THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS

Solar Bulletin

HARRY L. BONDY, EDITOR — 61-30 157 ST., FLUSHING 67, N. Y.

MARCH - APRIL 1957 — Numbers: 127 - 128

RADIATION MEASUREMENTS FROM THE EARTH SATELLITE

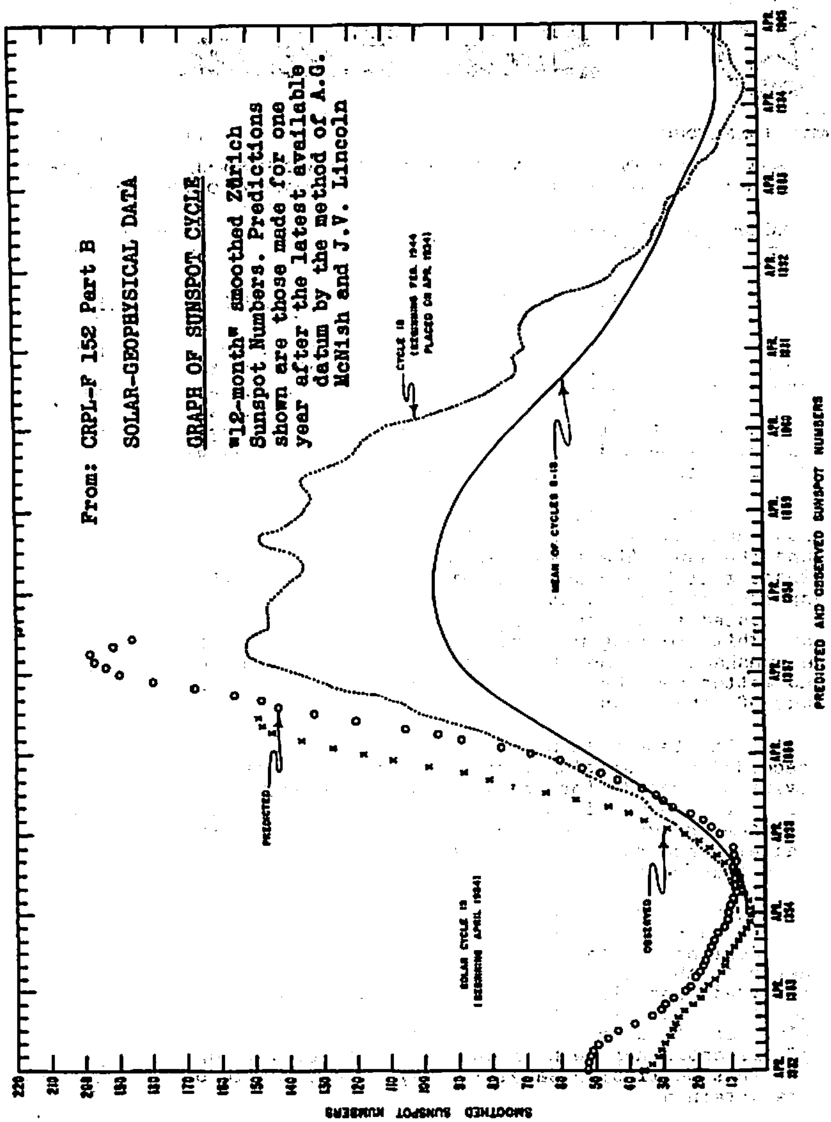
One of the artificial earth satellites to be launched during the International Geophysical Year is scheduled to be instrumented to measure the terms in the radiative heat balance of the earth; namely, the magnitude of the direct radiation from the sun (the solar constant), the solar radiation reflected from the earth, and the long wave radiation from the earth. The method of measuring these quantities was proposed by Dr. V. E. Suomi of the University of Wisconsin.

In this proposed method the satellite will carry at the ends of its four antennas four small spheres in radiative equilibrium with the earth and the sun. These spheres need not be evacuated glass tubes because there will be virtually no air at the satellite's height. One of these spheres will be painted black, another white, and third and fourth will be coated with a special Tabor surface which is black to solar radiation and white to long wave radiation. The two Tabor spheres will each have a sunshade (in one case a pair of discs and in the other, a ring) so that no matter how the satellite spins at least one of these spheres will be out of direct sunlight at all times.

The temperature of each sphere will be measured by thermistors and recorded on a special lightweight magnetic recorder inside the satellite every 30 seconds (or about every 150 miles traveled), and at the completion of each 90-minute revolution of the satellite around the earth, the 180 temperatures from each of the four spheres will be read from the magnetic recorder and radioed to the ground upon electronic interrogation by a transmitter on the ground.

By inserting the sphere temperature into a set of simultaneous linear equations, one can obtain the radiation terms mentioned above. In addition, by taking the ratio of the reflected radiation from the earth to the direct solar radiation, the albedo of the earth can be determined. The albedo of other planets is easily determined directly, but no direct determination of the earth's albedo has ever been made before. (The earth's albedo has been estimated to be about 35%.) The University of Wisconsin has been given a contract to develop the instrumentation for this particular satellite experiment and to process the data which are obtained.

Leith Holloway
3026 Porter St., N. W.
Washington 8, D. C.


