

A.A.V.S.O.

SOLAR DIVISION BULLETIN.

Neal J. Heines, Editor.

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Number 64; Page 169.

560 Broadway.
Paterson 4, New Jersey.

Our Spring meetings at Washington were very busy ones. Full details will be published in Sky and Telescope and the Recorders report will be found in Popular Astronomy soon under "Variable Star Notes"

The report of the Solar Division to the A.A.V.S.O. follows, with the exception of the Relative Numbers for this seven month period. These will be included in the coming monthly bulletins upon release of the National Bureau Of Standards.

Membership----- 174; Observers 89, Research Affiliates 85.
Membership Distribution--- 32 States, 14 Foreign Countries.
Report Blanks Issued----- 724 Incl. of duplicates and G1. Project.
Reports Distributed----- 489 Bur. Stan; 288 G1. Prj. Total 777.
Number of Observations----9869, to 4-1-51, 85,383 BS7299; G1.2184; R 386.
Communications Sent-----2168, " " to Date 13,073.
Communications Received---1157, " " to date 10,405.
Number of Solar Division Bulletins Issued; 8 Editions; 1392 Copies.
Number of Reduction Summaries distributed, 7 Mo. Period 1392 " .

CONDITION OF THE PRESENT SUNSPOT CYCLE.

Since our October report of 1950, rendered at Harvard College Observatory at Cambridge Massachusetts, solar activity continues to decline gradually in the regression towards minimum, which is expected during the 1954-55 period of the present cycle. It has been predicted that the next minimum will be a short one followed by a maximum not quite as high as the preceeding one in 1947.

During December of 1950, between the dates of 19 to 23 sunspot activity was very low, in fact, was declared as spotless by some, and with very low activity by others. The following details are therefore presented.

The Federal Observatory at Zurich, Switzerland, the international Headquarters for sunspot statistics, released in their monthly report of "PROVISIONAL SUNSPOT-NUMBERS" for the month of December 1950, the following; On December 19th., the Provisional Relative sunspot-number was seven (7). On the 20th., 0, (zero), on the 21st., 7, and on the 22nd., 0 (zero). We have received, gratefully, from Prof. Waldmeier an explanation concerning the 7 value. Quote; " On the 19th., and 21st., of December, only one single sunspot could be seen and the relative sunspot number was therefore $R = k \times 11$. For us the reduction coefficient amounts to 0.60 from which the relative numbers for the two above mentioned days result. Consequently there is no relative number possible between 0 and 7. Either there are no sunspots present at all (relative number 0) or if there is just one solitary spot the relative number amounts to 7." (end quote).

Observations for Provisional Sunspot-Numbers are made by Prof. M.Waldmeier with a 3" Refractor, carrying forward the work of his predecessors, with the same instrument, in order to maintain a strict continuity. If observing conditions do not allow observations by Waldmeier at the Zurich Observatory then their stations at Locarno or Arosa supply the data.

Mount Wilson Observatory using the 150 foot tower telescope reported as follows; December 19th., 2 groups; 20th., 2 groups; 21st., 0 groups; 22nd., 0 groups. This information was taken from the Publications Of The Astronomical Society Of The Pacific., April Issue, 1951, Vol 63; Number 371; p 93.

A.A.V.S.O. Solar Division Headquarters, Heines observing, using a 3" Refractor, reported 5 (five) spotless days beginning December 19th;1951.

Additional data from other observers active in the AAVSO Solar Division reveals the following ;

Dec. 19th;	6	Observers reported spots,	23	observers no spots.
" 20th;	5	" " "	24	" " "
" 21st;	6	" " "	24	" " "
" 22nd;	2	" " "	14	" " "
" 23rd;	4	" " "	18	" " "

We recognise a discrepancy here involving the varied powers and sizes of instruments, the quality of seeing conditions, and, in addition the observer himself.

It is understood that an instrument having a eight inch objective of good quality can reveal small sunspots that are beyond the resolving power of instruments that range from 3-5" objectives.

