No 1

A A V S O A B S T R A C T S

Edited by R. Newton Mayall

Papers Presented at the Annual Meeting October 13, 1951

Many members cannot attend either an annual or a spring meeting, therefore they have little knowledge of what goes on, particularly insofar as the papers presented are concerned. For the first time, and fittingly so, the papers presented at the 40th Anniversary Meeting have been boiled down and published herewith as Abstracts, so that our distant members may have some idea as to what each paper was about. This first issue is necessarily a skeleton. It is hoped that our absent members will receive this issue kindly, and that it will bring overseas members closer to us.

EFFECT OF SUNSPOTS ON CLIMATE CHANGE, by J. Leith Holloway, Jr.

Dr. H. C. Willett of the Dept. of Meteorology, M.I.T., has found an interesting, but not altogether perfect correlation between 40 year periods of high sunspot activity and periods of warm-dry climate, in middle and low latitudes. Also periods of low solar activity are generally found to be ones of cold and wet climate in these latitudes. It is suggested that the change in solar activity may control the role played by the long-term expansion and contraction of the circumpolar vortex in producing cold-wet and warm-dry climates respectively, in middle and low latitudes. A climate forecast: the next half century will be colder and wetter than the half century just past, which was exceptionally warm and dry. The data used goes back to 1750, and the forecast is made by extrapolation.

GREMLINS IN MY PHOTOMETER, by J. J. Ruiz

For the last three years there has been open warfare between the Gremlins and myself over my photoelectric photometer, but I finally got the best of them -- the little devils; but here are a few things that make them very, very mad and discouraged: 1) a stable and maneuverable telescope; 2) a good driving clock that will keep the image of the star within 0.2mm of the center for at least 10 minutes. My drive worm is mounted on preloaded thrust ballbearings; 3) moisture must be kept from the terminals of the 1P21 tube -- painting the surfaces with ceresin wax or DC4 grease helps; 4) for dirt, keep your house clean! 5) to prevent moisture on optical surfaces, heat slightly with a small electric coil. (Ruiz presented beautiful light curves of No. 12 Lacertae varying only 0.08 of a magnitude in a period of about five hours, to prove he has overcome the power of the Gremlins. Ed.)

NEW SOLAR FILTER FOR VISUAL OBSERVATION OF SUNSPOTS, by Stanley W. Brower

The new Brower Solarfilter has been perfected over a period of 1½ years to answer the need for a compact (1¼"OD x 1½" length) filter for reflectors. It consists of a specially coated glass disc, with the coating on the inside, and a neutral density filter as recommended by the AAVSO Solar Division. The two discs are mounted in a standard 1¼" OD tube 1½" long. In use the filter is placed about 2" or so in front of the eyepiece with the neutral density disc toward the eyepiece. Then any eyepiece can be used to observe the sun.

REVISED PROCEDURES FOR REDUCING SUNSPOT NUMBER OBSERVATIONS, by Alan H. Shapley

This paper was read by title only, because it was to be printed and distributed to solar observers. It is in the nature of instructions and requirements of observers. It is suggested that anyone interested in this subject who is not a member of the solar division, write to Mr. Neal J. Heines, P.O.Box 2353, Paterson 4, New Jersey, and enclose a self-addressed stamped envelope to receive a copy of "Revised Procedures."

DEFORMATIONS ON THE SUN'S LIMB, by Ralph N. Buckstaff

In the past, deformations on the sun's limb have been observed occasionally. During 1951, Rosebrugh, Bartlett, and I observed several of these phenomena; on March 16, May 9, and again on June 24, 1951. These deformations do occur and may be seen by any careful observer using modest equipment.

SOLAR GRANULATIONS, by Dr. James C. Bartlett

The official beginning of sunspot minimum occurred on June 19, 1950. Variations in granular appearance and its relation to fluctuations in the sunspot cycle have been under continuous study. It was postulated that during sunspot minimum the index of granular activity should show a decline. The curve of granular activity appears to be following the downward trend of general spot activity; and granular activity apparently precedes sunspot activity.

PRELIMINARY REPORT ON THE FORESHORTENING PROJECT, by W. Gleissberg

Preliminary results of the project are as follows: 1) Foreshortening of the sunspots does not follow the cosine law, as formerly supposed, and that the actual law is: cos d (1 - 0.072 tan d) where "d" = heliocentric angular distance between spot and apparent center of disc. 2) The new law of foreshortening can be explained geometrically by assuming sunspots as spherical hollows surrounded by a low mound.

APPARENT ASYMMETRY IN DISTRIBUTION OF SUNSPOTS, by W. Gleissberg

So far, during the present sunspot cycle the <u>number</u> of spots shows a western excess. There is a more pronounced asymmetry in the <u>formation</u> of spots -- many more being formed in the eastern half. Observations made for the Foreshortening Project can be used for two other problems: 1) Clearing up the behavior of the asymmetry in the number of spots during the present cycle; 2) Investigating the supposed dependence of apparent eastern excess in the formation of spot groups, with respect to size of telescope used.

EXPOSURE FORMULA FOR SOLAR PHOTOGRAPHY, by Harry B. Chase

Believing that more satisfactory results could be obtained if we could have recourse to some algebraic formula for determining the exposure time, the following formula was constructed and found satisfactory:

$$t = \frac{\pi BSM}{4 f^2 TC}$$

Where "t" = maximum shutter speed; B = sunlight in foot candles (use light meter exposed to incident light); S = ASA film rating (daylight); M = Telescope magnification; f = f-number of lens stop used; T = transmission efficiency of optical system (allow 0.05 for each lens surface exposed to air); C = manufacturer's rating of color filter, if used. The result will be a whole number representing a fraction of a second, and the <u>maximum shutter</u> speed that can be used without risking <u>overexposure</u>. <u>Minimum</u> shutter speed is four times maximum shutter speed.

