AAVSO
SPRING MEETING
MAY-22-23-1953
UNIVERSITY-OF-MICHIGAN
ANN ARBOR
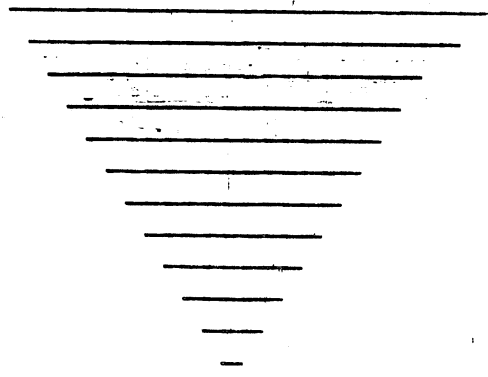
A timely subject at present is SUNSPOT MINIMUM.

Prof. Dr.W.Gleissberg has again supplied us with his predictions concerning the immenent minimum of the present sunspot cycle. It follows ;

" In 1950 a prediction concerning the epoch of the

coming sunspot minimum was publishe by me and one

of my collaborators in, 'Zeitschrift fur Astro-

physik' , Vol. 28, pp. 17 - 27. This prediction

reads as follows: " It is to be expected with a probability of 0.96 (i.e., of 42 to 1) that the minimum will occur not more than 18 months after the time when the smoothed relative sunspot numbers, on the decending phase of the present sunspot cycle, will have fallen below 38."

As Prof. M. Waldmeier, of Zurich, has just publish-the definitive relative numbers for 1952, WE Can calculate the smoothed monthly sunspot numbers until June , 1952. For the first six months of 1952 they are: January 43.2, February 42.0, March 39.4, April 36.0, May 33.6 , June 31.9.

From these data we see that the smoothed relative sunspot numbers have fallen below 38 in April , 1952. The above prediction, therefore, leads to the con-clusion that the minimum will occur probably before OCTOBER , 1953.

<div style="text-align:right">

Signed.
W. Gleissberg.

</div>

We also repeat a statement by Prof. Gleissberg, published before,in one of our Solar Division Bulletins in which he stated, " The coming Minimum will be of short duration, followed by a maximum only slight-ly lower than that of the preceding maximum of 1947, which was the second highest, of all known maxima ".

In the, JOURNAL OF GEOPHYSICAL RESEARCH, Vol.56, No.2, June 1951, p. 294, under the title, "A FORECAST OF SOLAR ACTIVITY", Prof. Gleiss-berg forecasts the following:

ITEM (4) R (Wolf's R) will exceed 130 at the maximum of the next cycle.
ITEM (5) The ascent to the maximum of the next cycle will be so steep that the values of "R" will rise from one-quarter of their maximum

<u>value to the maximum within less than 32 months</u>.

- - - - - - - - - -

March 1953 proved to be a rather interesting month. In a letter from Thomas Cragg we learned the following:

"The prize of the month was the very sudden development of the big eastern group on March 30th. On the morning of March 29th, bright faculae were observed in the area, and a faint spot was observed at the 150' tower. This group is on the equator!! On March 30th, Joe Hickox, on the mountain, (Mt. Wilson) found the southern most spot in the southern hemisphere while the big follower-spot was N. 1. A rather large bright calcium plage surrounds the group.

The group I reported as born in the west on March 30th was first seen at Mt. Wilson on March 27th as a bipolar near the Central Meridian. March 28th found it as a tiny speck (barely visible at the 150' tower). It was not seen on March 29th, then was rejuvinated on March 30th. As you may know, we have a habit of calling all of this one group even though it disappeared for a day. Whenever I mention that a group was seen at the 150' tower, that means it was also photographed at the 60' tower. At Mt. Wilson, a group or spot is not considered for numbering unless two observations of it are made. A photo at the 60' tower and a drawing at the 150' tower, or some similar combination is required.

Previous to the east limb appearance of the unipolar northern spot on March 27th, a very nice spot-type prominence was observed. I have enclosed three sketches of it from original negatives made at the 60' tower for your benefit. The streamers are quite obvious. Notice the beautiful loop at S-10 on March 26th at 17.44. Just a faint indication of it was seen an hour earlier."