From: CRPL-F 152 Part B
SOLAR-GEOPHYSICAL DATA
GRAPH OF SUNSPOT CYCLE
"12-month" smoothed Zürich Sunspot Numbers. Predictions shown are those made for one year after the latest available datum by the method of A.G. McNish and J.V. Lincoln
CYCLE 18 (BEGINNING FEB. 1944 PLACED ON APR. 1934)
MEAN OF CYCLES 8-18
PREDICTED
OBSERVED
SOLAR CYCLE 19 (BEGINNING APRIL 1954)
SMOOTHED SUNSPOT NUMBERS
PREDICTED AND OBSERVED SUNSPOT NUMBERS

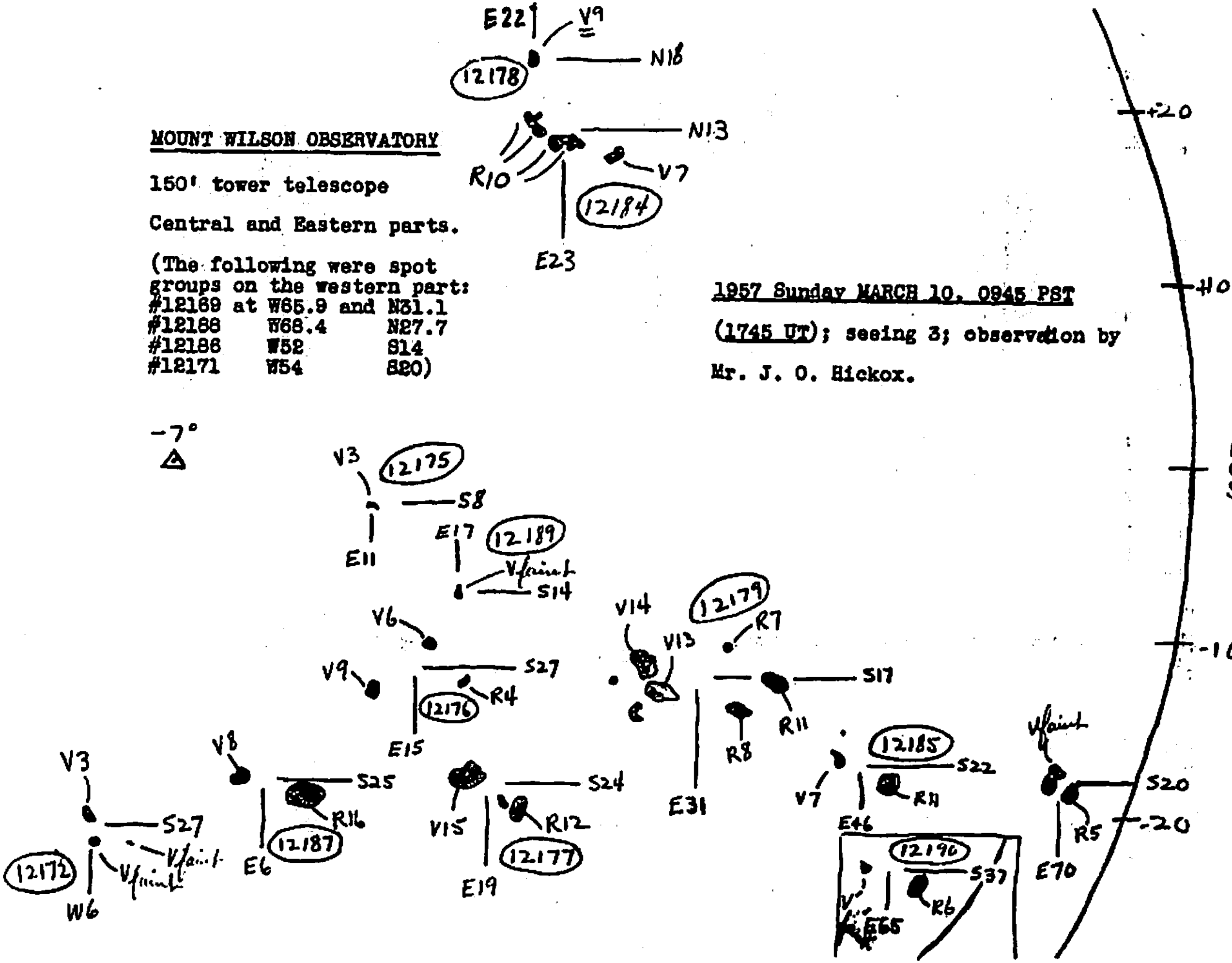
MOUNT WILSON OBSERVATORY

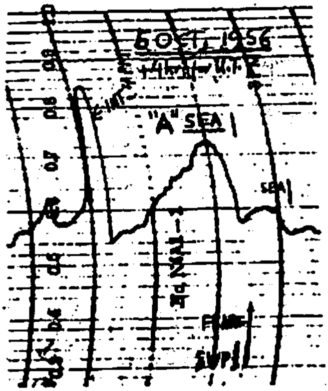
150' tower telescope

Central and Eastern parts.

