AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS

ABSTRACTS

OF

PAPERS

PRESENTED AT NATICK MEETING

19 OCTOBER 1968

CONTENTS PAGE

187 Concord Avenue, Cambridge, Massachusetts 02138

AAVSO ABSTRACTS

Edited by R. Newton Mayall

The 57th Annual meeting of the AAVSO was held on Friday, 18 October 1968 in Natick, Massachusetts. This meeting was held at the Natick High School Planetarium at the kind invitation of Mrs. Polly H. Vanek, Director of the Education Cooperative Astronomy Center.

New England has been blessed with a remarkable summer and fall. Even at the late date of the meeting the fall color was still good. This in itself is sufficient to bring our members to New England.

Friday evening our lecture was held in the Planetarium. Mrs. Vanek greeted us and talks were given by Mr. Jameson and Miss Macfarland, to acquaint us with the work being done at the High School, in astronomy.

The planetarium serves 12 school districts, with 116 schools, 2,000 teachers, and 70,000 school-age children. The planetarium has a Spitz Model A3P Prime Sky Projector. The children from the 12 districts and all grade levels are brought here to learn astronomy. The program being worked out is done under an ESEA Title III Grant. It is the only one in the country that is being successfully carried out. A demonstration of the various things that can be accomplished with the instrument was given; and the type of material used.

Saturday was given over to papers, after which a few went to Wrentham to visit our former treasurer, Percy W. Witherell, who is past 90 years of age, and in very good health and spirits.

Our dinner was held at the Holiday Inn, in Framingham. Following dinner, a book was presented to Ted Szybowicz, in appreciation for his generous gifts.

Margaret Mayall entertained us with a story of her trip to the Variable Star Colloquium, held in Budapest, Hungary. Due to the tense international situation, many did not attend, but that did not stop Margaret. She travelled from Vienna to Budapest by hydrofoil. This was a thrilling experience and once when the boat slowed down in front of a beautiful castle, she thanked the Captain for slowing down so she could get a good picture. The captain was pleased, and then said he had to slow down anyway to get the seaweed off the propeller.

If there is one thing our Director has, it is an adventurous spirit and a good sense of humor. She told us of the difficulties encountered by Dr. Detre, who was host of the colloquium, but with it all it was an interesting and successful meeting. On her way back she stopped in the Hague where friends arranged for her to see the opening of Parliament. She saw Queen Juliana of the Netherlands in her golden coach, a fitting end to a successful journey.

Our meeting in Natick was a happy one. There was plenty of time for everyone to get better acquainted. The long distance travellers were Curtis Anderson from Minnesota, Ted Szybowicz from Michigan, Walter Moore from Kentucky, Woolsey from Chicago, the Stokeses and Hurlesses from Ohio.

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NEW VARIABLE WITH N TYPE SPECTRUM, by Susan M. Hess

In the course of measuring a plate for the Yale Zone Catalogue, it was discovered that the star CoD -35° 4257 was missing from its given position. The second of two overlapping plates of this region confirmed that the star was not visible even though the plates reach considerably fainter than 11th magnitude. The star is listed in the Cape Annals (1955) as 8.6 visual. It was then noticed that CoD -35° 4257 had been suspected of variability in the Cordoba Durchmusterung (1894) where four visual magnitude estimates range over 1.3 magnitude.

A check of the star on the Warner and Swasey objective prism plates revealed an N-type spectrum with outstandingly strong bands of Si C_2. On the basis of these facts it was decided to examine the star for variability on the Harvard patrol plates.

The star's magnitude was estimated on nearly 700 plates of the region, and observations were obtained for 374 dates. On the ordinary blue plates the star was found to vary from brighter than magnitude 12 to about 15.3.

A light curve was obtained which shows the multiple periodicity often characteristic of long period variables with carbon spectra. The primary period is 502 days with a secondary beat period of the order of 3000 days. Three theoretical curves were found, each of which reproduces approximately, the main features of the light curve in the 4000 day interval from Julian Date 2427000 to 2431000.