There remains also the determination whether spots or pores were observed by some during this period mentioned.

Investigation is in process to determine the exact status of this discrepancy. Results will be made known at a later date.

What is significant here, is the fact, that Future records of the Final Relative Sunspot-Numbers (the smoothed numbers) will show that sunspot activity during the above mentioned period was at a very low level.

Mr.Thomas Noseworthy, one of our assiduous observers in the Montreal Centre of the R.A.S. of Canada, using a telescope of high quality, with a six-inch objective, a refractor, reported to us that he had observed a very high, north-latitude, group, which was visible on Dec.15th.,1950. The group was recorded as being located at aprox. 65 degrees north Lat., and 4 degrees west of the Central Solar Meridian. On the 16th., and 17th., of December cloudy conditions prevailed. The group was again observed on December 18th., but not later. We would greatly appreciate it if other readers of this bulletin have a record of this high Latitude group that they forward information concerning it to us in order that we may help Mr.Noseworthy substantiate this record high-latitude group.

Such high-latitude groups are rare but have been seen before. In our file containing correspondence from Mrs.Elizabeth Maunder, (one-half of the famous,former Maunder Solar team) Mrs. Maunder writes ;

" ----- certainly I can give you information about high-latitude sunspot groups between 60 - 70 degrees latitude. I observed them myself in 1916, as you will see in the enclosed Paper. ("Sunspots in a High Southern Latitude") by Mrs. Walter Maunder; source; MONTHLY NOTICES OF R.A.S. June 1917, Vol.LXXVII. No 8; pp.621-623.

Statistics from Heines Observations for the period between September 1st., 1950 to April 1st., 1951 reveal the following;

Sunspot groups Whole Disk-----	677
Sunspot groups Central Zone -----	298
Sunspots whole disk -----	4774
Sunspots Central Zone -----	2730
Sunspot Groups North Belt -----	365
Sunspot Groups South Belt -----	317
Sunspots North Belt -----	2746
Sunspots South Belt -----	2119
Spotless days North Belt -----	11
Spotless days South Belt -----	11

Naked eye sunspots have been observed as late as May 20th., 1951, (present writing) during the second appearance of the major group in the north belt, (my number 69).

Geographically observing conditions vary. In general they have been better during the minimum period of a sunspot cycle than in the maximum period. In northern New Jersey the observing days for the past 15 years are as follows ; 1936 - 270; 1937 - 280; 1938 - 299; 1939 - 311; 1940 - 273; 1941 - 317; 1942 - 309; 1943 - 322; 1944 - 314; 1945 - 302; 1946 - 304; 1947 - 308; 1948 - 300; 1949 - 298; 1950 - 260; Mean value for 15 years 298.1 ; High value 322 in 1943; Low value 260 in 1950. This makes an interesting graph. It is hoped that other observers will carry on this project for their own locality in years to come.

SOLAR DIVISION ACTIVITY.

The Solar Division is still actively engaged in the following projects; Sunspot Counts for the Central Radio Propagation Laboratory, National Bureau Of Standards; The Granular Surface and Color in Sunspots, Dr.J.C.Bartlett Jr.; Unusual Configuration and Color in Sunspots, Dr.Walter O.Roberts, High Altitude Observatory, Colorado; Foredarkening Project, Prof.W.Gleissberg, University Observatory, Bayazyt - Istanbul , Turkey; (This project will terminate during 1951 but Prof. Gleissberg wishes us to carry on in a new project which will be announced later; Migratory Birds, Sunspot Deleiniation, Sunspot Area measurements, S.D. Headquarters and Solar Radiation, Heines.

Membership in both sections of the Solar Division remain at the same level as in previous years.