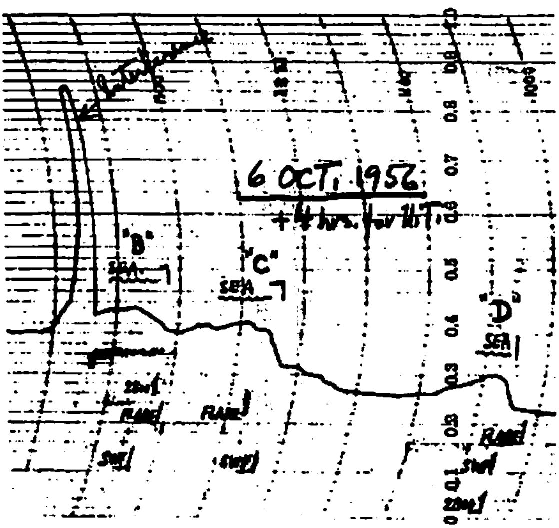
(The following were spot groups on the western part:
#12169 at W65.9 and N31.1
#12188 W68.4 N27.7
#12186 W52 S14
#12171 W54 S20)

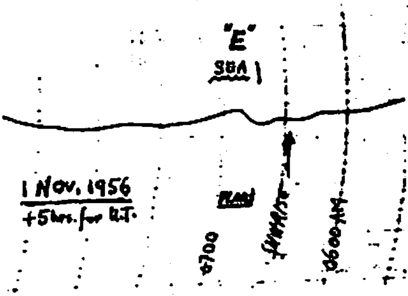
1957 Sunday MARCH 10, 0945 PST (1745 UT); seeing 3; observation by Mr. J. O. Hickox.





"A" an intense SEA
beg.:1917 max.1930 UT
end. 2020
Flare: 1- McMath-Hulbert
beg.1915; SWF beg. 1920





SOME EXAMPLES OF DAVID WARSHAW's SEA's

"B" slow rising SEA; beg.1703, max.1720 UT

"C" SEA superimposed on a generally rising level; obscuring the "ending"

"D" fast rising SEA with a somewhat broad maximum

"E" a small, distinct "early morning" SEA

General classification: "A" very intensive: SEA/3

"C", "D" medium: SEA/2 "B", "E" small; SEA/1

It is quite evident that the amplitude of a SEA is not dependent on the intensity of the flare causing it. All the above illustrated SEA's were due to subflares (1-), excepting "E", which was class 1 flare according the Ondřejov Obs., while the Swedish station on Capri called it 1-.

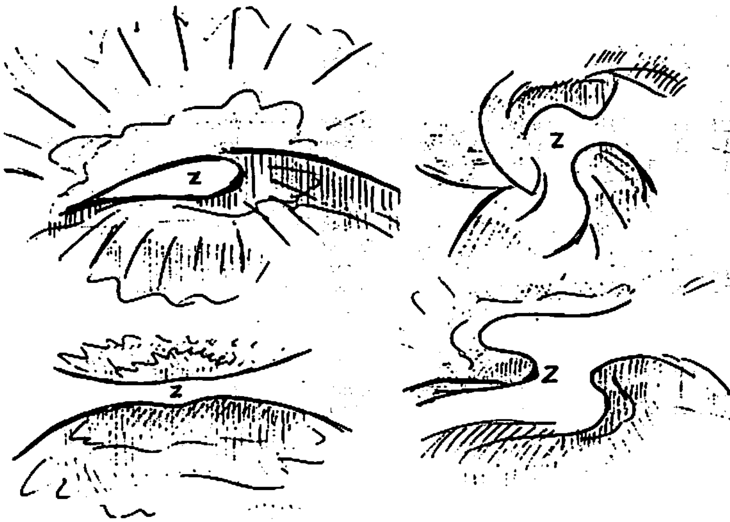
It is further to be noted that the above examples should at best be considered as SEA's recorded in latitude 40° and that, as Dr. Ellison believes, SEA's in higher latitudes have higher amplitudes.

Mr. David Warshaw continues his recording of SEA's. His material, as shown in the Table on page 5, is analyzed by Harry L. Bondy and these results will be published here. A detailed article on this work is in preparation. Messrs. W. Val Isham, Columbus, Ohio, and Walter A. Feibelman, Pittsburgh, Penna., have already joined Warshaw in this work.

SUDDEN ENHANCEMENTS OF ATMOSPHERICS (SEA's) on 27 kc/s recorded by DAVID WARSHAW in Brooklyn, N. Y. in October, November, December 1956.

date	beg.	max.	flare	SWF	Notes:
Oct.					
4	1508	1515	2+ MM b1513*	Sudden 1511-	Recorded also by Ellison, Lee
4	1545	1612	1- SP 1545	-same till 1655	Recorded by Lee as a SCNA
4	1720	1740	1- SP 1720	Slow 1720	" " Lee
4	1950	2013	1- SP 1950*	Slow 1955	" " Lee
5	1342	1345	1 MM b1344	Slow 1345-	possibly a double SEA
5	1401	1403	(1- SP 1410)	-same to 1405	double with preceding one
5	1438	1445	1- SP 1445	0	minute SEA
5	1622	1635	1- MM 1624	Gradual 1630	slow rising SEA
5	1917	1930	1- MM 1915	Slow 1920	very prominent SEA, also Lee
5	1855	1908	0	0	medium SEA
6	1414	1423	1- MM 1405*	Slow 1417	also by Ellison
6	1608	1617	1- SP b1625	Sudden 1612	sudden, high SEA
6	1703	1720	1- SP 1705*	Gradual 1712	slow rise
6	1942	1950	1- SP b1958	Sudden 1940	
8	1430	1442	1 SP 1425*	Slow 1425	
10	1702	1715	1+ SP 1655	Slow 1705	SEA into interference
21	1600	1608	1- SP 1555*	Sudden 1605	low SEA
Nov.					
1	1405	1426	1- SP b1420	0	
1	1145	1152	1 ON 1142	0	only 15 min. after sunrise
1	1535	1552	1- SP 1550	0	slow rise
4	1545	1552	1 SP 1555	Slow 1600	peculiar, into interference
7	1555	1618	1- SP 1550*	0	slow rise
7	1701	1704	1- SP 1645	0	sudden, small
9	1840	1842	1- SP 1840	Sudden 1840	SCNA by Lee
12	1647	1650	1- SP 1645	Slow 1630	small; also by Lee
12	2030	2040	1- SP 2030	(Slow 1831-2055)	
13	1445	1500	2 MM 1442*	Slow 1430	slow, low; also by Ellison
27	1408	1415	0	0	doubtful
27	1556	1605	1- SP	0	doubtful
Dec.					
2	1917	1925	1- SP 1915	0	very small; also by Lee
6	1800	1811	1- SP 1800	(Sudden 1742-1840)	very small