AURORAL INDEX, by Donald S. Kimball

An index number would be valuable in correlating reports from widespread areas, or to compare displays separated by months or years. Numerical values can be assigned to the different auroral forms to express their importance in the display. When correlating observations for a particular display, the indices are totaled for 15 minute intervals. Index sum for a day is found by adding the minute values for the display.

GRAPHIC METHOD FOR RECORDING AN AURORA, by Donald S. Kimball

Various auroral types are represented in graphic form by using symbols similar in appearance to the auroral types. The graphic form will show: Height and altitude range of forms above north horizon across the zenith to 30° above south horizon; color and brightness of individual forms; movement east and west;azimuth positions and widths.

INFERIOR CONJUNCTIONS OF VENUS AND SUN, by Cyrus F. Fernald

Inferior conjunctions of Venus are interesting to observe because it is possible to watch the crescent move from one side of the planet to the other in the short space of a few days (from one day to a week).

VISIBILITY OF PLANETARY DETAILS, by David W. Rosebrugh

Using a 6" telescope and 300x, the following planetary marks on Mars can be detected: Two round marks 100 mi. diameter, 200 miles apart center to center, can be separated; color in marks 100 mi. diameter, marks 50 mi. diameter, but no color; and a line 8 miles wide.

THE LEON CAMPBELL OBSERVATORY, by Harlow Shapley

Leon Campbell's acclaim, like sunlight and variable stars, transcends provincial borders. Sr. Domingo Taboada of Puebla, Mexico, has built up a considerable establishment, with three telescopes and many accessories, including one of the finest collections of clocks in the country. On the occasion of my visit to Mexico in September (1951), the Taboada Observatory was formally christened "Observatorio Leon Campbell." Leon Campbell was a furious worker while at HCO, and now Campbell is still busy -- in the Cholula Valley east of Popocatepetl in Mexico.

CHART MAKING, by Roy A. Seely

Preparation of charts for 100 southern variables is under way. Information is derived from photographs taken at Harvard's South African station. Because of the false size of the star images on the plates, caused by the different colors of stars, a dial has been designed and affixed to a bow compass. The dial is calibrated to an arbitrary scale, because it is not practical to depict star images whose areas are proportional to brightness. The device makes it easy to prepare all charts alike, and maintain uniformity of images of the same magnitude.

AAVSO CHARTS ON SLIDES, by John Streeter

I have brought a few AAVSO charts reproduced on 35mm color film (mounted 2" x 2"). We will just run them through the projector without comment, for they are self-explanatory. It gives me pleasure to present these 16 slides to the AAVSO for its slide file.

TEACHING VARIABLE STAR ESTIMATING, by Donald S. Kimball

Make a series of slides with the "variable" at sizes covering range in brightness. Project slides in a sequence such that estimates will give a light curve which approximates the true one. Each person makes his own estimates and plots his own curves.

R LYRAE, A BRIGHT SEMI-REGULAR, by Jeremy Knowles

This star is of interest because of the difficulties of observation: 1) Extreme redness, Spectrum M5; 2) Brightness (4.0-5.0) complicates most photographic methods; 3) Slight amplitude hampers visual work. From my study of the various material available on this star, I have drawn the following conclusions:

1. Principal variation, semi-regular, with periods of 50-130 days and amplitude of 0.3 or 0.4m.
2. Distinctive short-term variation, causing a drop of about 0.4m in 10 days; and a similar rise in the same time, occurring at widely separated intervals in no known regularity.
3. At times no variation at all. Longest observed standstill was at 4.2m for 500 days from October 1916 into January 1918.
4. Color index graphically found to be about 1.8m.

A DIFFERENT KIND OF LIGHT CURVE, by Clinton B. Ford

Detailed light curves of six well observed long-period variables have been studied from the viewpoint of relative changes in total visible radiation, from cycle to cycle. The relative total light "L" (in magnitude days) for each cycle is represented by an area bounded by the light curve and an arbitrary magnitude m_o, which is somewhat fainter than the faintest minimum in the total number of observed cycles. The area is measured with a polar planimeter. Such curves are of particular interest in demonstrating the "variation in the variations" of long period variables.

LIGHT FLUCTUATIONS OF Z1256, by Ralph N. Buckstaff

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The variation of Zinner Star No. 1256 has been unconfirmed, but in 1920 Graff thought it varied from 11.0 to 11.8. My observations of this star from J.D. 3437 to 3564 (1950) and from J.D. 3769 to 3930 (1951) showed it varying from 10.9 to 11.6, with maxima occurring at intervals of 43 and 79 days.

ZWICKEY'S NOVA AQUILAE 1951, by Dorrit Hoffleit

Dr. Fritz Zwickey, on June 3, 1951, discovered a nova at $19^h\ 05^m\ 17^s + 10^\circ\ 25'.8$ Harvard plates revealed that it had been bright 20 days earlier on May 14, 1951. Approximately 1700 plates taken prior to the nova outburst were examined, but they revealed no evidence that the star might be a recurrent nova. One long-exposure A-plate (3 hrs., July 14, 1936) shows a faint star close to the position of the nova, which indicates that the nova, at minimum, was 17th mag. or fainter. Current plates still show images too large and bright to identify the faint star with certainty as the nova.

TWO PROBLEMS FACING THE AAVSO, by David W. Rosebrugh

Fourteen times as much fan mail is received per article on telescopes and equipment as is received from articles on observing variable stars, the planets, and the sun. Amateurs are more interested in telescope building than in observing. Also there is a shortage of refractors in the 6" and 5" sizes; and relatively few in the 4" size have been made in the U.S.A.

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