Illustrations as mentioned above are shown on the next page. (250)

Due to the illness of Mr. Harry Bondy, (virus-infection), his fifth contribution - "A STUDY OF SOLAR INDICIES" - will be issued in the next Solar Division Bulletin Number 87.

As a supplement to <u>this</u> Bulletin we present

<div align="center">

"A TABLE OF SECULAR VARIATIONS OF THE SOLAR CYCLE"
By Prof. W. Gleissberg.

</div>

This study was published in <u>Terrestrial Magnetism and Atmospheric Electricity</u>, Vol. 49, No. 4, pp. 243-244. This is a very useful tool for research workers.
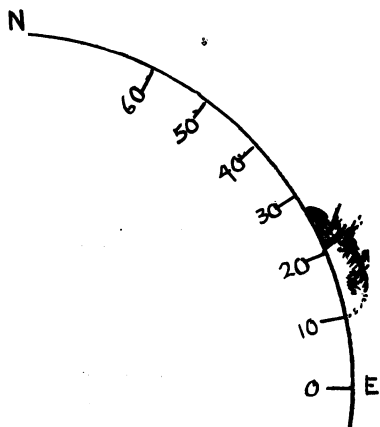
16:33 UT
3-26-53.
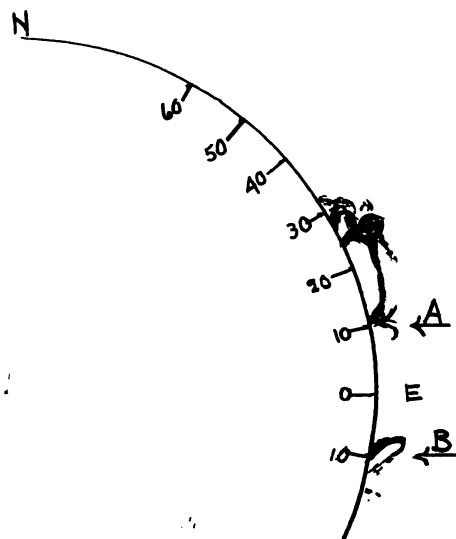
17:44 UT
3-26-53.

At arrow A - 29 Min. previously
this was here

At arrow B, sudden develope-
ment.
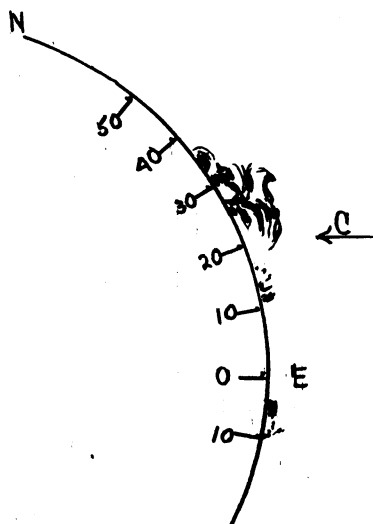
17:59 UT
3-27-53.

At arrow C, The lower members of the streamers remained much
the stronger up until 21:45, when it was no longer followed.

STATISTICS

The total number of sunspot Groups for the month of Mar. was   6
Zurich's Provisional Sunspot number for the month of Mar. was   9.9
The mean monthly sunspot area (U. S. Naval Obsvty.) for Sept. was 366
  "   "   "   "   "   "   "   "   " Oct.   " 427
  "   "   "   "   "   "   "   "   " Nov.   " 521
  "   "   "   "   "   "   "   "   " Dec.   " 520

*The highest sunspot group number as assigned at Solar
Division Headquarters was 15. It represented a small
group in the south belt on Wednesday, April 8th, approx-
mately five days past the Central Solar Meridian.
*Group counting reference for observers.

- - - - - - - - - -

Predictions of smoothed, monthly, sunspot numbers, for the next 6 mos;

        April 18   July 14

        May 16   August 13

        June 15   September 12

Released by Prof. M. Waldmeier, Director, Federal Observatory, at
Zurich, Switzerland, and transmitted by the Swiss Broadcasting Sta-
tion on April 4th, 1953, via short wave radio.