* = also recorded as an "outstanding event" on 2800 Mc/s by NRC, Ottawa
MM = McMath Hulbert Observatory; SP = Sacramento Peak; ON = Ondřejov Obs., Czechoslovakia; SWF = Short Wave Fadeout



AURORAL FORMS on
MARCH 1/2, 1957

observed in EDMONTON, ALBERTA, CANADA

by Dan Mac Pherson and John Mandrusiak

(forms from Mr McPherson's colored drawings)

Key: |||| red ≡ green //// blue \\\\ yellow

Z = zenith

* * * * * * * * * * * * *

DID WE PASS SUNSPOT MAXIMUM?

Since the epoch of Maximum /and Minimum/ is computed from "smoothed" sunspot numbers, and these running averages take into consideration a span of 13 months, it is not yet possible to decide definitely the epoch of sunspot maximum of the current cycle. According to Dr. Waldmeier's predicted smoothed numbers, maximum occurred during January 1957. On the other hand the McNish-Lincoln method predicts maximum for July. (See p. 2)

However, there are other indications that Maximum passed. For one, the definitive Zürich Number for November (201.3) equals the highest monthly mean of 1947, the previous Maximum, while December (192.1) was higher than the second highest value of the previous cycle. Since beginning, the Northern hemisphere was more active than the Southern one. This situation changed in October 1956. The highest number of spot groups occurred in September (87 Mt. Wilson groups). The highest measured magnetic flux (H) of Northern groups came in August (Hg=13.2); for the Southern hemisphere it came in October (Hg=12.9).

There are, however, other indications that make it doubtful that we passed maximum. Thus the radio flux on 2800 Mc/s as measured by the National Research Council, Ottawa, Canada, reached highest values of 247 and 248 in November and December 1956. In 1947 the highest flux average was 263.7 and 261.1 in April and May. There is the problem of latitude of spots; it seems also very likely that we have not yet seen the largest groups of this cycle.

hlb

A U R O R A E.

With the high solar activity regions moving into somewhat lower latitudes (±15°) the powerful corpuscular component of solar radiation can reach our earth more readily and thus cause greater auroral displays. A number of our Solar Division members is active in aurora observations and particularly our active members in Edmonton, Alberta, Canada, who are, fortunately, located in lat. 53° N. In a recent letter from Mr. Franklin Loehde we read about the great aurora of March 1-2*(which was visble at least as far south as Texas and possibly further). He sent us also a beautiful set of drawings in colored crayons made by Mr. Dan Mac Pherson and observed together with Mr. John Mandrusiak. Unfortunately, here we can show only the more outstanding shapes and not the striking colors, and yet Mr. Loehde writes:

> "As was reported in 'Stardust' /the local astronomical bulletin/ the auroral activity seems to be on the upgrade. Not only are there more displays but they are of an entirely different nature. In the five years I've been observing the displays have been steadily changing. Prior to 1955 the aurorae were sharper in outline and generally more colorful. Now the displays are more diffuse and widespread and lack in color. We used to look for displays over the northern horizon, but now they are either on the zenith or in the southern skies..."

Only one rotation later, Mr. Walter Scott Houston, Manhattan, Kansas, saw a "daylight aurora". Mr. Houston describes it as follows in THE GREAT PLAINS OBSERVER, Vol.2 #2 p.3: "On Wednesday, March 27/28 1957 I was watching an airplane over my house in the country at about five o'clock. Only a few cumulus scud clouds were in the head and and those were mostly west. Suddenly I realized that the "clouds" overhead were rippling in typical auroral fashion, and in fact, were actually auroral rays that reached almost to the zenith. The sun, of course was still up, so I moved into the shade of the house for better vision. This aurora consisted of bundles of narrow rays reaching certainly to 80°, faintly green in color. I saw them while facing the magnetic meridian, where they filled an angle of perhaps 60° in azimuth. They were difficult to see, but easy and obvious with averted vision. As twilight came on they seemed to rise less and by 6:00 PM were only 50° high. By 7:00 PM I could not see them any more but there now was a bright glow on the northern horizon, brighter then the sunset sky. 8:00 and dark revealed a set of rays similar to the 5:00 daylight ones, which faded out to be replaced by three thick, blunt rays to 45-50°, with the northwest one brilliant crimson and rose all over. This lasted no more than 15 minutes. A thunderstorm now moved in; but at midnight clearing skies revealed a medium glow on the northern horizon."

*) The March 1-2, 1957 great aurora may have been associated with a class 3 flare observed at Mitaka, Japan, on February 28 at 0005-0057 UT in the E-type sunspot group /N18°, W35°/.

