No 3

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 18 1952

The 41st Annual Meeting of the AAVSO was held in Cambridge, Massachusetts. Members began arriving Friday afternoon, October 17, 1952, and by sundown the halls of Harvard Observatory were buzzing with chatter. Old friends were talking it over and new friends were being made. They came from as far away as Wisconsin and North Carolina and New Mexico. At eight o'clock Friday, about 75 members gathered in the Observatory library to listen to a talk by Dr. Donald Menzel, now Acting Director of the Observatory. Dr. Menzel outlined the important part astronomy and astronomers have played in the gathering, correlating, and applying data obtained from visual, photographic, and radio observations to everyday problems such as weather forecasting and radio forecasting. These together with many other problems that are of value not only in times of peace, but in war as well are the reasons why various agencies of the government are sponsoring so many projects of this type. Among the important projects underway are the coronagraph studies of solar prominences -- detail studies of our nearest variable star. Dr. Menzel's brief talk was followed by motion pictures of solar activities recently made with the coronagraph at Sacramento Peak, New Mexico.

The Friday evening meeting and social hour is looked forward to each year, and is a good aperitif for the all day session on Saturday. Saturday evening about a hundred members gathered in a nearby hotel for dinner and a sociable time, before winding their devious ways homeward.

THE CASE FOR SUNSPOT NUMBERS, by Harry Bondy

Wolf's Sunspot Number, fortunate in its simple formula $R = k(10g+f)$ gives us an index of solar activity unsurpassed by any other. The Sunspot Numbers agree well with Allen's Relative Critical Frequencies for the Ionosphere and the correlation with radio emission from the sun at $\lambda = 10.7$cm (Covington's) is of the highest order. The overall solar activity as indicated by spots, flares, faculae, flocculi, prominences, coronal lines, and particularly radio noise, is in good agreement with the Sunspot Number.

While Alan Shapley's statement in the P.A.S.P., Feb. 1949, is again confirmed, Dr. Donald H. Menzel's statement in "Our Sun," and particularly in the Harvard "Centennial Symposia," calling R obsolete, is, in view of the facts, wholly unfounded.

Graphs giving yearly, monthly, and in the case of radio noise daily values are presented, beside smoothed out numbers.

Correlation with terrestrial magnetic activity for the present solar cycle is strikingly lacking, and is also graphically shown.

A SUNSPOT CROSSES THE EQUATOR, by Thomas A. Cragg

It is not the general case to find a sunspot that crosses the equator. It is a rather rare circumstance. On Feb. 5, 1952, there was a smallish group which developed not far from the center of the disk and very close to the equator. On the next day, Feb. 6, the group was larger and another group developed immediately to the south of it. Not much attention was paid this group until it was noted that the whole group was in the southern hemisphere on Feb. 8. Measures of the direct photographs made at the 60' tower showed that the equator passed right through the group on Feb. 5. Measures of the plate taken on Feb. 8 revealed that a total motion of four degrees in as many days was experienced by some members of this unusual group. Groups of this nature are of very great interest to solar observers.

SOLAR ACTIVITY IN 1951, by Demetrius P. Elias

Solar observations this year have been taken through the 82mm x 43 Merz equatorial refractor at the National Observatory (Athens, Greece) by the kind permission of Prof. S. Plakidis, Director. The method of observation is visual, through Wilson Filter, and projection on a 200mm disk. Number of observations were 283 in 280 days. There were 140 consecutive days in which observations could be made, from May 18 to October 4, and during this period we secured 107 consecutive observations. Aug. 27 was the only spotless day. The total number of groups was 300; 165 in the northern and 135 in the southern hemisphere. Forty-seven came from and disappeared in the invisible hemisphere; 50 came from the invisible hemisphere and died on the disk; 157 groups were born and died on the disk; and 47 were born on the disk and disappeared in the invisible hemisphere. The average latitude for the 165 northern groups was $+11.^{\circ}3$; for the 135 southern groups, $-9.^{\circ}9$; and the average latitude for the 300 groups was $+1.^{\circ}72$. Ten groups were visible to the naked eye on 35 days. The yearly mean sunspot group number is 4.4.

GEOGRAPHICAL EXTENT OF A PARTICULAR AURORA, by Donald S. Kimball

Data from fifty observations of the aurora of 1939, August 11-12, were analyzed and converted to a graphic form which showed changes in auroral activity at 15 minute intervals. The times when the aurora was first seen and when it appeared overhead were plotted on maps of North America. Lines were drawn on the maps to show the southern and western limits of the auroral zone for each hour. Comparison was made between the southern extent of the aurora and changes in geomagnetic activity. The auroral zone expanded southward as the magnetic storm increased in intensity and reached its greatest southern limit when the storm was most active. After local midnight and during the time when the magnetic storm abated, the auroral zone moved northward. Maps were drawn showing the probable areas of North America covered by the overhead aurora during the six hours of its greatest activity. The southern limit of the auroral zone apparently follows lines of geomagnetic latitude east of the twilight zone and rises northward where the aurora enters the zone of twilight.