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PUBLICATIONS

1. OBSERVATIONAL ASPECTS OF THE SUNSPOT CYCLE   H. W. Newton
     Journal of the B.A.A., Vol. 63, No. 3,   F.R.A.S.
        February 1953, pps. 94-97.
       Very informative - Not technical.

2. SUNSPOT ACTIVITY DURING 1952   Thomas Cragg
     Publications of the Astronomical Society of the Pacific
        Vol. 65, No. 383, April 1953, pps. 78-80.
       A comprehensive coverage. Be sure to read this.

3. SONNEN-ZIRKULAR - July, August, September 1952
     Publications of the Fraunhofer Institute Freiburg, I.B.
     Contains a wealth of Solar Data.

4. PHYSIQUE SOLAIRE   Dr. C. Macris
     Sur la vie moyenne des granules faculaires et des
       plages lumineuses dans la penombre des taches.

5. SOME STELLAR EXERCISES FOR PLANETARIANS
   The Strolling Astronomer, Vol. 7, No. 2, Feb. 53,
   pps. 23-27.
   Every observer should study this valuable contribution.

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COMPARISON OF SUNSPOT NUMBERS
OF MEDIAN OF REGULAR OBSERVERS WITH OBSERVATIONS

Demetrius P. Elias, Athens, GREECE

Instrument, Refractor, Merz 82 m/m X43

1952

DATE	POOR	FAIR	GOOD	EXCELLENT
January	3-204-192	10- 448- 281	14- 859- 622	1- 17- 12
February	0-	12- 327- 239	7- 279- 199	0-
March	2-132-129	10- 174- 183	14- 335- 302	0-
April	3- 51- 55	11- 454- 353	16- 564- 411	0-
May	4- 86- 89	15- 398- 315	9- 282- 194	0-
June	1- 37- 23	11- 487- 413	16- 617- 518	2-151-130
July	1- 24- 31	11- 493- 480	16- 614- 520	3-258-172
August	0-	8- 493- 464	23-1459-1186	0-
September	1- 34- 29	2- 23- 10	23- 765- 553	3-212-148
October	0-	2- 72- 69	26- 740- 544	0-
November	6-173-142	3- 70- 48	13- 440- 288	1- 46- 34
December	2- 62- 64	5- 168- 157	10- 346- 286	3-183-129
TOTAL	23-803-754	100-3557-3012	187-7300-5623	13-867-625
%	106.5	118.1	129.8	138.7

In 1952 observed sun on 323 days

Final 25.9%

DETAILS CONCERNING SPRING MEETING.

Friday May 22nd.

2:30 - 5:30 P.M.	Registration at the Michigan Union.
3:30	Council meeting in the Observatory Seminar Room.
8.30	Lecture, Rackham Amphitheater. Dr. Dean B. MCLaughlin.

SATURDAY MAY 23rd.

9:30 A.M.	Short Business Meeting Rackham Amphitheater, followed by Papers.
12:00 Noon	Group Luncheon, Michigan Union.
2:00 P.M.	Group Photo in front of the Rackham Amphitheater. Prints ready Mich. Union early Sat. Evening Price $1.00.
2:15	Session For Papers.
4:15	*Leave for trip to Heber D. Curtis Observatory at Portage Lake(15 M. from Ann Arbor.

SUNDAY MAY 24th.,

* Leave for McMath-Hulbert Observatory
    on Lake Angeles(54 M. from Ann Arbor.)
* These two trips will be arranged only if enough people sign up for them to justify opening the Observatories.

Mrs. Catherine Weddell, Observatory, University of Michigan, Ann Arbor, Michigan, will make your room reservations at the Michigan Union, and she must have your acceptance letter or card by May 15th., 1953. Single rooms with private bath are $5.00; with connecting bath $4.00. Double rooms with bath are $8.50 and $9.50. Please designate your choice on card or letter. The Union is located at south State Street, opposite south University. All maps will be available at the Registration Desk at the Michigan Union.