* * * * * * * * * * * *

MT. WILSON GROUP 11875

OCTOBER 6th 1956 by HARLAN T. HINEY, 1935 Colby Ave., Los Angeles 25, California

3" refractor (f 12.5); 80x direct view (prism wedge)
30" disk of sun; Seeing 2.5-3.5; large spot 20^h to 20^h 30^m UT;
rest of group 21^h to 21^h 50^m UT

The above drawing of the active October group (many flares, and SEA's) is one of the finest seen by this Editor. Mr. Hiney is not only a most meticulous observer of detail, but obviously a very skilled artist. Our heartiest congratulations for an excellent job. We hope to be able to reproduce many more of your drawings, Harlan.

hlb

* * * * * * * * * * *

From the review of "SOLAR ACTIVITY IN 1956" by Thomas A. Cragg written for the Publications of the Astronomical Society of the Pacific:

"The total number of sunspot groups observed at Mount Wilson in 1956 was 642 (Ed. note: see page 11 for monthly averages), compared with 208 in 1955, and 46 in 1954. The record number of groups observed in one year is 663 in 1947. Since the maximum activity in this cycle is expected in 1957, a new record will probably be set then. The rate of increase of solar activityfrom 1955 to 1956 greatly exceeded that from 1945 to 1946. This rapid increase is illustrated in Figure 1, which shows the number of spot groups and their distribution in latitude for the years 1945, 1946, 1947, 1955, 1956. If the number of spots continues to increase for another year, as it did at the similar phase in the last cycle, the coming maximum will certainly be the highest ever recorded."

"As in the last two years, the northern hemisphere with 53 per cent of the groups, continued to be the more active. The average latitudes of the groups in each hemisphere were +23°.4 and -21°.8 in 1956, +26°.1 and -25°.1 in 1955, and 27°.7 and -26°.5 in 1954."

(continued: Solar Activity in 1956 by Thomas A. Cragg)

"An unusual number of spots appeared in very high latitudes in this cycle. In the 65 years from 1878 to 1943, during which daily solar photographs are available, only four groups that lasted longer than one day appeared on the sun further than 40° from the equator. In the last cycle, 1943 to 1954, eight such groups were observed, five before and three after maximum. Already in this cycle eleven have appeared, seven of themin 1956. The group farthest from the equator was in latitude +49°. Because of the slow rate of solar rotation in that latitude, it was on the visible hemisphere for 16 days."

"Although none of the 642 spot groups observed in 1956 were as large as the huge ones of 1946 and 1947, the number larger than 1,000 millionths of the solar hemisphere were essentially the same as in 1947. Forthy-eight groups were visible without optical aid."

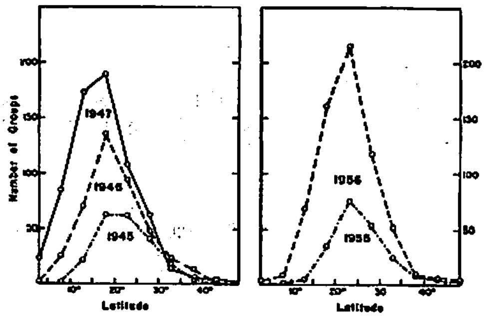
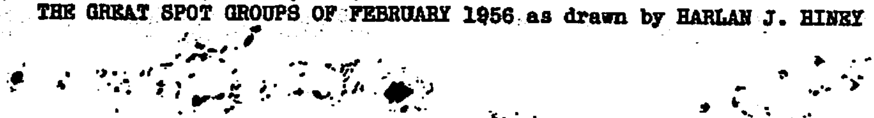


Fig. 1 Number of sunspot groups observed at Mount Wilson in each 5° zone for the years 1945, 1946, 1947, and 1956, 1955.

* * * * * * * * * * * *

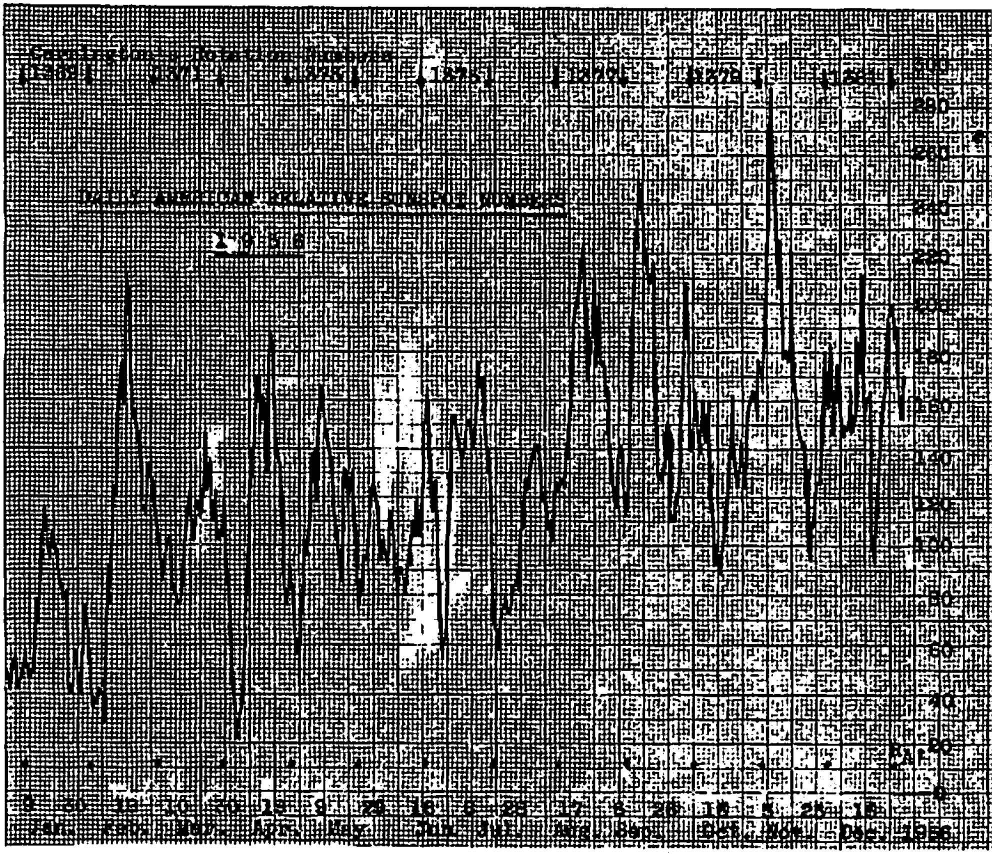
THE GREAT SPOT GROUPS OF FEBRUARY 1956 as drawn by HARLAN J. HINEY