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MISCELLANEOUS RESULTS FROM THE MARIA MITCHELL OBSERVATORY, by Dorrit Hoffleit

The 1968 summer season at the Maria Mitchell Observatory was exceptionally rewarding. The new Loines Observatory, housing an 8-inch Alvan Clark telescope, was dedicated. We hope the AAVSO will hold another meeting in Nantucket soon to try out this visual telescope.

Four college girls and I worked on 24 photographic variable stars. In many instances the new work simply confirmed the variability of previous suspects. However we did find new periods for four Mira type stars, one Algol, one SR and one RV Tau. Linda Deery reports on two stars in the globular cluster M28 with indications of changing period; Marilyn Twomey one W UMa; and Jean Jackman an interesting revision of the period of V Comae. CI Cygni was watched photographically all summer and was found to behave "normally" with a minimum at the predicted time -- instead of the nova-like flare we hoped might occur while we were watching!

I examined all the Mira-type stars in VSF 193 to see which are in directions of relatively clear galactic windows and which are in directions of dark nebulosity which abounds in this part of the sky, only some 10 or15 degrees from the galactic center. On the basis of the Wilson-Merrill period-luminosity relation for long period variables, distances uncorrected for interstellar absorption were computed. Without such corrections, all computed distances are too large, and by varying amounts. To my astonishment the average of the uncorrected distances for the stars in the relatively clear regions (7.8 kpc) came out 1.5 kpc greater than in the obscured regions (6.3 kpc). This suggests that the majority of the stars in the obscured regions are in front of most of the nebulosity and that most of the more distant stars are too badly obscured to have been discovered in my survey. Since more of the overall field is obscured than clear, it may not be too surprising that only 8 stars in clear patches are nearer than 4 kpc in contrast to 36 in the obscured areas.

Over 190 Mira type stars are included in this survey -- 86 in the comparatively clear patches, 107 in the dark lanes; but no Mira type variables at all were discovered in the one third of the field that looks most obscured. What is greatly needed for these faint photographic variable stars is a sufficient number of observations in red or yellow light to enable us to ascertain relative color excesses from which the apparent distances can be corrected for obscuration effects. The spectral classes also needed have already been determined from infra-red objective prism spectra at the Warner and Swasey Observatory.

I wish to express my appreciation to the National Science Foundation for supporting these investigations.

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V COMAE, by Jean Jackman

V Comae was investigated at the Maria Mitchell Observatory this summer using thirty Nantucket observations and 268 published observations. Of the published observations, Kukarkin contributed 120, Blazko contributed 108, and Hoffmeister contributed forty. The thirty Nantucket observations fit the published period of $0^{d}.46913844$, but the phase of the Nantucket maximum was one quarter of a period ahead of the published maximum.

The period giving the least scatter for each of the four groups was $0^{d}.4691368$ but over a span of 26,372 days, the maxima progressed from Ø = .380 to Ø = .780 indicating a secularly changing period. A k correction of $k = 1.184 \times 10^{-10}$ was applied and the maxima for all groups fall around Ø = .375.

In Blazko's observations there is one night run that falls completely off the curve. This night run does not even fit the period published with this group of observations. A number of spurious periods were tried in the hope that one of these would place the night run on the curve; however, this did not happen. It is possible that a mistake was made in the Julian Date.

When the four groups were graphed together, the curve seemed to have two distinct minima. The image of V Comae in the Lick Atlas is slightly pear shaped indicating the possibility of an unresolved companion. If V Comae has an unresolved red companion, different sensitivities of the plates would explain the two minima of the light curve. Although the Palomar Atlas does not indicate this, the possibility has not been ruled out.

SMALL AMPLITUDE VARIABLE IN SAGITTARIUS, by Marilyn Twomey

I worked this summer at the Maria Mitchell Observatory on Nantucket on DH Variable No. 184 in Sagittarius. The variable is probably a W Ursae Majoris star, an eclipsing binary with a short period. After much trial and error, I obtained surprisingly good results for a star with so small a change in magnitude ($\sim$.8m). I found two periods, .308476 days and .446627 days, which seem to make equally good light curves with my observations of the Nantucket plates (1957-1968) and the MF Harvard plates (1924-1933) separately. However, with both periods, the light curves from the NA observations and the light curves from the MF observations do not correspond. I assumed the star has a changing period, since the two groups of plates are 24 years apart, and tried a sine curve correction on both periods. I could not arrive at a satisfactory sine curve correction for either period. However, at the end of the summer, I did discover an unchanging period, .364913 days, exactly half-way between the two I have mentioned, which seems to fit both sets of observations. More work must be done on both the sine curve correction, and this last period, which looks extremely promising.