RED DWARF FLARE STARS, by Sarah Lee Lippincott

Some main sequence stars have exhibited rapid fluctuations in luminosity. It is to the red dwarfs I shall confine my descriptions. The light curve of a flare-up is characterized by a rapid increase, and a return to normal lasting perhaps ten times as long as the increasing branch, while the whole drama may take place well

within an hour. The time and frequency of occurrence is quite unknown and unpredictable. Changes of as much as two magnitudes have been recorded for a number of flares: one star has been reported six magnitudes brighter than normal during a flare-up. Due to their extreme intrinsic faintness, they are all necessarily nearby stars; the average apparent visual magnitude is 11.7. Some of the stars at the moment are on photoelectric photometry programs for one reason or another; many are on photographic astrometric programs, some appear on large field plates from patrol cameras. However, since flares are of such short duration they may easily miss being recorded. Continued and persistent monitoring is necessary to increase our knowledge of these elusive stellar phenomena. Flare-ups do not occur at predictable intervals. The frequency of occurrence, and whether all dM-stars are subject to detectable flares, are questions which can only be answered by more and more observations.

NO DISTORTIONS ON THE SUN'S LIMB, by Herbert A. Luft

At the 1951 Fall Meeting of the AAVSO, a paper was presented by Ralph N. Buckstaff of Oshkosh, Wisconsin, regarding observations of distortions at the sun's limb, which "may be seen by any careful observer using modest equipment." One hundred years ago the study of the sun's photosphere with a telescope comparable to these studies with which irregularities of the sun's limb were reported, were undertaken by many observers, but not a single one of the reported observations could be upheld by strict scientific tests. I considered the possible instrumental and observational errors, which for the reported distortion of June 24, 1951, gave the following results: (1) A too dark sun-filter could have been used, which blacked out the sunspot close to the limb; (2) All observations are made at P.M. local time, when visibility conditions are not so favorable for sunspot observations as in the morning hours. All the reported elevations are easy to explain by air turbulences in the P.M. hours, a well-known effect to most sunspot observers. Also the other observation reports deal mostly with humps and elevations and are similarly explainable as air turbulence, and in addition as physiological effects in the eyes of the observers.

T CORONAE BOREALIS, by Campbell Wade

Because of suspected variability of very short period, it is requested that the observer make several estimates of T Cor Bor's magnitude during the night the star is observed, giving either the standard time, or the Julian day to hundredths. It is requested that the observer note which comparison stars he uses and send this information with his observing report to the Recorder each month. It would be desirable to have separate simultaneous estimates of the star's brightness, using different comparison stars when possible.

SOLAR EYEPIECES FOR SUNSPOT COLORS, by B. C. Parmenter

An oil immersion eyepiece has neutral filtering properties throughout the spectrum except for predominances in the far violet. Such an eyepiece is composed of a lens upon which is attached 3 or 4 filters. To oil immerse the surfaces, one needs only to put a small droplet of light, white oil between the crown and flint glass of the main lens, and other droplets between each filter disk surface. A simple white type of 3-in-1 oil has been satisfactory. The oil-type set-up is superior to balsam. Balsam, when set, creates two extra surfaces itself and a reasonable small thickness of body. This does not hurt the axial rays, but the off-axial rays suffer from a refractive action. The liquid to glass surfaces eliminates a great share of optical surface defects, as well as dirt; and light transmission is noticeably higher.

POLARIZING SOLAR EYEPIECE, by George R. Warren

I have had an idea that critical control of light would help a lot in counting spots in more difficult groups. Using only what I had on hand, I turned out an eyepiece consisting of a plane black glass mirror set at 57°3 which reflects only a fraction of the light which is also plane polarized. An achromatic eyepiece of Kellner type looks at the image at 57°3, after which comes a light neutral gray filter and a Polaroid disk. The mirror remains fixed while the eyepiece rotates and extinguishes the light as in any usual variable polariscope. The control of light is a very pleasant feature to handle; the color of the sun (silvery white) is desirable, and the contrast of black spots on a white ground increases visibility. Definitions suffered with added reflections. One reflection at the polarizing angle and one Polaroid disk does not extinguish enough for a 3-inch aperture, so the filter was added. The eyepiece should not be used on a telescope larger than a 3-inch aperture. Its use on the full moon is very interesting.

COLOR PHENOMENA IN SUNSPOTS, by Walter Orr Roberts

Reports of color in visual telescopic observations of sunspots have persisted for many years. Rose-colored clouds over the umbra and penumbra have been associated with active sunspots. The visual colors also have been ascribed to the rosy hue shown by solar prominences, and the "clouds" therefore were simply prominences seen in projection against the sunspots. However the question was never conclusively settled. A substantial number of recent observations suggests the following conclusions: (1) Color phenomena are elusive; (2) Colors are reported with reasonable frequency but for a minority of sunspot groups. Color in sunspots may be a less frequent phenomena than solar flares; (3) Colors other than "rose" or "red" are reported, with brown, orange, yellow, and violet being commonly recorded; (4) Certain sunspot groups -- usually active ones producing numerous flares -- seem more likely to be reported as colored; (5) Times and locations of the color phenomena do not coincide with times and locations of flares. Many pronounced color reports have been for times when there were clearly no flares in progress. But flare-producing groups seem to be favored as color-producers.

