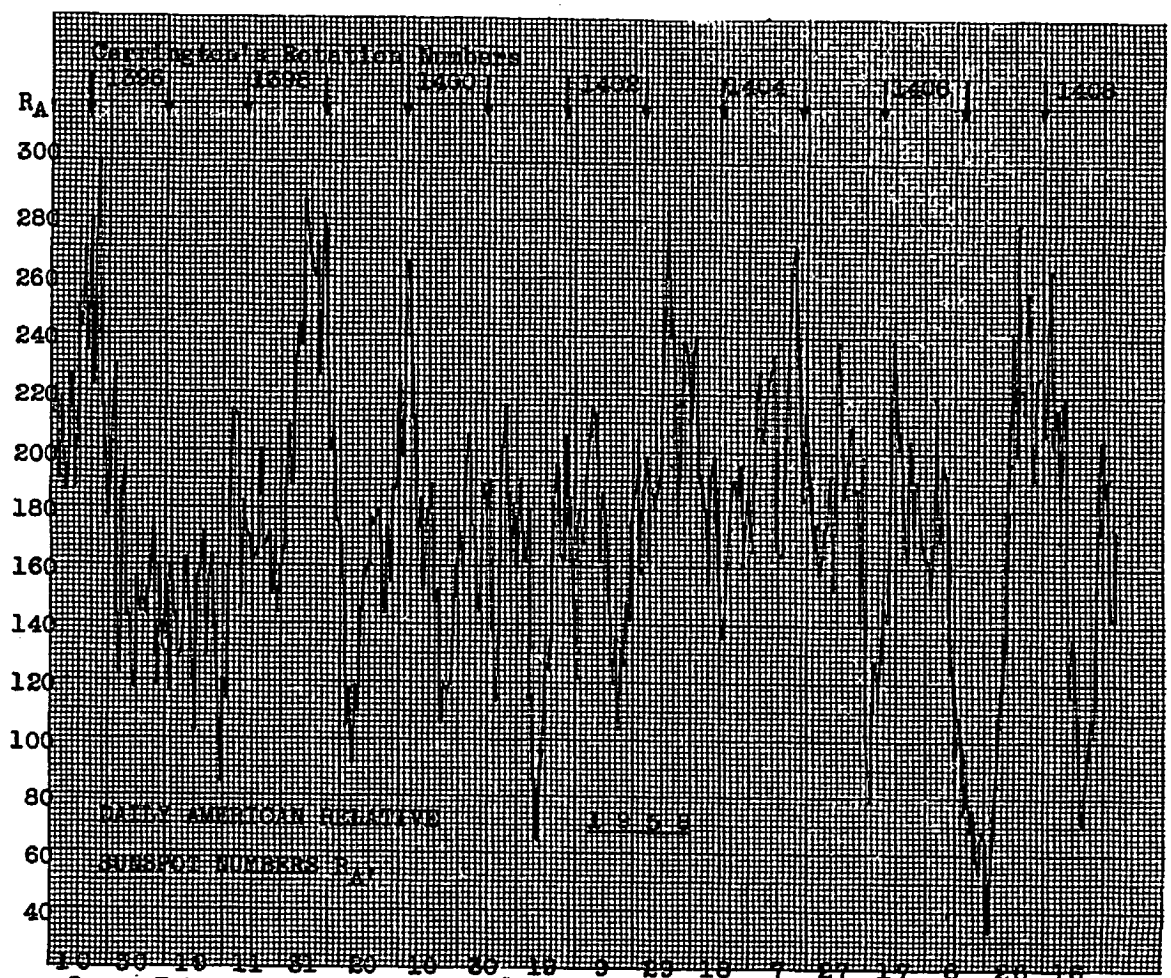
THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS

Solar Bulletin

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

SOLAR DIVISION COMMITTEE: RICHARD W. HAMILTON, AAVSO PRESIDENT; H. L. BONDY, CHAIRMAN
RALPH N. BUCKSTAFF; THOMAS A. CRAGG; SARAH J. HILL; DAVID W. ROSEBRUGH; ALAN H. SHAPLEY

OCTOBER - DECEMBER 1958 — Nos.: 146;147;148



At the Fall Convention of the American Association of Variable Star Observers (AAVSO) held at Springfield, Mass. in October 1958, several Solar Division members presented a number of fine papers and also held a symposium on their SEA work (described in another part of this issue).

Mr. Ralph N. Buckstaff (see further on) described his findings of sunspots occurring in same longitudes on opposite hemispheres. Mr. Walter A. Feibelman described his own photometric and spectrographic equipment used in his observations of aurorae. He showed that a serious observer can obtain significant auroral data from observations made even in a large city like Pittsburgh, Pa.. Many fine photographs made by Feibelman are reproduced in Sky and Telescope.

Mr. Walter J. Semerau described and showed on slides his excellent coronograph, spectroheliograph and cinematographic equipment for solar observations. He showed numerous photographs of prominences and spectroheliograms of flares, plages and filaments. Mr. Philip J. Del Vecchio described his geometric theory for explaining the diurnal "sunrise-pattern" revealed in our SEA study made on 27kc/s, while Mr. David Warshaw elaborated his own theory of this same phenomenon (see Solar Bulletin - Jan.-June 1958) postulating a separate ionized band. Harry L. Bondy reported on the results of the Solar Division's SEA Patrol.

Here are some conclusions by RALPH N. BUCKSTAFF in his study of "The Occurrance of Sunspots on the same Meridians in both Hemispheres".

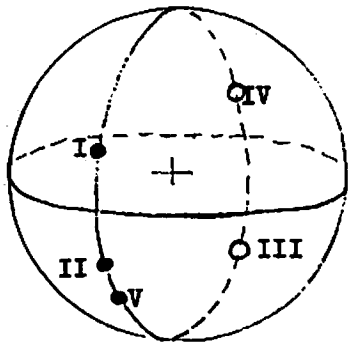
From August 1949 to August 1958, Buckstaff recorded 2139 sunspot groups. Of these 2139 groups, 348 groups i.e. 174 pairs or 16.2% were distributed on same longitudes in opposite hemispheres. As Buckstaff points out, such a large proportion (one out of 12 groups has a "twin" on the same longitude) can not be a chance distribution but must be related to a deeper, more fundamental process of solar activity thus pointing in the direction of better understanding basic solar processes. (Consider f.i. the Walen hypothesis).