Not mentioned in previous reports but now found to be of great significance is our Seeing Conditions Project under the leadership and origin of Mr.Cyrus F.Fernald. In an accumulative report Mr. Fernald has shown that it takes approximately four years to level from poor observations to good ones. This is highly important information and has helped to bring about some more changes in the determination of R_s , which changes follow in this bulletin, taken from an Informal Paper presented by Miss.J.Virginia Lincoln, of the Bureau Of Standards, and which was read by her at our Meeting on Saturday May 12th. A formal Paper will follow later and distributed to both sections, of the S.D.

Solar Radiation measurements continue and data for the balance of 1950 will be published in the bulletin soon.

Emergency measures still hamper the progress of the Monochrometer and Ultra Violet instruments.

The Aurora Division is in full swing although activity of the Aurora has decreased to a greater extent. Mr. D. Kimball, the chairman of the Division has a tape recording on this subject which has proved to be a very fine medium for society lectures. Rentals are now in process and information can be obtained by writing him at Yale University, Prospect and Canner Streets, New Haven 11, Conn. Forty minutes of time are consumed in the rendition. It is really worth-while.

Next fall, in October, The AAVSO will celebrate its Fortieth Anniversary. There will be big doings. Make plans now to be present at this event.

The Anniversary fund is increasing slowly but we have need of a great deal more funds if we are to meet the desired amount. Kindly remember to send on to Mr. P. Witherell, 84 Prince Street, Jamaica Plain 30, Mass. as soon as possible.

AMERICAN RELATIVE SUNSPOT NUMBERS - NEW METHOD OF PREPARATION.

This paper will describe the revised method which is in process of preparation for the American relative sunspot numbers beginning with January 1951. The groundwork for this revision is being done at the National Bureau Of Standards and has been delayed due to an unprecedented work load and shortage of personnel.

There are two main reasons for making this revision. First, as you know there has been a positive deviation of the American numbers prepared under the old method from those of Zurich. Though the shape of the solar cycle curve has been similar, it has not been possible to use the American numbers as direct continuations of the Zurich series (though the American were originally tied to the Zurich ones) since they have been consistently higher. Thus the American Numbers are again being tied to the Zurich scale. Second, in the future it will be necessary to reduce the time of preparation each month. At the same time we hope to improve the quality of the numbers. Once the revised method has been started it will be carried on by Mr. Heines and Mr. Rosebrough of your Solar Division.

There are several new rules which must be complied with before an observer will be used in the new number.

1. The observer's instrument must be large enough that the conversion coefficient or constant "k" which converts the observer's number to the Zurich scale will be in the neighborhood of 1.0. The same instrument and accessories must be used throughout. The method of observation may be changed, but it is recommended that it be constant too.

2. Each person must be an "approved" observer for two years. The observations of these two years will be used for his constant determination. These two years to be used must not be near sunspot minimum. The older American relative sunspot numbers, probably for one reason, deviated from those of Zurich because

the original constants were formulated in an epoch near sunspot minimum when the range of daily sunspot numbers was inadequate for the high part of the scale. Observers will be approved by Mr. Heines. Before approval is given for an observer to begin his two years of observation for constant determination, the observer will have served a two year training period. During this period he will have learned proper grouping, proper spot counting, and the preparation of consistent reports.

When two years have accumulated the constants will be formed once and for all by the same as described in "Reduction of Sunspot-number Observations" by A.H. Shapley, P.A.S.P., Vol. 61, No. 358, February 1949. The relative weights of the observers are measures of goodness of fit of their individual values to the regression line which gives their constant.

For the 1951 numbers 25 observers are on the "approved" list. Their constants and relative weights have been formulated on data from either the years 1948-1949 or 1949-1950. For 1952 the number of observers to be used in the numbers may be increased by addition of "approved" observers for 1950-1951.

Hereafter no combined reports will be used. This is in spite of how good they might be. Even the Mt. Wilson reports made from the 150 foot tower clearly show a personal equation in the preparation of the daily drawings. Therefore for consistency's sake it is necessary that only one observer report on a single instrument.

3. In the constant formulation to improve the quality of the number, all observations made under fair seeing when cloud cover was 6 or higher, or made under all poor seeing conditions, have been eliminated.