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TWO RR LYRAE VARIABLES WITH CHANGING PERIODS, by Linda Deery

This summer, in Nantucket, I used the Harvard photographic plates of Variable Star Field 193 to calculate the periods of two short-period variables of the RR Lyrae type, DH Variables #365 and #416. Both are near the globular cluster M28. The variability of these stars had been previously discovered by Dr. Hoffleit.

Var. 365 at $18^h18^m42^s$ $-24^\circ55'.9$ (also Bailey #8) showed a magnitude range from 15.6 to 16.6 as estimated on 185 plates. A plot of the phase of maximum against the Julian day for the period of best fit gives a shallow parabola opening downward, suggesting a secularly changing period with P_o of .56600 days as a base period at JD_o = 25,000 and a correction constant k^2 of 2×10^{-10}, calculating the phase in terms of period for the light curve by the following formula:

$$\emptyset = JD(P^{-1}) - \left[JD_o(P^{-1}) - n - (k^2n^2P^{-1})\right]$$

where

$\emptyset$ = phase
JD = Julian day of observation
P^{-1} = reciprocal of the base period
JD_o = Julian day of the top of the deviation curve
n = number of cycles from JD_o
k^2 = correction constant

Var. 416 at $18^h18^m34^s$ -24° $55'.8$ showed a magnitude range from 15.2 to 16.8 on estimates from 128 plates. The period of best fit was .5782736 days with a base period at JD_o = 23,500 and a correction constant $k^2 = 4.5\times10^{-10}$ as calculated by the formula used for Var. 365. The graph shows sufficient scatter to warrant further investigation.

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REPORT ON WORK AT MARIA MITCHELL OBSERVATORY - 1968, by Karen Alper

Last summer I was successful in determining the period of MN Sagitarii from Harvard and Nantucket plates. It is a Mira type star with a period of 283 days. I also observed CI Cygni from plates taken at Nantucket. It is expected to flare dramatically, but I observed no such variation during last summer.

My major project of the summer began with estimating the magnitudes of variables 316, 317 and 382 in Sagittarius from Harvard plates. From graphs of magnitude vs Julian Day, it was decided to try to calculate a period for 382, the most promising.

Variable 382 remains at about 14.4 most of the time; occasionally it drops to perhaps 15.2. The star has at least three companions which were only visible on some of the best plates. These companions have magnitudes near that of the variable when it is at minimum. I checked my measurements against some made from the same plates over a decade ago. My estimates were consistently much brighter, but the difference was not a constant factor. I could not resolve this difference.

The plates I used were in three groups. One had about 150 plates. Estimates from these were doubtful, but there were many plates taken at short intervals. A period of either one or two days or several hundred days was indicated. A second set of plates was of good quality, but all the intervals between the photographs were long. The third set was excellent. It indicated a duration of minimum of either one fourth of a day, one and one fourth days, five or six days, or something over twenty days. This set had several runs of plates taken at short intervals. These were mostly at maximum, but I used them to test the periods by trying to fit the intervals between the plates. I never got any period to work on even the good plates. At best I can guess that it is irregular. More high resolution plates taken at short intervals would help.

BRIGHTNESS OF COMPARISON STARS NEAR NOVA DELPHINI 1967, by Herbert Luft

At the Fall meeting of the AAVSO in Springfield, Mass., in 1967, I presented a paper dealing with some discrepancies of published magnitudes of stars near Nova Delphini. I remarked that iota Delphini is given 1 magnitude brighter in the new BS Catalogue than in others. It is now confirmed that there is a misprint in the third edition of the BS Catalogue and the correct magnitude should be 5.43 for this star.