North

FEBRUARY 19th 1956, 2045-2130 UT 15" disk 60x seeing 2-3.5

South



1956 was in many ways a most interesting year for sunspot observers. Starting right in January, a complex train of sunspots made its appearance. This whole region reached maximal proportions in February and faded in March.

During summer (August) we witnessed the longest lived bipolar group of very high latitude (+49°). Careful observers could readily notice that solar rotation in that latitude was considerably slower than it is in the average sunspot zone.

The last part of 1956 brought with it an unusually great number of spots - groups mostly of small size, however, - which finally culminated in the highest average sunspot number in November.

DAILY AMERICAN RELATIVE SUNSPOT NUMBERS R_A, FOR 1956.

Day	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1	48	50	127	79	101	94	154	133	147	154	153	183
2	42	75	113	49	96	102	147	137	157	184	176	147
3	52	69	104	37	107	97	143	141	133	207	169	155
4	55	52	98	22	134	92	133	141	121	197	183	175
5	42	35	86	31	138	114	142	134	116	140	209	155
6	44	38	94	36	118	107	151	119	137	142	254	146
7	47	37	102	53	155	98	151	122	141	163	287	149
8	57	42	103	84	166	79	152	107	128	150	265	148
9	52	40	83	107	154	91	140	110	113	139	207	164
10	46	29	83	134	146	90	154	102	123	160	225	147
11	49	47	77	140	143	81	176	123	160	143	224	153
12	59	75	77	169	134	93	166	126	205	159	178	185
13	78	96	85	170	118	92	169	122	222	133	180	171
14	69	124	103	147	110	110	143	127	249	115	177	211
15	97	121	111	161	95	104	138	125	245	94	221	152
16	115	153	123	130	86	120	115	137	230	100	170	161
17	1o8	175	102	188	107	114	73	145	222	89	161	163
18	97	158	116	173	131	118	68	159	210	95	150	100
19	95	212	118	161	119	145	58	192	209	104	145	94
20	106	206	112	139	131	162	70	198	215	113	143	112
21	100	168	114	135	117	146	75	211	175	125	121	134
22	89	156	146	124	108	116	80	217	129	162	131	151
23	86	152	123	86	75	127	73	224	128	134	95	160
24	79	147	134	76	80	103	73	196	132	124	104	185
25	81	140	110	91	95	90	82	170	130	128	120	195
26	57	116	123	82	94	55	85	182	150	143	126	199
27	41	113	103	78	105	63	82	209	110	124	126	186
28	43	132	105	57	119	95	105	175	110	133	155	190
29	57	128	104	57	125	128	107	203	117	157	180	160
30	52		118	77	121	153	127	175	121	164	157	153
31	41		88		111		123	175		162		170
Mean:	67.2	106.4	105.9	102.4	117.3	106.0	117.9	155.7	159.5	139.9	173.1	159.8

-

Mean Number of Sunspot Groups Observed Daily at Mount Wilson

Month	1954	1955	1956	Month	1954	1955	1956
January	0.0	2.2	6.4	July	0.6	3.2	9.3
February	0.1	2.2	9.3	August	0.8	3.3	13.5
March	0.5	0.6	10.6	September	0.3	4.9	15.2
April	0.3	1.4	10.8	October	1.4	6.1	12.9
May	0.1	2.3	9.9	November	0.9	7.3	11.8
June	0.0	2.4	9.3	December	0.7	6.9	13.8
				Yearly Mean	0.5	3.6	11.1

AMERICAN RELATIVE SUNSPOT NUMBERS $R_{A'}$ for January, February and March 1957

day	January	February	March
1	157	68	144
2	137	58	158
3	169	70	120
4	198	106	121
5	194	84	92
6	209	102	111
7	153	104	137
8	145	126	114
9	124	150	141
10	99	119	177
11	102	98	170
12	118	108	191
13	110	103	178
14	85	114	145
15	66	143	112
16	54	136	114
17	81	121	124
18	138	121	123
19	151	99	126
20	142	92	128
21	138	97	108
22	144	123	132
23	123	98	139
24	138	116	122
25	155	116	102
26	151	102	112
27	125	106	149
28	115	121	143
29	96		135
30	88		139
31	98		132

Monthly mean: January $R_{A'}$ = 129.1
February = 107.2
March = 133.5

* * * * * * * * * * * * * * *

ZURICH PROVISIONAL SUNSPOT NUMBERS R_Z for January, February, March 1957 dependent on observations made at Zürich Observatory and its stations in Locarno and Arosa.

