1333	4	27	10	38	J
1332	1	18	1	346	E
1333	1	24	4	344	C
1334	4	32	-15	254	D
1335	3	39	-15	259	A
1336	5	49	11	7	E
1337	6	53	13	11	H

Fig.1.
Frequency
of groups in
latitude.



TYPES OF GROUPS: Types of groups according to Professor Max Waldmeier's classification (see Table II).

FREQUENCY OF TYPES: The following classification has been established according to the daily data, the groups having been taken as new each day. Of the total of 333 groups resulting from the daily records on 295 days, the type range was as follows in Table III.

Table II.

Type	Number of gr.	%	Type	Number of gr.	%
A	27	37.5	F	1	1.4
B	18	25.0	G	0	0
C	6	8.3	H	2	2.8
D	8	11.1	J	6	8.3
E	4	5.6			

Table III.

Type	Number of gr.	%	Type	Number of gr.	%
A	84	25.3	F	3	0.9
B	45	13.4	G	3	0.9
C	59	17.7	H	8	2.4
D	33	9.9	J	82	24.6
E	15	4.5	x	1	0.3
			x indeterminate		

GROUPS AND SPOTS WITH A PENUMBRA:

Of a total of 333 groups/daily occurrence/ observed on 295 days, 193 showed a penumbra i.e.58.0%. Of a total of 1766 spots observed in the same period 568 showed a penumbra i.e.32.2%.

GROUPS OBSERVED BY NAKED EYE:

One group of F type was visible by naked eye on two days (April: 28-29) of a total of 72 groups and 295 days of observations.

MEAN DAILY SUNSPOT GROUP NUMBER:

January	2.1	19 observations	July	0.6	31 obs.
February	0.4	21	August	1.6	31
March	0.9	22	September	1.8	29
April	1.9	26	October	0.8	25
May	1.0	24	November	0.1	18
June	1.6	28	December	0.2	21

Yearly mean 1.1

A graph giving Mr. Elias' daily sunspot number (Wolf R/k) and the monthly k factors as supplied to him by Professor M. Waldmeier is also included in this summary. Unfortunately these two items could not be included here for lack of space, for which we apologize.