In summary Buckstaff found that a) similar (e.g. A - A) and dissimilar (A - J) UNIPOLAR groups comprised 50 respectively 37 pairs or a total of 87. This is 50% of these "parallel" groups. b) BIPOLAR similar (B-B) and dissimilar (e.g. B - C) added up to 22 and 7 or a total of 29 that is 16.7%. The balance or 58 group-pairs were mixed in types, i.e. unipolar with bipolar types or 33.3%. (See some examples on the next page).

Other astronomers have studied this "twinning" of spots. Dr. M. Waldmeier found the following distribution:

(I)	a) lat.A; long.B	⟶	-lat.A; long.B	(II)
	b) " "		-lat.A; long.B + 180°	(III)
	c) " "		+lat.A; long.B + 180°	(IV)
	d)* " "		lat.B; long.B	(V)

*) A pairing-off of groups on the same longitude but different latitudes in same hemisphere is also quite frequent in the current cycle as Buckstaff's drawings show. This case d) was not listed by Waldmeier.



Sunspot distribution according to Waldmeier

(text in "Ergebnisse und Probleme der Sonnenforschung" 1955; p.173)

(case V not listed)

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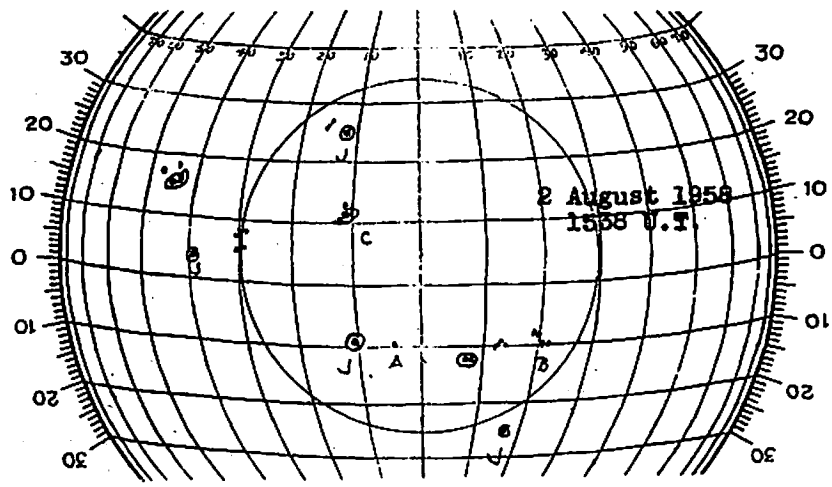
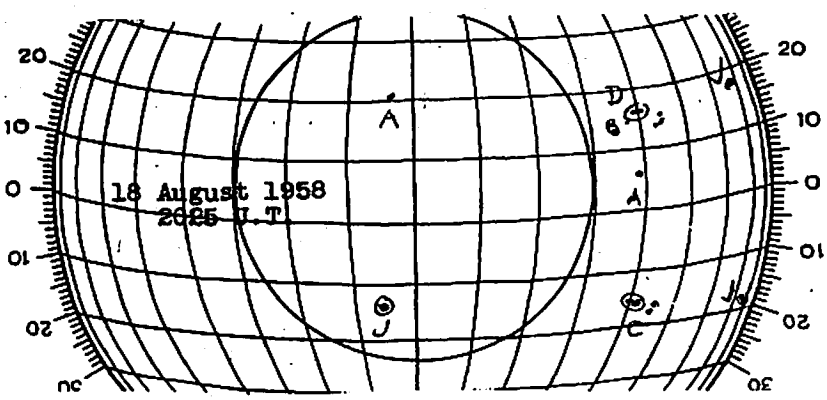
Some examples of "Sunspots in Same Longitudes" by BUCKSTAFF.



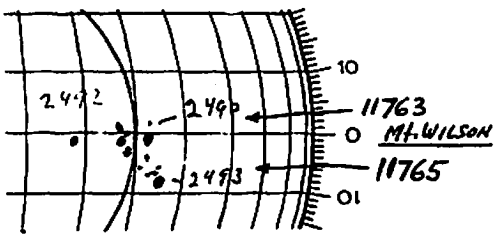


A RARE EQUATORIAL SUNSPOT,

Mr. RALPH N. BUCKSTAFF, Oshkosh, Wisconsin, sent us a copy of his regular sunspot projection drawings noting the rare equatorial sunspot group. (In our Jan.-June 1958 Solar Bulletin Buckstaff showed another equatorial or near equatorial group.)

Mr. Thomas A. Cragg, Mt. Wilson Solar Observatory, wrote the following notes on this group:

"Probably a little discussion of the complex group which straddled the equator in December is in order. (Magnetic) polarities were obtained on nearly every day of its disk passage, so for a change the story is rather complete. First, we divided the complex of spots into two groups, 11763 and 11765 with mean latitudes S2° and S6° respectively. As you know some parts of 11763 were north of the equator. The polarities of 11763 were sufficiently mixed to classify it as βδ, but were not affected in the slightest by the fact that the equator passed through the group. This is in sharp contrast to the group of May 1921 (CMP May 14, 1921)where everything was badly mixed on either side of the equator. The other group, 11765, was a reasonably straight forward βp. It should be also mentioned that the leading spot of 11763 had a large proper motion to the west."



9 December 1958 -drawing by RALPH N. BUCKSTAFF, Oshkosh, Wisc.

12 December 1958 photograph by JEAN NICOLINI, Sao Paulo, Brasil.

Ed. note: Since "equatorial" sunspots are very rare, we will quote from a paper by Mr. Thomas A. Cragg. This paper was presented to the Annual AAVSO convention in the fall of 1952.