4. When all constants and weights for the 25 observers have been computed, the observers will be listed in order of their relative weights with the highest weight first. If there is an obvious discontinuity in the list of weights, the observers may be divided into two groups "high" and "low".

Starting with only good observations (selection by Mr. Heines) one begins at the top of the "high" weight group going down in order recording values until a minimum of eight or maximum of twelve values are reached for each day. If there are not eight values possible from this first combination, one again begins at the top of the "high" group using the "poor" observations, next used would be the "good" observations of the "low" weight group, and finally the "poor" observations of the "low" weight group. If these last three combinations must be used the daily number will be formed on eight values only. From these selected observations the daily American relative sunspot numbers will be formed by the same method as previously used.

It is hoped by mid-summer to have the revised numbers up-to-date and on a routine schedule thereafter. Some time in the future it is intended to go backwards, using the 1948-1949 list of observers, to formulate American relative numbers for 1945 through 1950. This revised technique has been worked out by Mr. A.H. Shapley of the Central Radio Propagation Laboratory of the National Bureau of Standards, in cooperation with Mr. Heines. Mrs. E.H. Miller of the National Bureau of Standards is to be given credit for the arduous work in the preparation of these revised constants and weights.

(Talk presented by Miss J. Virginia Lincoln at the Spring Meeting of the AAVSO at Georgetown University, May 12, 1951, in the absence of Mr. A.H. Shapley, who has been called out of town to one of the Central

Radio Propagation Laboratory's Field Stations.

STATISTICS.

The total number of observed groups for the month of April was----- 21.
The total number of days with sunspots for the month of April was-- 30.
Zurich's Provisional Relative Sunspot-Number for April was 93.5.
Mean Monthly sunspot area for October to date, Not released.

*The highest sunspot group number as assigned at Solar Division Headquarters on May 18th., was number 94. It represented a small spot near the east limb of the sun in the south belt, a similar spot was observed in the north belt with a relatively same longitude its number was 93.

* Group counting reference numbers for observers.

Predictions of smothed Monthly sunspot-numbers for the next six months are as follows ;

May. 61

Aug. 56

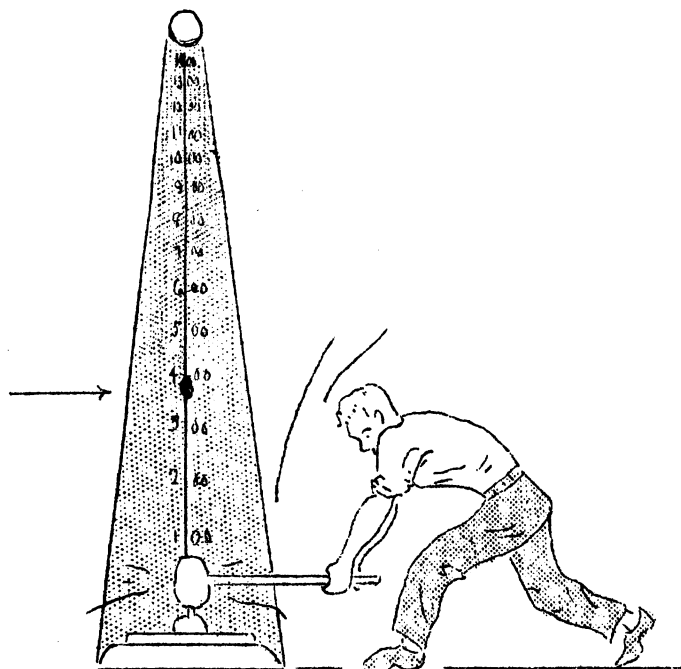
Jun. 60

/ Sep. 55

Jul. 58

Oct. 53.

Released by Prof. M.Waldmeier, Director, Federal Observatory, Zurich,Switzerland, and, transmitted by the Swiss Broadcasting Corporation.



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