day	January	February	March
1	150	105	153
2	180	114	164
3	203	73	137
4	195	103	127
5	217	94	125
6	244	110	146
7	215	123	146
8	196	136	143
9	156	144	180
10	146	126	186
11	145	113	210
12	148	116	224
13	123	100	228
14	114	115	164
15	90	120	161
16	90	139	146
17	100	127	155
18	126	120	148
19	150	109	150
20	150	90	110
21	155	111	128
22	183	115	137
23	171	126	152
24	201	126	145
25	170	127	160
26	146	128	171
27	134	133	154
28	125	126	146
29	117		154
30	88		172
31	92		145

Monthly mean: January R_Z = 152.3
February = 116.8
March = 157.0

L E T T E R S :

To the Editor;

For several months the writer has had the impression, which he has expressed to others, that there have been fewer spots per group in the current Cycle 19 than there were in Cycle 18 at the corresponding time, which occurred 10 years and two months ago as indicated in the "Daily Solar Indices" sent out monthly by the National Bureau of Standards.

The writer's own final reports on his sunspot counts are presumably somewhere in the Solar Division files and his original field notes have been thrown out during the course of a couple of personal moves, so the writer has not found it possible to confirm this impression from his own notes. However, Mr. Cyrus F. Fernald, Wilton, Maine, has kindly sent me his group and sunspot counts for portions of Cycle 18 and Cycle 19, which appear to confirm the above impression and a compilation of them leads to a surprising conclusion.

Herewith is a tabulation showing a comparison of Mr. Fernald's sunspot counts for the corresponding periods of June 1946 to January 1947 in Cycle 18 and August 1956 to March 1957 in Cycle 19. These two periods are 10 years and 2 months apart, so that they cover the same 8-months portion of each cycle.

In Cycle 18, Mr. Fernald saw 1116 groups and 7589 spots, or an average of 6.8 spots per group. In Cycle 19, Mr. Fernald saw 1363 groups and 6869 spots or an average of 5.0 spots per group. The surprising fact is that there were actually 720 fewer spots in Cycle 19 than in Cycle 18. This, despite the fact that the Relative Sunspot Numbers for Cycle 19 are considerably above those of cycle 18.

Evidently the reason the Index for Cycle 19 is running higher than the Index for Cycle 18 is because it has more groups, namely 1363 as compared to 1116. Groups of course are counted as the equivalent of 10 extra spots in Wolf's formula.

Mr. Fernald has sent me his counts for longer periods. From June 1946 to December 1949, inclusive, a total of 43 months, he saw 6837 groups and 46,647 spots or 6.8 spots per group. From July 1955 to March 1957, a total of 21 months, he saw 2787 groups and 13,069 spots per group. These periods, although they do not exactly correspond in the two cycles, again tend to confirm the impression that there were more spots per group inCycle 18 than there have been in Cycle 19. The figure 6.8 is 45% higher than 4.7.

It is also the writer's impression, with which it is believed that both Mr. Fernald and Dr. Bartlett concur, that in Cycle 18 there were considerably more of the really large and turbulent groups. This writer remembers one group, perhaps it was in 1946 or 1947, which had a total of 200 spots in it. The best that Cycle 19 has produced is one group with about 60 spots in it. The writer's highest daily count in the former cycle was around 400, whereas the best the sun has done this cycle is around 300.

While the above analysis is not comprehensive enough to definitely establish that there is a difference between the richness of groups in Cycle 18 and Cycle 19, it certainly points to that conclusion. This makes one wonder whether the sun was not fundamentally more active in Cycle 18 than it has been in Cycle 19.

David W. Rosebrugh

66 Maple Avenue
Meriden, Conn.

Table I.

Comparative Sunspot Counts of Cyrus F. Fernald, Wilton, Maine.

Cycle 18				Cycle 19			
Month & Year	Groups	Spots	Spots per Group	Month & Year	Groups	Spots	Spots per Group
1946				1956			
June	137	809	5.9	Aug.	250	1292	5.2
July	150	1665	11.1	Sep.	227	923	4.0
Aug.	165	1338	8.1	Oct.	179	927	5.2
Sep.	157	1259	8.0	Nov.	139	1131	8.2
Oct.	162	713	4.4	Dec.	84	385	4.6
Nov.	142	733	5.2	Jan.'57	154	674	4.4
Dec.	92	604	6.5	Feb.	125	522	4.2
Jan.'47	111	468	4.2	Mar.	205	1015	5.0
Total:	1116	7589	6.8	Total:	1363	6869	5.0
June 1946 to Dec. '49 inclusive	6837	46647	6.8	July 1955 to Mar.'57 inclusive	2787	13069	4.7

D.W.R.

* * * * * * * *

Editor's note: We are indebted to Mr. Rosebrugh for a very interesting letter. I recall a similar situation when the 18th cycle was compared with the preceding one. Then too many felt that the 1944-1954 cycle was less active than the 1933-1944. Unfortunately, statistics, and this seems to apply - particularly to solar indices (the volumes of 'correlations'; 'predictions' dependent on 'solar activity'..) are full of pitholes and, alas , even mirages. To wit, such elusive factors as consistency, completeness, homogeneity to cite just a few, form the "soft underbelly" of all statistical conclusions. Here, e.g. we would expect a fair agreement between Fernald's figures and say those obtained by the Zürich Observatory. Given the same period /as used in the above Table I., we get the following comparable ratios from the Zürich Sunspot Numbers: 7.1; 14.0; 11,0; 9.4; 7.9; 10.6; 12.8 and 8.5. Alas, these two sets of figures vary from 20% to 100%! But how much of this difference is due to the bad fall-to-winter seeing and even outright lack of many observations (as can be seen, the difference actually grows with the season?