"On February 5th, 1952 there was a smallish (sunspot) group which developed not far from the center of the disk and very close to the equator. On the next day, Feb. 6th, the group was larger and another group developed immediately to the south of it. Not much attention was paid this equatorial group until it was noted that the whole group was in the southern hemisphere on Feb. 8th. It had started out at N1° according to the drawing made at the 150' tower telescope (Mt. Wilson Obs.) From (additional photographic) measures (made at the 60' tower) it was learned that the equator passed right through the group on Feb. 5th, the "leader" being at N0°.2 and the "follower" at S1°.5. Measures of the plate taken on Feb. 6th revealed the "leader" at S1°.3 and the "follower" at S2°.4..

Measures of the plate taken on Feb. 8th revealed that a total

(continued from the preceding page)

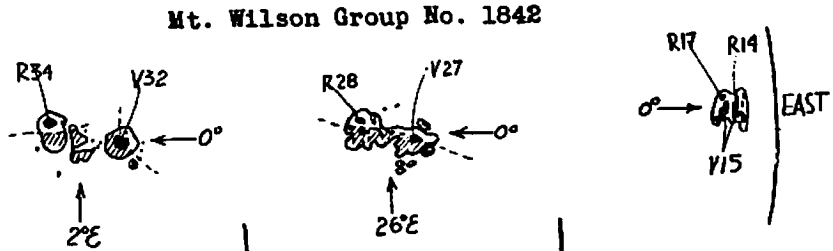
"...motion of four degrees in as many days was experienced by some members of this unusual group.

The polarities for this (equatorial) group were normal for a southern hemisphere group. There was no change in polarity as the leader crossed the equator as some might have expected."

Additional data on "equatorial sunspots":

The large May 1921 sunspot group came over the eastern limb on May 8th. During its entire passage the solar equator ran right through the spot (excepting, perhaps, the first day when Mt. Wilson Observatory listed its mean latitude as N1°). At first, it was a more or less single compact spot; on the 11th it divided into a western and eastern component, which merged on the 12th and redivided again on the 13th to remain as a bipolar group. Magnetic polarities showed it to be very complex, therefore it was classified as γ and then as $\beta\gamma$. This group crossed the central meridian on May 14th (CMP 14.7; long. 3°2).

Mt. Wilson Group No. 1842



1921, May 14, 1400 UT | 1921, May 12 1630 UT | 1921, May 9, 1830 UT

The "Greenwich Sunspot and Geomagnetic-Storm Data, 1874-1954" describe this group as follows:

"A big complex spot (γ), unique for its size on the solar equator and of great observational interest because of the distribution of magnetic polarities. The spot divided into two (components), remnants of which lasted for two months. The geomagnetic storm associated with this spot was a very great one of long duration. Apart from the storm itself, four "sudden-commencements" were recorded. (Ed.note: no regular flare observations were made at that time, but there can be no doubt that the four sc's were flare results)."

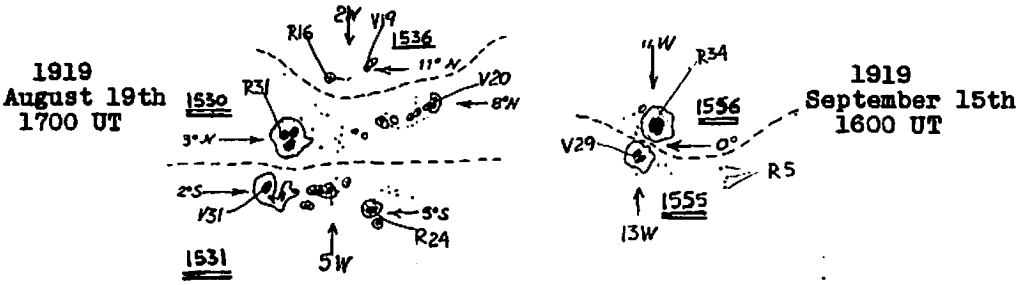
The mean area of this equatorial group (Mt. Wilson Number 1842; Greenwich No. 9334) according to the Greenwich R.O. measures was 1324 millionths of the sun's hemisphere, while its maximum area was 1709×10^{-6}.

The Greenwich Sunspot Data listing groups larger than 500 mil. of the sun's hem. (between 1874 and 1954), a total of 761, show only two other groups within two degrees of the solar equator.

(Equatorial sunspots)

Mt. Wilson Group Number 1556 (CMP 1919,Sept.14.8) and 7297 (CMP 1941, Oct. 2.1), of these the one of 1919 was very interesting because of its relation to another close-by group in the opposite hemisphere. Actually group 1556 was a recurrence of 1530 (CMP 1919, Aug. 19.2). The following illustrations are selfexplanatory. They are from "Magnetic Observations of Sunspots 1917-1924" (Mt. Wilson 1938) by Hale and Nicholson. Group #1556 was actually one of the longest-lived sunspot groups on record. It was first seen at Mt. Wilson on July 23, 1919 (#1513) and then each month (Nos. 1530;1556;1576;1593;1603) until December 7, 1919, a life span of 138 days.

A similar pair of two small groups around the equator was seen on October 8, 1918 (MtW. 1272 and 1279); both were short lived.



The 1952 equatorial group (cited earlier by Cragg) was quite small. The following data are from the U. S. Naval Observatory Circular No. 42 (Apr. 1953); Sunspot data "Summary for 1952".