OBSERVING WITH P.E.P., by John J. Ruiz

Amateurs should be encouraged to use photo-electric equipment. To show that worthwhile results are possible, I am showing a light curve of σ Aquilae (an eclipsing variable) from observations I made this summer. This is one of the variables in the AAVSO "New Program." The minimum comes within 0.1 day from that computed from the formula 22486.797 + 1.95026 E given by Wylie (Ap.J. 56) thirty-two years ago; or if we use the new epoch and that of Wylie we arrive at a more accurate average period of $1^d.950261$. Another curve is that of #12 Lac, a β Canis Majoris type of variable, based on observations taken in 1951. Ten curves like this were sent to C. de Jagers of the Utrecht Observatory, Netherlands, for reduction. Mention of this and the results obtained is made by Dr. Otto Struve in the current issue of "Annales D'Astrophysique." Finally a set of observations of the Pleiades (to calibrate my photometer in terms of international magnitude and color indices) is shown which agrees closely with those obtained by Eggen (Ap.J. 111, 89, 1950) and Johnson and Morgan, Ap.J. 114, 522, 1951.

INFORMAL REPORT, by David W. Rosebrugh

A book dealing with 400 long period variables was contemplated by the late Leon Campbell. Two hundred of the light curves have been plotted and drawn. It is hoped to finish the remaining 200 curves before the 1953 Fall Meeting. Thereafter Newton Mayall will make the plates for reproduction, and Margaret Mayall will write a suitable introduction. Then the book can go to press.

During the meeting I have asked for a show of hands to settle an argument as to how many observers wear glasses when looking through their telescopes. Of the 61 observers present, 31 said they did not habitually wear glasses when observing; 14 said they removed their glasses; and 16 said they wore glasses. Fourteen of the latter said they have astigmatism.

AAVSO OBSERVATIONS 1911-1930, by Robert M. Greenley

Within the limits of the source material, an attempt is being made to credit every observer who reported even one observation. This is a progress report on fundamental data for a 50-year history of the AAVSO. Many observations were not accredited to anyone, therefore this is a skeleton report that will be followed in the next year or so with data for 1931-52. The record will then be kept up-to-date.

THE FIRST YEAR, 1911-1912

Observer	No.Obs.
Bancroft	101
Burbeck	59
Bouton	250
Craig	281
Dow	24
Forsyth	326
Miss Furness	49
Gray	953
Hathorn	198
Hunter	150
Jacobs	1014
Lacchini	731
McAteer	161
Olcott	902
Perkins	15
Miss Sutton	73
Miss Swartz	118
Vrooman	211
Miss Young	557

THE FIRST 20 YEARS (1911-1930)

246 observers reported one or more observations, as follows:

2	20,000+
1	15,000 - 20,000
4	10,000 - 15,000
4	5,000 - 10,000
7	4,000 - 5,000
3	3,000 - 4,000
5	2,500 - 3,000
26	over 2,500
36	over 1,000
77	over 500
169	under 500
84	under 100
7	under 10
1	under 5
uncredited	500±

Observers Credited With More than 10,000 Observations

Observer	Date	No.Obs.
Peltier	1918-30	28,274
Lacchini	1912-30	27,237
*McAteer	1912-24	15,500
Bancroft	1912-22	13,626
Bouton	1912-30	13,386
Baldwin	1923-30	12,994
Chandra	1920-30	10,759

*(Recorded Obs, 11,953; Obit by D. B. Pickering, 15,500)

Observers Credited With 5,000 to 10,000 Observations

Observer	Date	No.Obs.
Luyten	1917-19	7,669
Richter	1914-17	7,267
Olcott	1912-30	6,307
**Waterfield	1921-29	6,277

**(Grandson of Sir William Herschel)

MISCELLANY

We wish to note here briefly those who had a definite place on the program, but for whom we have no papers or abstracts.

Harry Chase mentioned a relatively new refractor called "Unitron," which has proven very satisfactory for variable star work and is more or less easy on the pocketbook.

Clinton Ford, our Secretary, gave a short resumé of his visit with Lacchini and Ancarani in Italy. Through unfortunate circumstances, your Recorder was unable to visit with these two well-known observers. We can all be grateful to Clint for taking the time to personally convey the best wishes of all our members to Lacchini and Ancarani. Such visits to our distant members bring them closer to us, and we hope it lessens the gap for them and spurs them on to further endeavor.

John Streeter told of the observations of the Gegenschein in 1952; and pointed out that δ Cephei is the "Training Star DeLuxe."

Rolland LaPelle spent a few moments on "Preserving our Constant (Solar); and Paul Stevens spoke briefly on mountings for the Skalnate Pleso Atlas, with illustrations by kodachrome slides.

William Tifft outlined briefly the photographic method of detecting variables.

It is always hard to give a true picture, in the abstracts, of papers by John J. Ruiz, who always presents information copiously illustrated with entertaining slides that produce broad grins. He can be acclaimed by the AAVSO "Cartoonist Laureate." Keep it up, John!

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