Unfortunately, at this writing, I do not know the Zürich group counts for 1956. Since there is usually good agreement between Zürich group counts and those made at the Mt. Wilson Observatory (usually within plus and minus 10% of monthly averages), I tried to get an indication from the ratio R/W (= Zürich Sunspot Number/Mt. Wilson group counts). This crude method yealds the following results: for 1946+1947 R/W = 12.0; for 1955+1956 R/W = 11.7. A further breakdown gives R/W 1946 = 11.8; R/W 1947 = 12.2; R/W 1955 = 10.6; R/W 1956 = 12.8. Any conclusion!? I hope to be able to publish here the ratios derived only from Zürich data. A further breakdown into group-types (A,B,C,D,...J) would be most illuminating, since, to my knowledge, it is not known what proportions the various types assume during small, medium and high cycles. HLB

* * * * * * * * * * * *

THE WHITE FLARE OF 23 FEBRUARY 1956.

Since only five authentic "white flares" (i.e. flares seen without spectroscopic equipment or narrow band filters but in the "white" light) — are known to us /see Solar Division Bulletin - Sept.-Oct. 1956/ we shall quote here the full report on the great flare of 23 February 1956 as it appeared in the PUBLICATIONS OF THE ASTRONOMICAL SOCIETY OF JAPAN, Vol.8, No.1:

> (A description of the flare as recorded with spectrohelioscope and radio telescope forms the first part of this article. The pertinent data given are: a) coordinates of the flare 74°W,23°N b) beginning of the flare 0331±01 UT; max. 0342; ending 0415 UT, c) maximum brightness 303% of the adjacent continuum)....
>
> "While W. Unno and M. Shimizu were engaged in the photoelectric scanning of the sunspot area with the tower telescope (f=2200cm) they noticed a small white spot on the projected image of the sun in the total light. The diameter was of the order of 5", which was the same order of the size of atmospheric scintillation at that time. The time they noticed was about 0345. (ed.note or just after the maximum) The brightness was about the same as that of the center of the sun's disk. The duration was of the order of 5 minutes. The position was in good agreement with that of the intense flare observed with the spectroheliosocope, and it is certain that the flare was observed in the integrated light.
>
> "There was also a facula-like patch which was somewhat brighter than the ordinary faculae. This seemed to last about 5 minutes after the white spot had disappeared. Another curious phenomenon was observed just outside of the limb. An amorphous matter of fan-shaped structure was seen in reddish-blue color. The intensity was very faint and was just distinguishable from the sky light by color. Optical systems were checked and the observed phenomenon was found not due to any stray light. The position is in agreement with that of the prominence. It disappeared at about the same time when the white spot disappeared."
>
> (Ed. note: the original text has no underlined words)

We once again urge our members to observe with care large and active sunspot groups. Perhaps other "white flares" will show up during the current high cycle.

Corrections: Item No. 10 in our November-December issue, page 2 - change the word "reducing" to "producing". Also in the second paper by Mr. Leith Holloway corrections must be made: note that "Jan. 1957" should read "January 1956" and that the March 1956 predicted value should read 96 and not 86 as printed. I regrett these errors. A further extension of Mr. Leith Holloway's Predicted $\bar{R}_{A'}$ values and those actually observed follows:

Month	Predicted $\bar{R}_{A'}$	Observed $\bar{R}_{A'}$
November 1955	64	65
December	72	73
January 1956	80	80
February	88	89
March	96	99
April	104	107
May	112	114
June	120	122

* * * * * * * * * * * * * * * * * * *

OUT OF OTHER PUBLICATIONS.

"THE OBSERVER", published by the Yakima Amateur Astronomers, March 1957 issue, carries an interesting article on a METAL REFLECTOR TELESCOPE MAY HELP IN STUDY OF SUN:

"A remarkable piece of metal - weighing only 12 pounds but costing $ 1700 - is being readied at Phoenix, Ariz., as a possible tool for astronomers to study the sun. The substance is beryllium, lightest of all metals. It is in the form of a disk, about 12 inches in diameter and two inches thick. The beryllium disk is of potential value in astronomy because it may be able to face the sun and absorb its heat without getting too much out of shape to act as a light-collecting mirror for a solar telescope."

"The National Science Foundation is planning to set up a test telescope at several sites in the United States and the Pacific isla nds as possible locations for observatories. The tentative sites thus far picked include Junipero Serra Peak in Monterey County, Calif., and the summit of volcanic Mauna Loa in Hawaii." (Ed. note: see the superb solar photograph's taken at Junipero Serra Peak by Leon G. Salanave reproduced in the May issue of Sky and Telescope.)

"At the Foundation's Phoenix observatory project the disk will first be subjected to the sun's heat and then measurements made of the extent of its warping. How it behaves in this test will determine whether it may itself be ground into a mirror for one of the instruments...Beryllium heats up rapidly. But it may turn out to be good mirror material, says Dr. A. B. Meinel, observatory project director, because there is a possibility that it will throw off heat about as fast as it absorbs it. The way the molecules fit together in the metal also makes it desirable.as possible mirror material. It is very hard and can be ground like glass."

* * * * * * * * * * * *