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

Edited by R. Newton Mayall

PAPERS PRESENTED AT THE 46TH ANNUAL FALL MEETING, OCTOBER 4-6, 1957

The 46th Annual Meeting of the AAVSO was held at Amherst College, October 4-6, 1957, at the invitation of Dr. Albert P. Linnell, head of the Department of Astronomy and Director of Amherst College Observatory. The college is situated in the center of a typical small New England town, in the western part of Massachusetts. Here, too, is located the University of Massachusetts. The Amherst College campus spreads over the top of one of the hills in the town, and as one walks around the campus, impressive views of the valley below and the Holyoke Mountain range beyond are met with everywhere. But more important, at this time of year New England is truly one of the beauty spots of America -- it is the time when nature puts on one of its spectacles, when the foliage changes to brilliant colors. Our meeting this year was held in the midst of and at the peak of this phenomenon. Amidst such beauty it seemed sacrilege to spend any time indoors. But everyone with a camera did have time to record in color the life and setting of one of American's old and beautifully situated colleges.

Our headquarters were at the Lord Jeffery Inn, a comfortable country inn of distinction and good living. Our meetings were held in the auditorium of the Mead Art Building, wherein are housed many important works of art.

Friday evening we were privileged to have with us Mr. Frank M. Bateson, the Director of the Variable Star Section of the Royal New Zealand Astronomical Society. Before the meeting, Mr. Bateson had spent over a week at the AAVSO headquarters in Cambridge with a view to greater cooperation between the two organizations. He is visiting the major observatories in Canada and the United States before returning to his home in Rarotonga, Cook Islands, South Pacific.

Saturday morning was given over to the business of the organization. The reports read by the Director and the chairmen of the various committees and divisions showed the past year to be prosperous and profitable. Our endowment fund is growing, and we now have under active observation about 900 variables. Our membership is also growing -- now about 600. The new council convened, and all officers were re-elected to serve for the coming year. The afternoon session was given over to papers.

A sumptuous dinner was held at the Lord Jeffery Inn, where 60 of us sat down to get better acquainted over good food, and to sit around a roaring fireplace on a clear, crisp fall evening to chat and enjoy ourselves.

Following dinner, we visited the Amherst College Observatory, where the 18-inch refractor was trained on the moon, the Ring Nebula in Lyra, and other objects of interest. Also Dr. Linnell had on display several striking photographs from the Palomar Sky Survey. Dr. Linnell was ably assisted by Edwin Weston and the Misses Beach and Wyckoff, from Smith College.

This will be a memorable meeting, for the Soviet Union launched the first man-made satellite during our meeting. We received word of this great event Friday evening. Also it will be remembered for the large number of members who came from great distances -- some for the first time. All records for distance were broken by Mr. and Mrs. Bateson, who came from the Cook Islands in the South Pacific. We are happy they could spend so much time with us and attend our meetings. Dr. and Mrs. Melville came from Jamaica, British West Indies, Claude Carpenter from California, the Goods and Miss Williamson from Montreal, Canada, Mr. and Mrs. Parker from Georgia, and Philip Seldon from Dayton, Ohio.

Among such pleasant surroundings and congenial company, the meeting was all too short, but we hope our distant members will remember the occasion kindly and want to come again. On Sunday everyone headed either north,south, east or west, to enjoy the fall color on the way home.

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VARIABLE STAR OBSERVING IN NEW ZEALAND, by Frank M. Bateson

In his talk, Mr. Bateson spoke briefly on the history of the Variable Star Section of the Royal Astronomical Society of New Zealand. He then went on to summarize what this very active observing section had accomplished since its formation, remarking that the present total of observations exceeded 250,000, of which total Albert Jones had made 100,000. Passing from the figures, instances of international cooperation in recording special variables were mentioned. A tribute was paid to the assistance rendered by Leon Campbell in the early days of this Section.

The aims of the New Zealand section are to observe all Mira Ceti and long period variables brighter than magnitude 10, in the southern sky. All southern U Gem and R CrB type stars, and an extensive list of other special classes of variables, are under observation. It is planned to extend these lists as soon as possible, and one of the main purposes of Mr. Bateson's visit to the States was to arrange even better coordination of the programs of the AAVSO and the New Zealand Section.

Mr. Bateson concluded by giving some impressions of his on the present status of amateurs in observational work. He stressed that from his contacts with professionals throughout Canada and the eastern portion of the United States he had come to the conclusion that the serious amateur observer had a very considerable part to play in securing data not only in the field of variable stars, but in many other fields, such as meteors, aurorae, planetary observing, especially of Jupiter and Saturn, and in solar work. He stressed the need to get many more of the very fine home-made instruments into active use.

Mr. Bateson concluded the Friday evening meeting by showing two colored motion picture films of the islands, taken by his wife. These showed their home and family, the native houses, and the beauty of Rarotonga in the Cook Islands. These fine pictures brought this far-off island close to us. (ED.)