Mt. Wilson Group Number 10879 (CMP Feb.6)

Date 1952 Feb.	mean long.	mean lat.	Area *)	Spot count	rel. to CM**)
5.7	173	0°	84	9	E5°
6.7	171	S2°	134	10	W6°
7.6	174	N1°	24	2	W21°
8	not visible on photographs			0	
9	"	"	"	0	
10.7	174	S1°	16	1	W61°

*) Area in millionth of sol. hem.; **) relative to the apparent Central Meridian at time of photograph

The December 1958 equatorial group (reported by Buckstaff, Cragg) had a CMP (Central Meridian Passage) on December 11th. On the 12th the area of this group (preliminary measure) by the US Naval Observatory was 1515 x 10^{-6}. This group was in a plage region (Mc Math-Hulbert Obs. Number 4913) which produced on its passage from eastern to western limb at least 64 flares!, of these at least 12 of importance 2 and over! associated with 12 short wave fadeouts (SWF)! Intense yellow coronal line was observed at both limb passages; two sc geomagnetic storms were associated with it.

A Report on the AAVSO-Solar Division Indirect Flare Detection Patrol for the IGY - the socalled SEA - Program.

Our ambitious attempt to organize and coordinate a successful network of stations using radio-astronomy technics for the purpose of detecting indirectly solar flares by means of recording Sudden Enhancements of Atmospherics (SEA's) on 27 kc/s has achieved its goal. Thanks to the ingenuity and perseverence of DAVID WARSHAW a fully functioning Patrol-Network was established from coast to coast, and thanks to the efforts and talents, not to say unlimited and wholly unselfish devotion of our members in a field where even professionals can hardly advise, we may be justifiably proud of our contribution to the IGY.

Perhaps the following two quotations will suffice to illustrate the above point. As our readers know, the Solar Division received on a loan basis, four Brown recorders specifically for this SEA Program:

"This is to advise you, (Mr. Bondy) with pleasure, that the National Bureau of Standards has offered to extend the loan of the recorders now in use by the AAVSO for an additional year to cover IGC-59 (International Geophysical Cooperation, an extension of the IGY). The Solar Technical Panel has indicated its approval of the continued loan and we sincerely hope that you will be able to continue your program for the coming year."

"Miss Lincoln is very pleased with the data she has been receiving from your people and we feel that this program is an important contribution to the IGY observing effort. We are all very grateful to you and your colleagues for the devotion to the task that you have obviously felt."

signed: Walter Orr Roberts,
Chairman Solar Technical Panel,
USNA, International Geophysical Year

From another letter:

"The SEA work of the AAVSO group has been on the whole very satisfactory and is giving us a greater worldwide coverage for SEA's than would otherwise be possible."

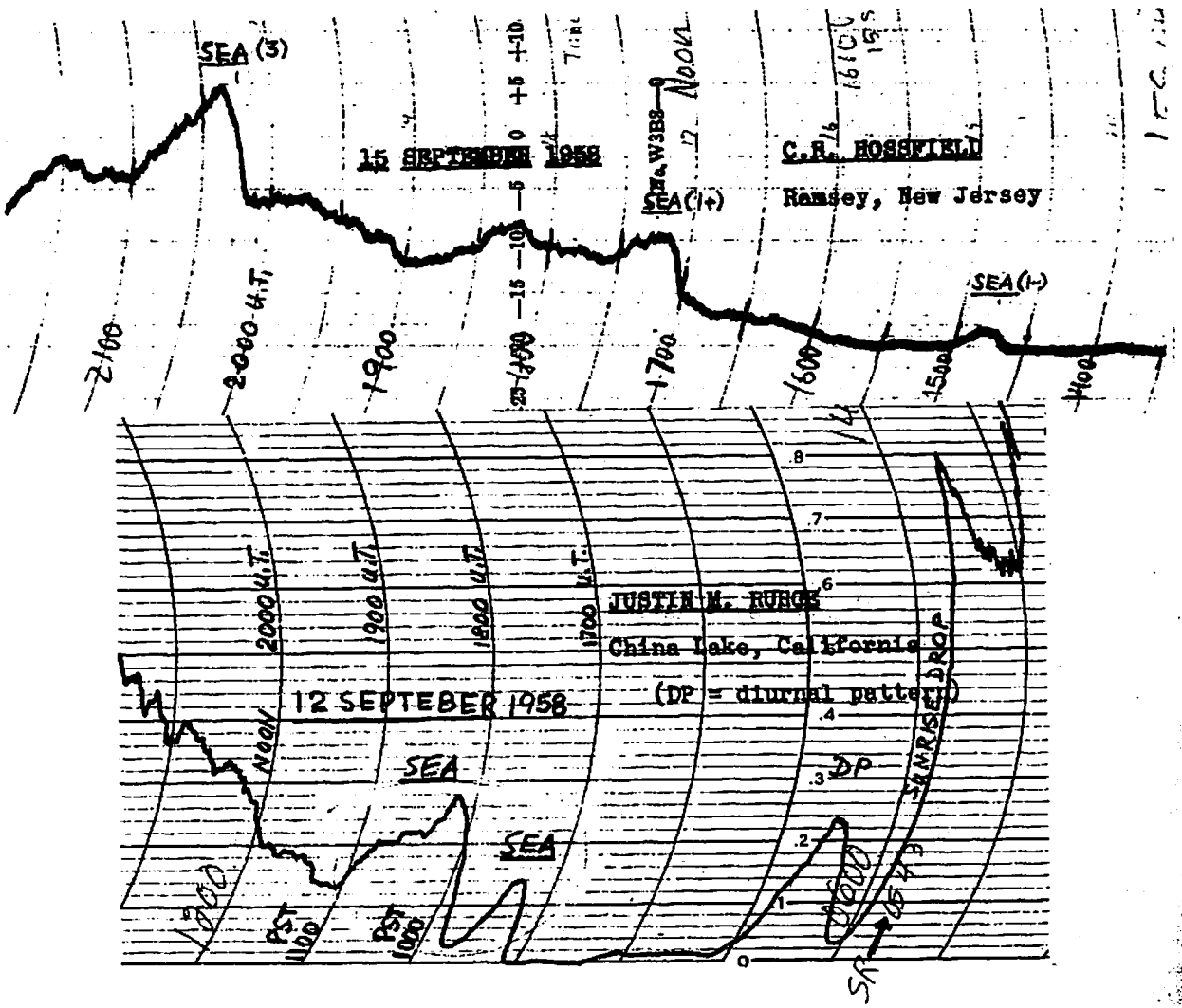
signed: J. Virginia Lincoln,
Chief Radio Warning Services Section
National Bureau of Standards

ACTIVE STATIONS:

A1-David WARSHAW, Brooklyn, N.Y.
A2- Walter A. FEIBELMAN, Pittsburgh, Pa.
A3- Philip J. DEL VECCHIO, Paterson, N.J.
A4- Val ISHAM - DENISON, Powell, Ohio
A5- C.H. HOSSFIELD, Ramsey, N.J.
A6- Ralph N. BUCKSTAFF, Oshkosh, Wisc.
A7- Justin M. RUHGE, China Lake, California
A8- Walter Scott HOUSTON, Manhattan, Kan.

