A.A.V.S.O.

SOLAR DIVISION BULLETIN.

Neal J.Heines,Editor.

December 1951. 560 Broadway.
Number 69. Page 187. Paterson 4, New Jersey.

TWO THOUSAND TIMES OF SNOW DECLARE
THAT ON THE CHRISTMAS OF THE YEAR
THERE IS A SINGING IN THE AIR;
AND ALL WHO LISTEN FOR IT HEAR
A FAIRY CHIME, A SERAPH STRAIN
TELLING HE IS BORN AGAIN,
-- THAT ALL WE LOVE IS BORN AGAIN.

James Stephens.

MERRY CHRISTMAS

Mr.P.W.Witherell our faithful A.A.V.S.O. Treasurerer is in the Faulknew Hospital, Center Street,West Roxbury, Mass. We feel that he would appreciate a card or letter from you. Send some good cheer.

Mr.David W. Dewhirst, M.A.;F.R.A.S., has succeeded Mr.F.J.Sellers as Director of the Solar Section of the British Astronomical Association. Our best wishes to you Mr.Dewhurst!!

On several occasions we have mentioned the use of the Zurich series of Sunspot-Numbers, sometimes inadequately. Prof.M.Waldmeier. Director of the Swiss Federal Observatory, has kindly furnished us complete information as to their use.

"The Provisional sunspot-numbers are derived exclusively from the observations obtained from our Swiss observing stations (Arosa,Locarno, and Zurich), whereas the definite sunspot relative-numbers are being deduced at the end of every year from the very numerous observations arriving here from all over the world. For those days for which reports could be obtained under good conditions at Zurich (or Arosa or Locarno) they represent the definite relative-numbers at the same time For the remaining days the provisional relative-numbers are being corrected by means of the foreign observation reports. If you compare the provisional sunspot relative-numbers with the definite ones you will notice that the differences are very small. We are compelled to publish the provisional sunspot-numbers as quickly as possible because many institutes take an immediate interest in them. At the end of every year when the definite sunspot relative-numbers are at hand, the provisional sunspot-numbers are not needed anymore.

These definite sunspot relative-numbers, derived from actual observation, show often very strong fluctuations which are caused by the unequal distribution of the sunspots, and, the rotation of the sun. In order to get independent of these fluctuations, the mean of each month is formed. These means still show considerable fluctuations, the meaning of them. however, is entirely real, since the activity of the sun does not increase and decrease unifromly, but consists of different outbursts. With the aim of getting independant of these remaining fluctuations, the smoothed sunspot relative-numbers have been introduced. On the essential, they are almost equal to the means of the year.

You make a great error in beleiving that only smoothed sunspot relative-numbers can be used for researches concerning the solar-terrestrial relations.

Which relative-numbers are to be employed depends entirely on the purpose of somenne's researches. For instance, it is a matter of course that somebody investigating the influence of the rotataion periods of 27 days should use the daily sunspot numbers.

POPULAR ASTRONOMY IS TO BE DISCONTINUED AS A PUBLICATION, with the close of the year. It's past service has been a boon to many and its loss will be widely felt.

STATISTICS.

The total number of observed groups for the month of October was----14
The total number of days with sunspots for the month of October was-31
Zurich's Provisional Sunspot-number for October was ---------- 51.4
The monthly mean sunspot area(U.S.Naval Obsvty.) Not released in time.
The highest sunspot number as assigned at Solar Division Headquarters

was observed on November 23rd.,as number 218. it represented a sunspot near the east limb, in the north belt.(this number given here to help observers check their own count).

Predictions of Smoothed Monthly Sunspot-Numbers for the next six months are as follows;

Nov.	60	Feb.	52
Dec.	58	Mar.	50
Jan.	54	Apr.	48.

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

PUBLICATIONS.

"Characteristics of Solar Flares"---------- R.S.Richardson.
Astrophysical Journal Vol.114, No2, pp. 356-366

"Some Observations Of Dark Filmaments in Prominences"-------- V.Ohman
Same issue as above pp. 367-369.