Mrs. Mayall would like to receive titles and abstracts at the HARVARD OBSERVATORY. They will be printedand distributed soon after the Meeting,

DAILY   Ri

Observer	Ki	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Mean	No
Adams	0.70	0			14	0	0	0	0					11	11	0				12	11		11		12		0	24	23	36			9.7	17
Bartlett	1.51	0			0	0	0	0		0	0	/0		0	0		/0	0		17	18	15	11		0			27		28	30		8.6	17
Beardsley	0.74				0	0	0	0	0	0	0	0											/11	/12									0.0	7
Beetle X	1.06			0		0	0	0			0	0	0				0	0							12		0	24				35	5.5	13
Bissette	1.45				/0	0	0	0		0						/0	0	0	0		11	11	11										3.7	9
Bollmeyer X	0.81	0		0		0	0	0	0		/0			0					0		15	/12											1.7	9
Bondy	1.22	0				0	0	/0		0			0				0			13	11	11						23			41		9.0	11
Brennan X	0.93			0			0	0		0					0	0	0			13	14						39		57				11.2	11
von Bronsart	✳	0	0	0	0			/0	0			0	0	/12	0	0	13	15	13	15	/13	13	14	13	0			/14	62	/59			9.0	19
Buckstaff X	1.11																0	0		11	11	12	11	11	12		27		23				11.8	10
Chassapis	0.74				/0	0		/0	0			0	0	12		/0	0			11		12	11	11	12	11	0	36	34				10.0	15
Cragg X	0.92	0	0	0	0	0	0	0	0	0	0	c	0	0	0	0	0	0	/0	11	11	12	11	11	11	0	0	13	23	27	67	69	8.9	30
DeKinder X	0.80	0	0			0	0	0	0	0	0	0	0				/0	0	11		/11		11	13		/0	/12	24					4.2	14
Detgen	1.39	0	0			0					0	/0									11						/0	/13			30		6.8	6
Elias	0.60	0	/0	11	14		/0	0	0			0				12	/0		11	/13	11	13	12	/12	12	11	0	35	23		57		13.9	16
G.Estremadeyra	✳							/0		0										22	/23	18			0							10.0	4
V.Estremadeyra X	0.80	0	0	0	16	0	0	0	0	0	0			0	16	0		0	13	15	16		16	16	18	0	0	29	44	45	74	71	13.4	29
Evans	✳						0	0	0				0				0	/0	13	13	13				/0	/0		25		40	50		14.0	11
Fernald X	1.02	/0	0			/0	/0	0	0	/0	0	0		0			0	11		13	12	12		0									4.0	12
Focas X	0.60		0	11	0		/0	0	0			0	12		12	0		/0	13		13	11	11	11	12	0	37	23					9.2	18
Galbraith	✳		0	14	0	0	0	0	0	0	0	0	0	11	12	0	0	0	11	13		12	11	12	/11	0	0	25		/48	53	52	9.0	25
Haines	✳							/0								0	13	19		14		/14		0		27						12.2	6
Heines X	0.97	0	0			0	0	0	0	0	0	0	0	0	15		0	0	0	11	11	13	13	12	0				24		58		6.8	23
Koyama X	0.70			/0	0		0	/0	0		0			0						12	14				0	0				58		8.4	11
Loebbick X	1.02	0	0		0			0	0	0	0	0								13	11					/22				29		5.3	10
Luft X	0.98	0		0		0	0	0	0	0	0	0		16		0		0		13	12			25			44		6.9	16
Macris X	0.77		0	11	0	/13	/0	0	0	0		0	0	12		12	0	/0	13	11	13	11	/12	13	12	0	/11	38	23	/61			8.9	19
Maher X	0.90		0	0		0	0	0	0	0	0	0	0	0			0		11		11	12	12	0	0	12	23		40		5.5	22
Moore X	0.76				0	0		0	0		11		0	0	13	11		13		24		6.5	11
Olson	0.68	0	/0				0	0	0			11	12	12	13		63	12.3	9
Pierson X	0.83	0			0	0		25	13	12		26	10.8	7
Pierson Jr	0.89	0	/0	0	0	0	/0	/0	24	11	0	21	13	/14	25	43	11.2	10
Pilsworth X	0.86	0		0	/0	0	11	12	12	26	/36	8.7	7
Rosebrugh X	0.68	0	0	0	0	0	0	0	0	0	14	13	12	15	11	14	/11	/0	/11	25	4.9	16
Smith	✳	0	0	/0	0	/0	0	0	11	14	14	12	0	5.1	11
Strayhorn	2.06	0	0	0	0	0	14	2.3	6
Stryker X	1.06	0	0	0	0	0	0	0	0	0	0	0	0	11	11	24	24	25	5.6	19
Sullivan	0.60	0	0	11	16	0	0	0	0	0	0	0	0	15	14	0	0	28	27	29	60	61	12.4	21
Thomas X	0.84	0	0	0	0	0	0	0	0	0	0	0	0	11	12	16	11	12	13	0	12	39	41	6.9	24
Thrussell X	1.47	0	0	0	0	0	11	0	0	0	0	0	0	0	11	13	11	12	12	0	11	/36	50	6.2	21
Trathen X	1.28	0	0	0	12	0	0	0	0	/0	/0	/0	0	0	0	/0	/11	11	11	11	0	0	23	11	11	47	34	8.1	21
Venter X	1.28		0	0	0	0	0	0	0	0	0	0	0	0	/0	11	11	11	11	11	0	22	23	/37	5.5	22
Warren X	1.10	0				0		0	0	0	0	0	0	0	0	12	12	12	12	11	11	13	15	31	31	7.6	21
Wells	✳	0	0	0	0	0	0	0	0	0	0	0	39	39	39	8.3	14
Williams X	0.92		0		0	12	13	12	12	8.2	6
Wilson	✳	/0	/0	0	/0	0	0	0	/0	0	0	/0	11	13	11	11	/11	/12	5.1	9
RA		0	0	1	4	0	0	0	2	0	0	0	0	2	7	3	0	0	3	11	11	12	11	12	12	3	0	18	21	20	48	44	7.9	
Rz		0	0	0	0	14	0	6	0	0	0	0	0	7	15	8	7	0	8	10	8	10	10	10	9	9	7	17	25	32	47	48	9.9	