The records and data are collected by H.L. Bondy, analyzed and then forwarded to the National Bureau of Standards with copies for all IGY-World Centers. Summary tables /like those shown on the following pages/ containing a list of all "Prominent" (= outstanding) and "parallel" SEA's are prepared and distributed to our active members for comparison and study as well as to several participating observatories. SEA Data are then also published in the monthly CRPL Series-F "Solar Geophysical Data" of the National Bureau of Standards together with those obtained by professional institutions. It is most rewarding to realize that a fair portion of all world-wide gathered SEA's comes from members of the AAVSO-Solar Division.

Some of the most outstanding SEA's recorded by our members come from C.H. HOSSFIELD, Ramsey, New Jersey and from Juustin M. RUHGE in China Leke, California. The following are some fine examples:



The January 1959 issue of RADIO-ELECTRONICS will carry another article by Mr. Warshaw called "Improved Solar Flare Indicator". His improved circuit (S.B. Nov.Dec.'57) and the work of the Solar Division will be described therein as well as some additional technical matter.

On the following pages (10 to 14) the reader may get an idea of the work involved. In addition to the standard report forms used (prepared by NBS) our members note the general difference in night-to-daytime level as revealed in the socalled "sunrise drop" (SRP). Also the general pattern preceding and following an SEA is noted (pt/ft). Thus using the NBS classification we get the following data:

a) SEA Class from 1- to 3+ for the largest cases (amplitude + duration)
b) Definiteness 0 /for doubtful/ to 5 /definite/ describes the ease with which an SEA is identified
c) Beginning, Maximum and Ending in Universal Time; the beginning is usually quite definite; maximum too can be most often determined with ease, the ending is least definite
d) Sunrise Pattern (SRP) difference in night-to-day level from Very Large Drop (VLD to VSD) Very Small Drop or none (NOD)
e) Preceding and following pattern (Pt/ft) tells us if the trace was quiet, disturbed (d) or had interference (i) before and after an SEA was identified (this factor of course elaborates effective the "definiteness".

Future Solar Bulletins will carry an evaluation of the results we obtained in this work. In the meantime our SEA Program continues through the IGC-59.

Harry L. Bondy

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GEORGE R. W A R R E N

From Mrs. Warren we received the sad news that George died from angina pectoris. George Warren was one of our first Solar Division members. He was an excellent Amateur Telescope Maker and Radio Ham. Those who knew George personally knew what a goodhearted, jolly fellow he was. George built his own telescopes, clock drives, tower observatory, cameras, radios and many more items. But he was not only a practical builder but a fine organizer and was able to analyze and understand how solar observations should be reduced. It was George Warren who developed the socalled "Gleissberg Forms" (used in the study of foreshortening effects on the visibility of sunspots), a very ingenious form which shows readily the distribution of spots relative to the central meridian.

In recent years George's eyesight began to fail him and he had to give up his observations. Still, he continued to the last trying to build an inexpensive pen-recorder for our SEA work.

We will miss George Warren a great deal.

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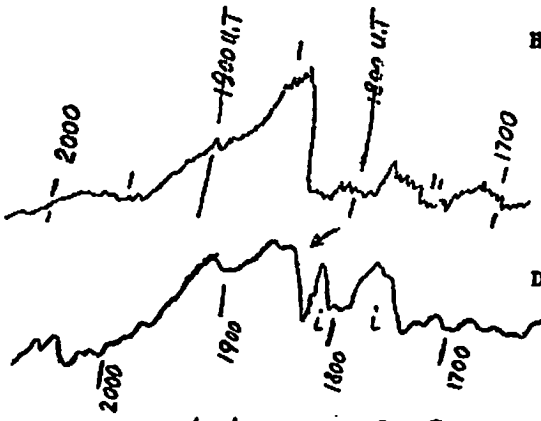
Another death.

When at the end of 1953 this Editor undertook to continue publishing the Solar Division Bulletin, a good friend of ours, Mrs. Tova Gertrude Laffer immediately offered to help with typing the stencils. Last October Mrs. Laffer suddenly died, leaving behind three small children.

SOME EXAMPLES of SEA recorded in November 1958:



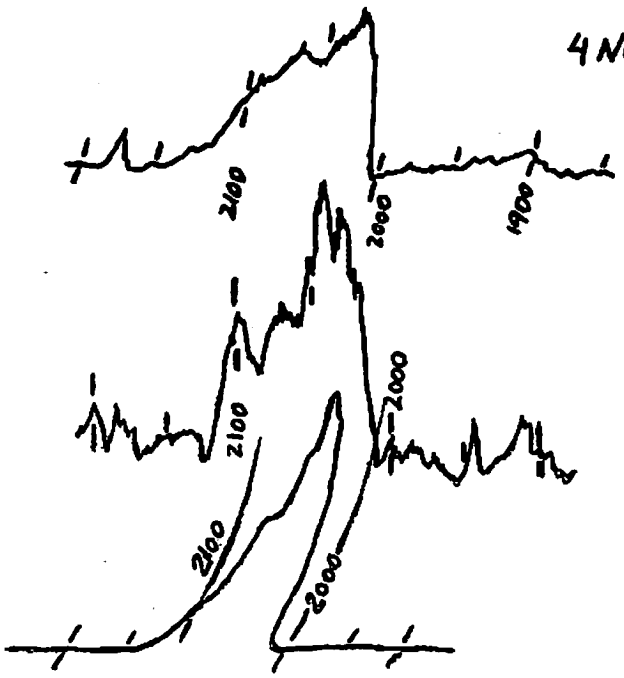
HOSSFIELD, Ramsey, N.J. (A5)