SUNSPOT POSITIONS, by Ralph N. Buckstaff

The position of sunspots in the current cycle deviates from the norm. Characteristic of this cycle is the great number of large spots at high latitudes in the northern hemisphere. The position of spots in the southern hemisphere is more or less normal. (Charts showing the distribution were plotted from positions measured on Stonyhurst Disks which are used by most solar observatories. ED.)

<u>PLEASE NOTE:</u>

We regret that the author of "DO U.F.O.'s EXIST?" in the Abstracts of Spring 1957 was anonymous. The paper was written by Robert W. Dunn. Please correct your copy.

ELECTRONIC COMPUTERS AND ASTRONOMY, by James Henry Carlisle III

All who are interested in astronomy should also be interested in the development of electronic computers or so-called "electric brains." Since World War II they have been playing an increasing role in government, big business, and scientific research. No science leans more heavily on mathematics than does astronomy, so the new high speed computers can offer tremendous help to many phases of astronomical work. The large computer now makes it possible, for the first time, to provide accurate tables of the future positions of hundreds of the known asteroids. The life history of a star can be predicted by feeding into the computer the dimensions, temperature and composition of the star in the beginning of its life, and then programming the computer with the basic formulas and theoretical laws of astrophysics. The computer then calculates the lifetime changes in the star. The reports of MOONWATCH teams will be fed directly into a computer so that the orbit of the artificial satellite can be calculated rapidly enough to permit the constant observation of the object in spite of the unpredictable changes that may occur in its orbit.

Every amateur astronomer should take the opportunity to see such computers in operation. Though the large room-size machines like Univac are most famous, there are smaller computers which work on the same principles as the giants and which do much valuable work.

There are two basic types of computers: analog and digital. Analog computers solve problems by measuring physical objects or forces. The slide rule is the most common form of analog computer. Digital computers can be made to handle very large figures to as many decimal places as desired.

The abacus and the modern desk adding machine and calculators are the most common forms of digital computers. The all-electronic calculator can add, subtract,multiply and divide thousands of times a second, and is controlled by punched cards or tape like player pianos. The larger machines can do more than compute. They can store thousands of words or numbers in their memory units. They can sort, arrange, or classify the data according to any rules one desires. Thus they can be made to translate foreign languages, prepare an index or concordance to the Bible, invent names for drugs, and play games like chess with human opponents. The large machines that have this versatility are now called "data processing machines" and not just "computers."

Since astronomers must keep track of millions of stars and nebulae, electronic indexing and cataloguing of celestial objects by their spectral classes, luminosities, distances and other properties must in the future play an important part in astronomy.

I think the best way for amateur astronomers to learn the principles of digital computers is for one to buy a fascinating electric brain kit called "Geniac." The Geniac manual shows how to wire 33 different Geniacs that solve complex wills, test intelligence by quizzes, reason logical syllogisms, calculate in decimal and binary digits, compose musical tunes, translate ciphers, and play games, including tic-tac-toe, without losing to a human opponent!

MY FIRST SUMMER IN NANTUCKET, by Dorrit Hoffleit

The activities of my first summer at the Maria Mitchell Observatory included work on variables in Sagittarius, photography of Comet Mrkos, and weekly public Open Nights. Thanks to the National Science Foundation I had three research assistants who accomplished a large amount of the good work summarized here. I shall talk mainly about the variable stars in the 100 square degree area on which we are concentrating. While at Harvard I had marked over 450 stars as suspected variables. Several assistants, chiefly Mrs. Jean Hales Anderson, had then estimated their magnitudes on 30 selected photographs. The distribution of the amplitudes of the variables was found to be as follows:

Range in Magnitude	0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2.0
Number of Stars	22	98	132	78	125

Next we concentrated on the stars with the larger ranges, estimating the magnitude on approximately 200 plates. The results for 65 stars were recently published in the Astronomical Journal. This summer we measured more of the variables and found periods for 21 of the new variables, as well as for 14 others previously published by Ida E. Woods in 1926. The latter have not been accepted in the General Catalogue of Variable Stars because they have not heretofore been adequately verified.

The distributions of the periods are of interest:

Length of Period (days):	100-150	150-200	200-250	250-300	300-350	350-400
Number of Stars in A.J.:	8	13	20	14	5	1
Number of New Periods:	2	6	8	10	5	1
Total:	10	19	28	24	10	2

Length of Period (days):continued	400-450	450-500	500-550
Number of Stars in A.J.: "	0	0	1
Number of New Periods: "	2	0	1
Total:	2	0	2

The intrinsically brightest of the long period variables are those with periods of about 200 days. Hence it is not surprising that the most frequent period among the stars first measured is slightly shorter than for those measured subsequently. The amplitudes of the fainter objects of longer period are more frequently diminished by the presence of optical companions in crowded star fields.