Mr. Arthur J. Stokes presented a paper at the Spring meeting in Lima, Ohio, this year and he has made photoelectric measurements of various stars near Nova Delphini giving better values for magnitudes than those I obtained from various catalogues. However, he also mentioned delta Delphini in his list. This star is variable and noted in the Kukarkin-Parenago Catalogue of 1957 as belonging to the delta Scuti type stars. Consequently, this star should not be used for any comparison.

For some fainter stars Mr. Stokes used the numbers of the Boss General Catalogue, and I wish to give here the mostly used description for such stars in the system of Durchmusterungen, and if listed, in the BS Catalogue and now also in the new Smithsonian Astrophysical Observatory Star Catalog.

GC 28821 = BD + 17°4378 = Saoc 106376
GC 28843 = BD + 17 4382 = 106396 = BS 7923
GC 28814 = BD + 19 4484 = 106373 = BS 7914

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ZETA DELPHINI, A VARIABLE STAR??, by Herbert Luft

In the paper presented last year I mentioned the discrepancies on zeta Delphini. In the meantime I consulted the new Arizona-Tonanzintla Catalogue, also the old Uranometria Nova Oxonienis by Pritchard, who observed these stars about 80 years ago with a wedge photometer. I observe this star quite often and I find that zeta Delphini is variable about half a magnitude. I have not made enough observations to obtain a light curve, but sometimes this star is definitely fainter than 29 Vulpeculae for a relatively short time. Since both stars and other comparison stars are nearby, visible to the naked eye and in small binoculars, this star should be examined further. I also had the opportunity to consult three copies of the old Bayer Uranometria, in the editions of 1601 and 1663. In the 1601 edition this star is given as 5th magnitude. In the handwritten 1663 edition it was another value, but corrected to 5th magnitude. Perhaps the observer some 300 years ago found it necessary to correct the magnitude written down.

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LOW LATITUDE SPOTS NEAR SUNSPOT MAXIMUM, by Charles H. Smiley

Most reference works say that the first spots in a beginning sunspot cycle occur near 30° latitude, north or south, and that as the cycle continues, the spots appear and disappear nearer the equator. When the sunspot number is at or near a maximum, the numerical average of the latitudes of sunspots is about 15°. Very few spots are seen nearer the equator than 5°, nor farther then 40°, north or south. It was a little surprising, therefore, as the sunspots were near a maximum* to find a spot on the sun about a degree south of the equator on the first of September, 1968. This spot was followed until it disappeared around the western limb of the sun about the 11th. It did not reappear when the rotation of the sun should have brought it back if it still existed. On the eighteenth of September, another spot was found about 3° north of the equator and this one was followed until it vanished on the twenty-fifth before it reached the sun's limb. Two students -- Eugenia Robinson and John Brittain -- have joined me in making measures of the positions of these two spots and calculating the sidereal period of the sun's rotation from their motions. For the sunspot of latitude -1°, the period was 25.19 days; as compared to 25.15 days found at Mt. Wilson for this latitude. For the sunspot latitude +3°, the period was found to be 24.76 days as compared to 25.16 days (Mt. Wilson). In each case these values represent averages from the values determined by the three observers. For comparison purposes, another spot of latitude -15° was followed from September 25 to October 5; its period was found to be 25.93 days compared to 25.50 (Mt. Wilson).

In contrast to the low latitude sunspots, one is reminded that in 1956 when the sunspots were approaching the highest maximum in recorded history, a spot of unusually high latitude, +48°, was observed on August 18 at Ladd Observatory.

*Some Predictions of the Current Sunspot Maximum

James Dodge	1967.4	170 #
Desmond King-Hele	1968.1	140
Robert Brown	1968.1	164 #
M. Waldmeier	1968.1	
Rexford Avery	1968.8	157 ¢

Charles Smith	1968.9	142 ¢
Walter White	1969.0	100 #
Leith Holloway	1969.3	120 #
Alice Dalrymple	1969.3	128 ¢
Charles Smiley	1969.3	133 #
Wesley Green	1970.7	62 #

- Predicted in 1962 ¢ - Predicted in 1966

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IMPORTANCE OF VISUAL OBSERVATIONS IN COMET RESEARCH, by Jurgen Rahe and Bertram Donn (Goddard Space Flight Center, Greenbelt, Maryland)

Until the end of the last century comet observations were almost exclusively of a visual nature. These observations were primarily concerned with the structure and structural changes of comets. In modern comet research, these studies have played only a minor role. The rediscussion of older visual observations and their comparison with modern photographic methods shows that the former yield some information on the processes occurring in the vicinity of the nucleus that has not been revealed by photography.