SEA Class: 3
definiteness: 5
pt/ft = d/d

DEL VECCHIO, Paterson, N.J. (A3)

SEA Class: 2&
definiteness: 1
pt/ft = i/d

1 NOVEMBER 1958



4 NOVEMBER 1958

HOSSFIELD, Ramsey, N.J. (A5)

BUSKSTAFF, Oshkosh, Wisc. (A6)

RUHGE, China Lake, Calif. (A7)

Examples from Monthly Reports listing Prominent SEA's recorded by members of the Solar Division - AAVSO for the International Geophysical Year (IGY). (Copies from actual tabulations:)

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AAVSO - SOLAR DIVISION

"SEA Program for the IGY"

PROMINENT SEA's recorded from August to Decmber 1958.

(All SEA's of class ≥ 2 and definiteness ≥ 3)

All SEA's recorded on 27kc/s unless otherwise noted. All AAVSO Stations use the "Warshaw-type Receiver".

AAVSO - SOLAR DIVISION STATIONS:

A1 - WARSHAW, Brooklyn, N.Y.
A2 - FEIBELMAN, Pittsburgh, Pa.
A3 - DEL VECCHIO, Paterson, N.J.
A4 - VAL ISHAM-DENISON, Powell, Ohio
A5 HOSSFIELD, Ramsey, N.J.
A6 BUCKSTAFF, Oshkosh, Wisc.
A7 RUHGE, China Lake, Calif
A8 HOUSTON, Manhattan, Kan.

August	Class	Definiteness	Universal Time Beginm	Max.	End.	SRP	pt/ft	Stations
02	3+	3	1840	1858+ 1920	1940	MD	q/d	1, 2, 3, 5, H., E.,
03	2	3	2145	2150	2245	MD		1, 2, 3, H.,
07	2+	3	1050	1101	high SD		q/i	3 on 52 kc/s (?)
08	2	3	1550	1600	1615	LD	q/q	2
09	2+	3	1320	1343+ 1352	1440	SD	d/q	6
13	3+	3	1948	2016	2133	SD	d/d	3 (also on 52kc/s), H.
14	2	4	2315	2320	2340			2, 6
15	2	3	1910	high	2000	LD	d/d	2, 3
16	2	3	2350	2418	2503	SD	q/q	6
17	2	3	1315	1325	1345	MD		2 (pec.)
20	2	3	1755	1810	1830			2, 6
20	2	4	2034	2100	2125	VLD	d/d	3, H.
24	2+	4	1123	1158	1235	MD	SRP/S	3, 5, (?)
25	2+	4	1540	1545	1610	SD		2, 1, 5

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(PROMINENT SEA's)

Sept.	Class	Definiteness	Universal Time Begin	Max.	End.	SRP	pt/ft	Stations:
01	2	3	2055	2100	2120	SD	-	2, 5, 7, H.
02	2+	5	1047	1108	1140	MD	SR/q	1, 2, 5
02	2	4	2102	2110	2150	MD	i/q	1, 2, 5, 6, 7, H.
03	2	3	2255	2305	2335	VLD	d	2
09	2+	5	1825	1845	1940	LD	q	2, 6, 7, 1, 5, H.
12	2	5	1630	1645(1730)		SD	q/q	7,
12	2	3	2347	2410(2445)		SD	q/q	7,
13	2	4	1430	1435+ 1445	1530	SD	-	2, 1, H.
13	2	3	2240	2250(2330)		SD	q/q	7,
15	2	5	1650	1705	1850	MD	q	2, 5, 7, 8, H.
15	2+	5	2005	2015	2105	MD	q	2, 5, 7, (H.SCNA)
28	2+	5	2048	2058(2140)		VLD	d/d	8, 5, 1, H.