✳   Insufficient Data Available
X   Standard Observer

/   Observations rejected because of poor visibility and sky conditions

"A TABLE OF SECULAR VARIATIONS OF THE SOLAR CYCLE"

The aim of the present paper is to provide workers on phenomena which
are allied to solar activity with a new table on sunspot-frequency in
addition to the tables published by Brunner in the September 1939 issue
of this JOURNAL. Brunner's Table 1, which contains the observed rela-
tive sunspot-numbers for all months from January, 1749, to December,
1938, shows that the variations of the spot-frequency through the
eleven-year cycle are disturbed by secondary short variations. On
the assumption that these short variations are of an accidental char-
acter (this assumption is supported by the fact that investigations
of the curve of observed spot-numbers by periodogram-analysis have
revealed no persistent periods shorter than the eleven-year cycle),
they can be eliminated by smoothing the observed spot-numbers. The
method of smoothing used by the Zurich astronomers consists in form-
ing the average of every 12 consecutive values of the observed monthly
relative numbers and in taking the average of two consecutive averages;
this latter is taken as smoothed relative sunspot-number for the cen-
tral of the 13 consecutive months whose observed sunspot-numbers have
been used for forming the average. If, for example, A denotes the
average of the observed monthly relative numbers from January, 1930,
to December, 1930, and B the corresponding average from February, 1930,
to January, 1931, then $(-A+B-/2)$ is taken as smoothed relative sunspot-
number for July, 1930. The smoothed sunspot-numbers as computed by
this method have been given in Brunner's Table 2.