Photographic pictures generally do not show the structures of the emission of the ionized CO^+ tail molecules near the nucleus. These structures are masked by the continuous background emission of the neutral coma molecules such as CN and C_2. In visual observation, however, the emission of the CN molecules, which in most cases predominates in the spectra, is less effective. Therefore, the structures of CO^+ bands near the nucleus are observed visually more often than on photographs.

Visual observations of various comets published during the last century show nearly identically the same fountain-like structures of the uprushing material, mostly resolved into several more or less separated "jets". Observations of these phenomena have only rarely been made by photography.

In a Comet Atlas that is being prepared at Goddard, several drawings of various comets are included which were published during the last century after visual examination through a telescope. We are not aware of any similar material for bright comets which have appeared since 1910. It would be an extremely worthwhile project if members of the American Association of Variable Star Observers could devote some of their time and capabilities to further studies of visual structures in the coma region of comets. These structures are of great importance for an understanding of the source of ionization in comets, the mechanism of formation of tail rays and the interaction of the solar wind with comets.

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TOTAL ECLIPSE OF MARCH 7, 1970, by Lewis J. Boss

Eclipses both of the sun and moon may be said to have a life history. The present character of the eclipse whether it be partial, total or annular has not always been thus in the past nor will it continue to be the same indefinitely in the future. A total solar eclipse will take place on March 7, 1970, and is the last opportunity most observers living on the southeastern seaboard will have to witness such an event for the rest of the century.

Solar eclipses are born at the rate of about four per century, each series containing some 70 eclipses, the presentation of which will occupy an interval of about 1200 years. Each eclipse is separated in the series by an interval called the "saros" amounting to a period of 18 years, 11 1/3 days (a day more or less depending upon the number of leap years taken into account). The 1/3 day in the interval causes a shift in the locality of the following eclipse 120° westward in longitude and after three returns is almost back again in the same place. However, since the sun at the end of each saros interval is about 21' west of its preceding position relative to the node, a slow change is effected in the type of eclipses produced together with a change in the latitude of the localities in which they are visible.

All of North America will see this eclipse, weather permitting, as partial with varying amounts of the sun's disc obscured, depending upon the location. The Hawaiian Islands are not well situated for this event since the sun will rise on eclipse day with the moon more than half-way through its passage across the sun's face. This eclipse series started on May 17, 1501 (Julian Calendar), as a very small partial eclipse visible only in high northern latitudes, taking place at the moon's ascending node. The first central and annular eclipse occurred on August 11, 1627, and the change from annular to total eclipse took place on December 10, 1825. On January 11, 1880, Mr. Robert Treat Paine, in whose honor the Paine Professorship of Practical Astronomy at Harvard College was established (traditionally held by the Director of the Observatory) observed the 22nd return of this eclipse in California at the age of 76 years.

The next return, on January 22, 1898, was widely observed in Europe, parts of Asia and Africa and was seen as a partial eclipse in Hawaii. During this eclipse the long coronal streamers extending along the ecliptic were first photographed and at Visiadrug, on the west coast of India, Sir Norman Lockyer's party photographed the flash spectrum. These photographs revealed that the flash spectrum was practically a reversal of the Fraunhofer spectrum, although Sir Norman at that time was not convinced that one was the exact counterpart of the other.