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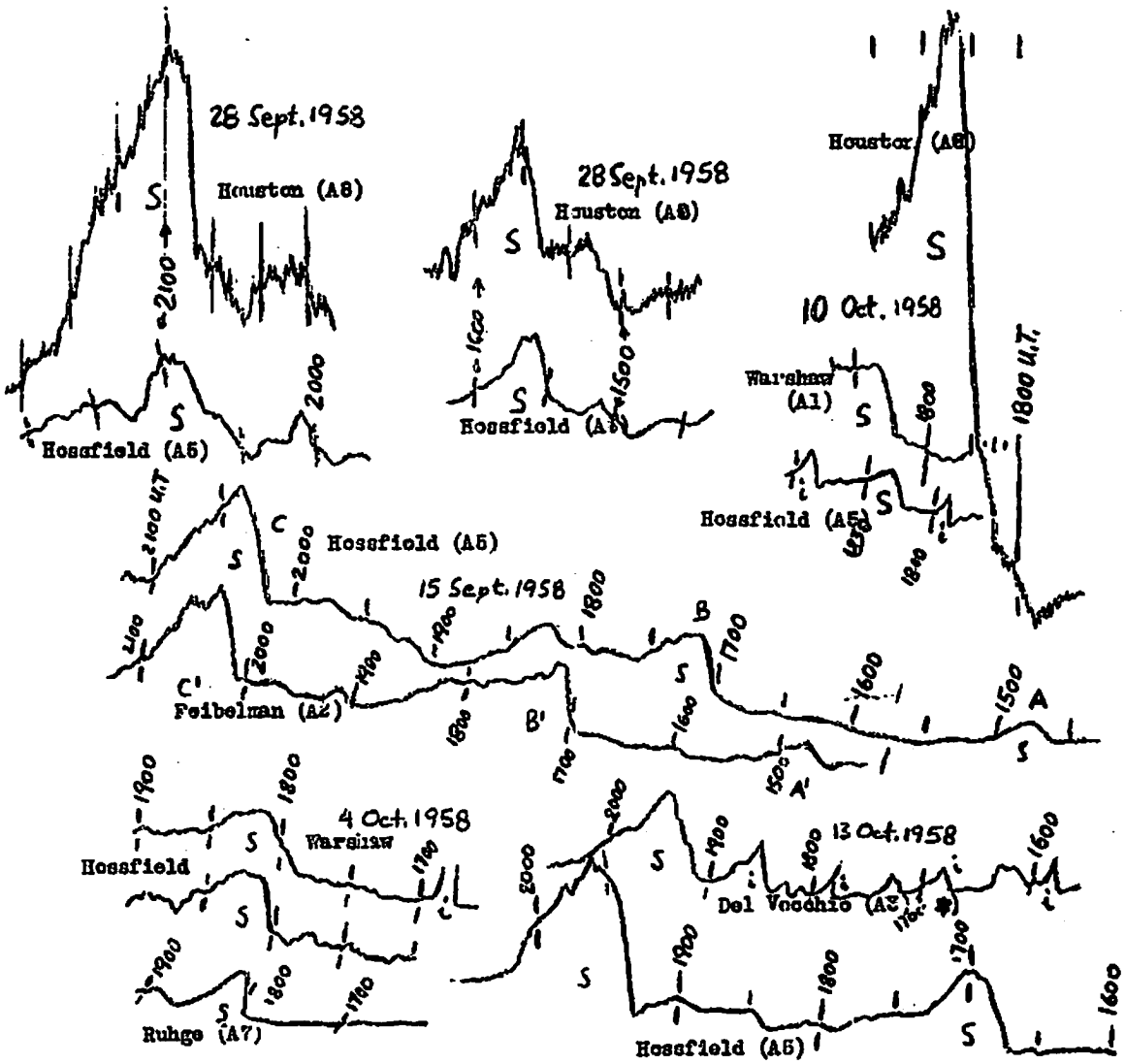
OCTOBER 1958

03	2	4	1815	1825	(1900)	MD	q/d	7, 5
04	2	4	1356	1405	(1435)	LD	q/d	5, 1, ROEdinburgh
04	2	4	1800	1805	(1840)	VLD	d/d	5, 1, 7,
06	2	5	1710	1720	1750	VLD	q/SEA	7, (3?)
06	3	3	1750	1810	(1900)	VLD	SEA/d	7,
10	3+	4	1715	1725+ 1735	1830	VLD	q/q	7 (? all others 1815??)
10	2	4	1815	1822	high	LD	d/d	1, 5, HAO Rep.
13	2+	3	1437	1439	1530	LD	q/i	3, HAO Report
13	2+	3	1642	1650	1715	LD	q/q	5, R.O. Edinburgh
13	3+	5	1918	1930	2010	LD	q/q	5, 3, HAO Rep.
19	2	3	1759	1814	1840	MD	d/SEA	3, 1, 5,
19	2+	5	1950	1958	2032	MD	d/d	3 (pec., unconfirmed)
20	2+	5	1917	1925	2015	VLD	d/d	3, 5, 1,
21	3	4	1949	1955	(2050)	VSD	d/d	5, 1,

AAVSO - SOLAR DIVISION

SOME EXAMPLES OF SEA's RECORDED BY AAVSO-SD STATIONS in SEPTEMBER and OCTOBER 1958



*) copy of copy i - interference

AAVSO-SD
Stations: Warshaw, Brooklyn A1
Feibelman, Pittsburgh A2
Del Vecchio, Paterson A3
Hossfield, Ramsey, A5
Ruhge, China Lake, A7
Houston, Manhattan, Kan., A8

Harry L. Bondy, Chairman,
AAVSO - Solar Division
61-30 157 Street,
Flushing 67, NY. USA

Nov. November 1958	Class	Definitoness	Universal Time Begin	Max.	End.	SRP	pt/ft	Stations:
01	3	5	1618	1823	1920	SD	d/d	5?)6; 3; HAO
04	3&	5	2002	2013	(2130)	SD	q/d	5, 6, 7, 1, 3,
08	2&	3	1824	1832	(1900)	SD	SEA/d	1, 5,
18	2&	4	2036	2038	2118	VSD	q/q	5, 5, HAO
27	1&	5	1900	1906	1945	NOD	q/q	1*, 5*, 7*, (3), HAO
28	1	5	2140	2148	2230	VLD	q/q	7*, (3?), HAO
December 1958								
02	2+	3	1920	1933(next SEA)		VLD	q/S	7 (flare)
03	3	3	1738	1744	1815	VLD	d/d	5, 7, HAO Prel. Rep.
06	2	5	1945	1955	2035	LD	d/q	7, 1, HAO Prel. Rep.
07	2+	5	2240	2250	(2325)	VLD	q/q	7
07	2	5	2048	2103	2145	VLD	q/q	7, 5
08	2	4	1735	1750	1820	VLD	d/d	7, (subflare)
09	3+	3	1655	1703	1730	VLD	d/d	5, HAO Prel. Rep.
11	3+	4	1935	1941	(2030)	VLD	d/q	5, 3, 7, HAO P.R.
11	3+	3	2140	2205+ 2213+				
				2235	2330	VLD	S/ss	7 very complex (flare)
12	2	5	1257	1302	(1345)	MD	q/q	5,1,3, HAO; Dunsink
13	3	4	1834	1845+ 1849	(1920)	SD	S/d	1, 5, 7, HAO P R
21	2	5	1855	1907	(2000)	SD	q/q	5, 1, HAO P R
25	2	5	1935	1945	(2030)	VSD	q/q	5, 7
11*	1+	3	1810	1815	1835	SD	q/q	2, 5, 7,HAO; Edinburgh

*) recorded from Scotland to California

Notes: Underlined Station implies that said SEA was recorded as "prominent" (defined above); others gave lower estimates

SEA class and definiteness is given in accordance with the definitions given in NBS Report 5540 (Nov.22, 1957)

SRP =SunRise Pattern pt/ft = preceding and following trace

All SEA's recorded by AAVSO members are listed in a separate table when they are the "same" i.e. parallel. The following illustrates how world-wide SEA's' spread can be.