"The Motions of Eruptive Prominences" ---------- Edison Pettit.
Publications of the Astronomical Society of the Pacific.
Vol.63, No.374 October 1951. pp.237-244.

"Some Relics of Galileo in Florence" ----------Rufus Suter
Scientific Monthly,October 1951,pp. 229-234

"Galeleo in Padua " ---------- Rufus Suter
Sky and Telescope Nov.1951,pp.3-4.

"A Photographic Study of Changes of the Infrared Emission of the Polar Aurora" ---------- Herman - Leinbach.
Transactions of the Geophisical Union Vol.32; No 5.,--.679-682.

"Solar Faculae" ---------- H.B.Rumrill.
Popular Astronomy Vol.LIX,No.7,pp367-370.(Posthumously)

"The 37 Year Cycle In The Variation in the Length of Time Between Sunspot Maxima; 301- A.D. 1928 A.D." ----------H.W.Clough
Cycles October 1951. Foundation for the Study of Cycles, 9 East 77th., Street, New York 21, N.Y.

" The 37 Year Cycle" (Part two)---------- G.T.Lane
Cycles Nov. 1951. same address as above.

"The Sun Is A Peculuar Star" ----------Otto Struve
Sky and Telescope Nov. 1951. pp.11-13.

!!! HAPPY-NEW-YEAR !!!

SUPPLEMENT TO THE DECEMBER AAVSO BULLETIN.

An Exposure Formula for Solar Photography.

H.B.CHASE.

Beleiving that Solar Phography should be more popular, the writer set out to develope a program, using ordinary materials and proceedures, such as would be avaiable to the amateuer observer. It was found that the proceedures for Solar photography were similar to those of conventional photography up to a certain point, and considerably, different from there In conventional photography we use the "trial and error" method extensiv with varying results, untill we arrive at a modicum of sussess,
In Solar photography it becomes necessary to try different combinations of eyepieces, aperatures, filters, films, and shutterspeeds. Each combination required anew series of from 4 to 6 test exposures. Film was being consumed at an alarming rate, with relatively few satisfactory results. It was evident that a more scientific approach must be made if tha subject were to become attractive to other observers. A short cut to satisfactory results was needed. Some sort of formula might do. An algebraic formula for conventional photography was obtained, which served as a pattern but which required some modification in order to be made adaptable to the solar problem, With that formula, plus an accumulation of exposed film and the record of the circumstanced of each exposure, the formula which follows was constructed. With it a considerable number of successful exposures and very few poor results have been obtained. The developement of this formula is predicated on the use of a focal-plane shutter, but we see no reason as to why it should not apply to other typ of shutters, provided that the speeds are high enough. High shutter speed eliminate the use of a power drive on the telescope.

The Formula: $$\frac{p\ B\ S\ M}{4\ f^2\ T\ c} = t\ (max)$$

Where (p) equals "pi" or 3.1416
(B) " the brilliance of the sun, expressed in foot candles as read from a light meter, exposed to the incident light of the sun. Note A.
(S) " the A.S.A. or manufacturers Daylight rating of the film, as given in their catalogue. Note A.
(M) " the Telescope magnification. The focal length of the objective divided by the focal length of eyepeice.
(f) " the f number, or the distance from the aperature to the film plane divided by the diameter of aperature Note A.
(T) " the Transmission efficiency of optical system. This value is a decimal fraction, less than (1) one. Allow 5% for each lens surface exposed to the air.
(c) " The manufactuerer's rating of the colored filter, if one is used. Note A.
(t max) is the shutter speed that can be used without risking Overexposure. Note B.
(t min) is the minimum shutter speed that can be used without risking underexposure. Note B. The minimum speed is (4) times the Max. speed.

Note A. The value is a whole number.
Note B. Although the result is expressed as whole number, it represents a fraction of a second in the same manner as the markings on all modern shutters.

H.B.Chase.