Recent investigations have led to the conclusion that--as the course
of spot-frequency during each spot-cycle is disturbed by short varia-
tions of an accidental character--the cycles themselves seem to be
disturbed also by accidental variations. It must, therefore, be possi-
ble to reveal the essential behavior of the sunspot-cycles by smoothing
them adequately. For this purpose I have formed the averages of every
four consecutive epochs of sunspot-minima or maxima as given in Brun-
ner's Table 3 and then I have taken the average of two consecutive
averages; this latter is taken as smoothed epoch of minimum or maximum,
respectively, for the central of the five consecutive cycles whose
epochs of minimum or maximum have been used for forming the average.
The same procedure was applied to the smallest relative numbers r which
characterize the depths of the minima and to the greatest relative num-
bers R which characterize the heights of the maxima. The values ob-
tained by this smoothing are given in accompanying Table 1. To avoid
any confusion with the smoothed relative sunspot-numbers as computed
by the Zurich astronomers I propose to call this new kind of smoothing
"secular smoothing."

The arrangement of Table 1 is exactly the same as that of Brunner's
Table 3 so that it needs no explanation. The unit of weight of the
epochs of minimum and maximum has likewise not been changed. As the
weights of the epochs have increased by the secular smoothing I give
the phase-intervals also for cycles before 1755.

In Table 1 the secular variations of the solar cycle show themselves
by systematic fluctuations of the intervals between two minima (m-m),
between two maxima (M-M), from minimum to maximum (M-m) or from maximum
to minimum (m-M), and of the quantities r and R which characterize the
depths of secularly smoothed minima and the heights of secularly

smoothed maxima. The quantities r and R are known, however, only for
the more recent cycles. It would be of interest to learn whether the
secular variations of the solar cycle are reproduced also in terres-
trial phenomena.

TABLE 1--Secularly smoothed minima and maxima of sunspots

Minima				Maxima				Phase-interval		
Epoch	Weight	(m-m)	r	Epoch	Weight	(M-M)	R	(M-m)	(m-M)	
		years				years		years	years	
1632.7	8			1638.1	8			5.4	6.0	
1644.1	8	11.4		1649.8	6	11.7		5.7	5.9	
1655.7	8	11.6		1661.6	6	11.8		5.9	5.3	
1666.9	7	11.2		1672.8	6	11.2		5.9	5.1	
1677.9	8	11.0		1683.9	7	11.1		6.0	5.1	
1689.0	7	11.1		1695.0	8	11.1		6.0	5.1	
1700.1	8	11.1		1705.7	10	10.7		5.6	5.6	
1711.3	8	11.2		1716.8	15	11.1		5.5	6.0	
1722.8	9	11.5		1728.1	16	11.3		5.3	5.9	
1734.0	10	11.2		1739.1	17	11.0		5.1	5.7	
1744.8	12	10.8		1749.8	18	10.7		5.0	5.6	
1755.4	16	10.6		1760.0	27	10.2		4.6	5.5	
1765.5	25	10.1		1769.7	28	9.7	119.4	4.2	6.2	
1775.9	25	10.4	8.4	1779.9	24	10.2	120.8	4.0	6.9	
1786.8	27	10.9	6.4	1791.2	23	11.3	107.8	4.4	7.0	
1798.2	29	11.4	4.1	1803.5	25	12.3	88.6	5.3	6.9	
1810.4	38	12.2	2.9	1816.0	31	12.5	78.4	5.6	6.2	
1822.2	42	11.8	3.6	1827.5	40	11.5	89.4	5.3	6.0	
1833.5	45	11.3	4.9	1838.4	45	10.9	105.9	4.9	6.3	
1844.7	46	11.2	5.9	1848.9	46	10.5	120.6	4.2	6.9	
1855.8	46	11.1	5.9	1859.8	46	10.9	120.2	4.0	7.4	
1867.2	46	11.4	4.6	1871.4	46	11.6	105.7	4.2	7.2	
1878.6	46	11.4	3.8	1883.0	46	11.6	96.0	4.4	7.1	
1890.1	46	11.5	3.3	1894.8	46	11.8	87.4	4.7	6.7	
1901.5	46	11.4	3.2	1906.2	46	11.4	83.5	4.7	6.5	
1912.7	46	11.2	3.5	1917.2	46	11.0	87.8	4.5		