DECEMBER 1958							
11	3+	2	1800	off sc 1840	VLD	d/d	Bossfield
11	1+	3	1810	1815 1835	SD	q/q	Feibelman
11	3+	0	1807	off sc 1856	VLD	q/S	Ruhge-very rapid rise
11	3	x	1807	x 1855	x	x	HAO Prel. Rep.
11	x	x	1812	1814 1838	x	x	R.O.Edinburgh

Note: the preceding SEA was recorded from Scotland to California!

Eidgen. Sternwarte Reprint of: Zürich (Switzerland)

Definitive Sunspot - Numbers for 1958

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	214	150	109	290	250	200	165	262	200	223	217	241
2	213	168	90	292	246	154	164	250	221	220	212	234
3	200	161	140	245	269	183	190	200	230	207	205	228
4	217	144	185	253	268	203	203	177	240	175	192	221
5	191	177	203	244	267	206	209	198	206	157	177	233
6	192	187	215	238	223	192	214	209	220	140	152	227
7	205	197	220	246	198	185	212	223	175	125	133	242
8	210	181	198	246	177	200	205	230	160	115	114	255
9	232	168	186	204	150	202	193	253	166	116	97	252
10	252	167	181	197	181	200	201	244	219	121	85	258
11	253	171	173	159	166	193	175	253	245	123	84	237
12	255	177	162	140	172	197	130	228	267	135	85	211
13	271	168	154	127	114	178	138	220	265	138	93	198
14	279	174	158	96	103	160	135	202	233	142	97	185
15	291	159	165	99	106	132	135	190	230	160	95	150
16	278	148	155	108	110	100	144	177	206	219	95	142
17	247	147	164	147	116	113	160	163	189	231	80	124
18	230	139	162	168	123	100	181	152	205	243	80	109
19	212	141	155	191	140	114	191	128	187	238	98	80
20	190	160	154	192	132	107	188	131	163	232	106	83
21	171	170	156	212	162	141	196	145	156	212	125	92
22	173	170	163	212	165	157	184	160	172	241	142	114
23	182	173	187	201	171	187	178	192	175	230	155	150
24	137	182	204	181	199	185	170	183	174	190	178	185
25	137	187	180	206	189	191	179	198	161	176	211	218
26	143	174	194	182	170	207	213	180	169	171	237	229
27	169	153	226	192	157	207	238	196	177	164	247	218
28	160	125	292	198	160	193	250	202	208	179	258	183
29	130		302	207	192	200	261	225	217	200	259	168
30	110		338	208	178	159	268	225	201	193	260	175
31	132		342		182		263	210		210		175
Mean	202.5	164.9	190.7	196.0	175.3	171.5	191.4	200.2	201.2	181.5	152.3	187.6

Yearly Mean: 184.8

M. Waldmeier

AMERICAN RELATIVE SUNSPOT NUMBERS - $R_{A'}$ - 1958.

Day	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1	213	154	120	261	199	139	180	240	227	197	170	255
2	222	143	114	271	211	115	168	240	204	209	196	225
3	195	152	159	227	265	148	192	216	218	187	192	191
4	218	159	186	281	240	202	206	178	226	187	136	225
5	185	176	214	276	212	216	225	217	229	142	125	226
6	120	119	212	235	172	185	223	238	234	99	87	226
7	225	160	145	201	183	165	185	235	166	103	108	207
8	212	131	182	206	153	182	162	211	164	79	99	236
9	187	155	173	176	176	161	185	235	167	113	75	263
10	249	117	171	174	180	189	175	240	205	127	86	203
11	243	160	162	154	188	172	149	192	230	115	69	215
12	269	143	163	105	148	162	120	189	262	128	75	170
13	235	128	166	117	152	180	135	180	271	149	59	220
14	279	130	200	92	107	115	104	155	238	142	54	186
15	223	143	166	119	120	86	132	191	202	180	68	116
16	300	162	169	111	117	65	127	198	184	216	66	135
17	240	145	171	145	120	86	147	177	214	239	34	116
18	215	121	151	157	130	96	142	149	189	202	51	96
19	198	103	168	159	159	127	176	136	175	207	73	71
20	178	156	144	161	161	126	187	142	175	168	85	86
21	203	159	160	176	171	135	204	161	158	163	105	94
22	229	171	166	175	158	175	158	174	164	214	118	107
23	143	129	191	179	197	195	185	190	173	169	135	102
24	123	156	208	164	206	164	198	185	175	190	179	153
25	184	163	189	144	175	162	162	195	192	182	197	173
26	198	139	233	173	173	205	188	161	153	168	242	204
27	142	108	243	155	145	175	181	175	190	164	200	186
28	129	85	237	187	153	181	189	184	228	163	279	191
29	118		287	188	189	133	206	166	180	152	222	143
30	155		278	223	179	121	250	193	165	169	215	142
31	144		268		190		285	209		220		173
Mean:	199.2	141.7	187.0	179.7	171.9	152.1	178.2	192.0	198.4	165.9	126.7	172.5

Yearly Mean: 172.1

The American Relative Sunspot Numbers are reduced by Dr. Sarah J. Hill, Whitin Observatory, Wellesley College, from observations made by members of the Solar Division-AAVSO. They are computed for the U.S. National Bureau of Standards and are published, in addition to this Solar Bulletin, also in the NBS-CRPL F-series "Solar Geophysical Data", as well as monthly in Sky and Telescope.

A graphic illustration of $R_{A'}$ for 1958 is on the following page.