The 24th return was visible as a partial eclipse in North America on February 3, 1916, but attracted little attention elsewhere since the path of totality began in the eastern Pacific Ocean at $121^{\circ}36'$ west longitude and only $7^{\circ}21'$ north of the equator. From this point in the watery wastes of the Pacific Ocean the moon's shadow sped easterly and northeasterly across the extreme northwest part of South America and the Caribbean Sea, thence the shadow passed over the island of Guadaloupe, then out over the Atlantic Ocean to a point $9^{\circ}5'$ west longitude and $49^{\circ}24'$ north latitude, a location off the southern tip of Ireland and west of Lands End, England, where the eclipse ended at sunset.

The central line of the next eclipse in the series began just east of the Island of Borneo in the Malayan Archipeligo on February 14, 1934, at $120^{\circ}45'$ east longitude and $6^{\circ}35'$ south latitude. The shadow passed over the islands of Celebes, Gilolo, the Losap Atoll, Oroluk Atoll and Wake Island, but mostly over the waters of the Pacific Ocean and ended on February 13th (sic) in the Pacific at $146^{\circ}40'$ west longitude, $42^{\circ}19'$ north latitude, several hundred miles west of the Oregon coast. The maximum duration of totality at this eclipse was 2 minutes 53 seconds at a location about 400 miles northwest of Oroluk Atoll.

In 1952, on February 25, the 26th return was not seen in the United States but the path of totality began in the South Atlantic midway between the bulges of Brazil and Africa, swept across Central Africa from Libreville on the west coast of Gabon to Port Sudan on the Red Sea, then across Saudi Arabia to Basra on the Persian Gulf and thence over Iran, ending in the frozen wastes of Siberia.

The March 7, 1970, event will probably have an audience of something over 50 million people as totality will be complete or nearly so in an 80 mile wide belt across the upper part of Florida, southeast Georgia, coastal North and South Carolina and the southeast tip of Virginia, where the central line passes out into the Atlantic Ocean at Virginia Beach, just below Norfolk, Virginia. The longest duration of totality at this eclipse occurs on the central line at about $95^{\circ}49'$ west longitude and $17^{\circ}06'$ north latitude. According to National Geographic map Atlas Plate #22 this area is quite high, about 11,138 feet is indicated, and some 50 or 55 miles east of Oaxaca, a city of 50,000 located on Inter-American Highway 190. For New York and New England observers the best site is probably Nantucket Island and here totality will last 1 minute 54 seconds with the sun something over 30 degrees above the horizon. Mid-totality will occur at 1:47 P.M. Eastern Standard Time.

The longest duration of totality on the central line for this series will take place on July 16, 2186, of 7 minutes 21 seconds; however, the eclipses of June 22, 2150, and July 3, 2168, will both have durations of nearly 7 minutes. The last total and central eclipse will be seen March 24, 2601, and the last partial and end of the series will take place July 2, 2763.

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CH CYGNI, by Michael Mattei

CH Cygni is showing remarkable changes in the ultra-violet, variations of .2 to .5 magnitudes are recorded during one night's observations. Recordings made on chart paper will show changes from seconds to minutes.

Two particularly interesting features which occur quite often are the double peaks. They appear at different intensities. The other is the half hour quiet period as I call it. As yet no explanation is given for this calm period.

Dr. Armin Deutsch of Mount Wilson reported in June 1967 that a dramatic change in the spectrum of CH now shows a continuum of a hot blue star overlying the familiar M6 spectrum. Is CH a double star? If it is not a spectroscopic double, then maybe this half hour quiet period occurs when one star occults the ultra-violet variable.

A good example of a quiet period, shows very little variation on top, but below you begin to see large variations in intensity which are characteristic of CH. These quiet periods last about a half hour then variations begin to occur again.

Does CH have a period? The only way we will find out is to get more observations and have a computer look for a period.

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TO BE OR NOT TO BE, by Carolyn Hurless

That was certainly the question I'd asked myself the night of July 3rd, 1968. As I was checking the field of TU Cygni, one of the variables I consider a regular on my program, I found the field more difficult to define in terms of star patterns, i.e., I see my fields as triangles, squares, etc. for purposes of identification. My triangle seemed not to be that but to be instead an irregular diamond. In checking the chart closely, I noted an unmarked star above the variable that had a very faint and close companion. I immediately went to my 8mm eyepiece (my scope is an 8" refl f/3.2) and tried to separate them, which I could not. I've resolved stars closer than this and it seemed to me the star's brightness did not agree with the star diameter on the chart and furthermore, why hadn't I noticed it the last 9 years while following TU Cygni? I looked and relooked, and finally called out husband Don who is always right and he's had some experience estimating in the past. He studied the field assiduously and came to the same conclusion, the star was certainly brighter than it should be, up around 9.8, where the star diameter indicated 10.7 or there about. I immediately sent Headquarters a special delivery with the field marked with an attached note that it's probably nothing but it seemed so at least to me. Since then I've watched the star each observing session and I've noted changes of up to .5 m variation. I say I have and will continue to do so. I heard from Cy Fernald on this subject of unmarked stars on charts that he's noticed seemed brighter or fainter than should be, and he said he only gets excited if there is a magnitude or more change. Who wouldn't. At the end of observing season in the TU Cyg field I shall take all of my observations and draw up my own light curve. Anyone interested in persuing this same suspect, let me know and I'll supply the directions to it, although several observers have already been alerted and obviously nothing fantastic has occurred. None-the-less, let this experience serve as a guide to any new observers to not only observe the variable but keep and eye on all surrounding stars relative to their charts. In this case you'll know whether or not a near-by star agrees or doesn't with what its chart picture says, 99 & 99/100% of the time it does. With my star, it's still "to be or not to be" -- is it a variable?

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A NEW PHOTOMETRY, by Herbert A. Luft

This is a suggestion for a new Photometry. The Photometric Nova Oxoniensis, by Pritchard, ca. 1885, the HARVARD Revised Photometry by Pickering ca. 1895 and the Potsdam Photometric Durchmusterung by Müller and Kempf, 1907 -- all done by visual means -- are now over 60 years old. It appears necessary to have a new Photometry done by photo-electric measurements. A good beginning is the Arizona-Tonantzintla Catalogue, which contains only 1300 bright stars to $4^m.5$.

After consultations I learned that it is possible to make photo-electric measurements of 100 stars within one hour, provided the Gremlins about which Mr. Ruiz spoke some years ago are eliminated. Suppose 10 observers in the Northern and Southern hemispheres can spare only 2 hours monthly for one year, doing only 50 observations in one hour it would be possible for these 10 observers to do 12,000 observations in this one year, and so cover all 9100 stars of the Bright Star Catalogue or the Harvard Revised Photometry, thus getting modern CORRECT magnitudes, which are quite urgently required. If these 10 observers can extend their work for another 2 years in the suggested manner, it would be possible to extend such a new Photometry for another 24,000 stars, thereby covering the whole sky down to $7^m.75$, or all of the stars which are in the Skalnate Pleso Atlas by the late A. Becvar.

(Note: After considerable discussion following this paper, it was agreed that the foregoing figures were very unrealistic, and the program would require much more time.)

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CANON OF SOLAR ECLIPSES, by Cyrus F. Fernald

The new Canon of Solar Eclipses by Meeus, Grosjean, and Vanderleen covers the period 18 July 1898 to 11 March 2510. This Canon is more accurate than Oppolzer's, which uses three points on the curve -- beginning, end, and middle. Oppolzer treats the 1) radius of penumbral and umbral cones, 2) speed of shadow center; and 3) sun's declination as constants.

The new Canon shows improvement in determining values of constants, certain of which change with time.

A Comparison with the astronomical ephemeris shows that in most cases the mean longitude duration is .0005 for gamma value, or for period 1960-65, the mean error of Oppolzer is .00270, or 16 kilometers in the fundamental plane.

Coming eclipses are as follows:

7 March 1970	Perry, Fla.	Duration	3^m 10^s
10 July 1972	Gaspe	"	2^m 15^s
30 June 1973	Sahara	"	7^m 45^s
30 May 1984	Georgia	"	0^m 12^s (Annular)
11 July 1991	Mexico	"	6^m 45^s
10 May 1994	Ohio	"	6^m 14^s (Annular)

(NOTE: We have obtained some climatological data from the Chamber of Commerce, Perry, Florida; "Probability clear skies 30%; partly cloudy skies, 40%; and cloudy skies or rain, 30%. Maximum daytime temperatures average 70° but have been in the 80's. Minimum temperatures average 45° but have been in the 30's.)

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POSSIBLE FLARE STAR IN CORONA, by Martin French

While making a routine observation of the recurrent nova T Coronae Borealis on the evening of August 1, 1968, with a four-inch (10cm) reflector, I noticed a 'new' bright star about 1° to the north. My first thought was that Nova T Coronae was bright, as with a little persuasion the pattern roughly fitted that of my chart for T Coronae (supplied by British Astronomical Ass'n variable star section). So I centered my telescope on the star which was then brighter than 7.89 (from a comparison star identified later). Immediately after this the star faded sharply for between 30 and 45 seconds and then faded for about twenty minutes to 8.6. The time of the start of the decline was 10:07 UT.

On August 5th I was able to make a positive identification from the Bonner Durchmusterung which lists it as BD +26°2769 and of magnitude 8.2; the position corrected to epoch 1950 is R.A. $15^h59^m.7$, Dec. +26° 31'. Atlas Eclipticalis gives the spectral type as F. Unfortunately, I have no means of confirming the spectral type and have heard nothing of it since and am no nearer knowing if it could be a true flare star or not. As a matter of interest the variable star observer, B.A. Carter, F.R.A.S. observed Nova T Coronae at about 10:20 UT and noticed nothing unusual. This was not after an alert.

Subsequent observations during August and September have revealed a possible variation of about 0.6m between 7.9m and 8.6m. However, it is too early to say if this is real or not.

(NOTE: The star is H.D. 143808, 1900 pos. $15^h\ 57^m.4$ +26° 40', spectrum F5)

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PHOTOELECTRIC OBSERVATIONS OF 32 CYGNI, by Arthur J. Stokes & Larry Lovell

The eclipsing binary star 32 Cygni was observed photoelectrically by Lovell and Stokes during the approximate time of an eclipse predicted from Botsula's light elements:

34373.3 + 1149.3 (Koch, Sobieski and Wood, 1963 Publ. Univ. Penn., Astro Series Vol. IX)

No observable eclipse was found in V magnitude within the limits of $V = 4^m.00 \pm 0^m.02$ during the observing period of J.D. 2,400,096 through J.D. 2,400,146. The stars 30 Cygni (Stokes) and gamma Cygni (Lovell) were used for comparison stars.

The blue magnitude observations were unfortunately omitted during the critical period of minimum and are therefore inconclusive.

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PROGRESS REPORT ON REDUCTION CONSTANTS FOR SUNSPOT OBSERVERS, by Richard H. Davis & Polly Vanek

The computer program written by Connie Stowe (see Abstracts of papers presented at 1967 Fall Meeting) was modified to make it more efficient in computing reduction constants for many observers, and is presently being used with the help and cooperation of Dr. Owen Gingerich, who has made available the computing facilities of the Smithsonian Astrophysical Observatory, to compute monthly scale and weight factors, based on 1967 data, for all observers who regularly submitted reports to the Solar Division during that year.

In addition, a new program was written for the time-sharing computer terminal, made available to the AAVSO through the generosity of an anonymous benefactor of the Solar Division, by means of which the daily American Sunspot Numbers R_A, can be computed with a great saving of time and effort. It is planned to write additional programs for this time-sharing computer terminal by means of which reduction constants for all sunspot observers can be computed on a monthly basis, and by means of which the artwork for the monthly Sunspot Summary can be printed, all with a single data input. It is hoped that these programs will permit more effective supervision of sunspot observers than has been possible in the past.

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COMPUTER ANALYSIS OF W CYGNI, by Richard H. Davis

As a first step in making a computer analysis of observations of W Cygni, a program was written for the time-sharing computer terminal made available to the AAVSO which automatically plots tabulated values of 10-day means. It is planned to write additional programs which will permit the determination of the personal equation for each observer who contributed sufficient observations during the period for which the analysis is being made, and then the redetermination of 10-day means from observations which have been corrected by the application of those personal equations and perhaps also weighting factors based upon the degree of scatter in the personal equations determined for different observers.