Among the high amplitude variables measured we found several interesting irregular variables. One of Miss Woods' variables, V348 Sgr, had previously been announced as an R Coronae Borealis star. Mrs. Anderson measured it on over 500 Harvard photographs. Her observations for the years 1907-1927 confirm the R Cor Bor type, but both earlier and later observations show the star at minimum more often than at maximum; there is consequently little resemblance to the typical R Cor Bor star. From 1927 to 1940 it appears more like a semi-regular variable with cycles ranging from 200 to 400 days.

Two variables look intriguingly cataclysmic. Each was observed on several successive nights at a single maximum at about 14^m. The apparent amplitude from all plates exceeds two magnitudes. In one of the two cases, a minimum was observed 28 days after the maximum which had lasted about 40 days. These might be novae or U Geminorum stars, but the evidence is scant indeed. Another star appears to be a bona fide U Geminorum star; four maxima were observed, the duration of one of them being about 30 days.

Two of the stars are possible members of the RV Tauri class; one shows cycles of about 32 days but is not regular; while another defies description and I shall simply exhibit its complex light curve.

The summer assistants who helped me glean this wealth of information are Choko Fujita, Fulbright Scholar from Japan who is a graduate student at the University of Indiana; Jocelyn R. Gill, recently instructor at Mount Holyoke, now doing advanced graduate work at Yale; and Joan Sears, a senior astronomy major at Wellesley.

(Dr. Hoffleit brought three original negatives showing Comet Mrkos. ED.)

IGY PROMINENCE PATROL AT NORTHWESTERN, by B. C. Parmenter

It will be remembered that at the Fall AAVSO Meeting in 1956, a paper was read regarding the remodelling of the solar lab at Northwestern Observatory, Spokane, Washington, under the Directorship of B. C. Parmenter. With the high activity of last spring coinciding with first observances from this new apparatus, so high were the results it has since been supplying data for the IGY Program.

Active Prominence Regions (APR's), Bright Surges at Limb (BSL's), and Eruptive Prominences at Limb (EPL's) are daily being observed, and attending reports sent to Solar Data Centers (IGY) at Boulder, Meudon, and Moscow.

Now the recent installation of a beautiful grating to replace the large prisms has been accomplished. Due to the simplified arrangement and high optical quality of all optical components, an "idealized" spectrum is the final result. The few observations made at the time of this writing show that the installation is exceedingly sensitive to all Hydrogen (Ha) activity both for the disk and limb. In the past, with the old prisms, much of this fainter and more obscure material was noted.

It is hoped that before too long two auxiliary stations constructed along the same lines will go into operation and provide additional material to fill any "gaps" in the records. One of these, also located at Spokane, will work directly with the laboratory here. The other, at Georgetown, Illinois, will take over numerous other duties, as is seen fit from time to time.

SOUTH OF THE BORDER, by John J. Ruiz

During the last year, John Ruiz has spent a great deal of time in his native Cuba and in Mexico. He presented color slides showing the life of the people in each country, and we were pleased to see pictures of our member, Santiago Abascal in Havana, and his observatory. Ruiz also showed many pictures of our member Domingo Taboada and his observatory at Puebla, Mexico. (ED.)

A MYSTERIOUS OBJECT, by Phillip Seldon

I wonder if anyone beside myself observed an unusual object that was visible during the middle of the month of August 1957? This object, which seemed to be a small, close comet, was observed to travel from a point near U Cygni to a position near epsilon Ursae Majoris during the three day period of August 10-12, 1957. If I had not observed this object myself, I would hesitate to believe that such a rapid motion was possible.

The object was first noticed while I was observing U Cygni on the night of August 10. The instrument used at the time was an unmounted Moonwatch telescope which gives a 12 degree field. I saw what appeared to be an extra star in the field. I did not pay much attention to it at the time. Luckily I noted its position. A few minutes later clouds intervened and I went inside for the night. A little later, I decided that I would have to satisfy my curiosity. I checked Webb's star atlas to see if the star was recorded. It was not. At midnight it cleared for a while. This object had moved almost one degree since the last time I observed it. I examined it with my three inch telescope and noted that it showed an ill-defined disk about 10 seconds in diameter. It was surrounded by a faint nebulosity, increasing the diameter of the object to about 50 seconds. When first observed at 22:00 E.S.T. the position of the object was R.A. $20^h\ 34^m$, Dec. +47°.2. At midnight its position was noted as R.A. $20^h\ 23^m$, Dec. +48°.

The next night, August 11, the object was found to be in the constellation Draco at R.A. $17^h\ 43^m$, Dec. +73°.6 at 22:30 E.S.T. Its magnitude had increased to 5.1 and it showed a faint tail about 5 minutes long by 30 seconds wide. Now it started to look like a comet.

On the 12th the comet was between gamma and epsilon Ursae Majoris at R.A. $12^h\ 21^m$, Dec. +53°.1. It was visible to the naked eye as a faint star. The nucleus was now about two minutes in diameter and was magnitude 4.3. It had a two and one-half degree tail of about 7th magnitude.

On August 11, I had received information that a new comet had been discovered. At the time I thought that the object I was observing was this new comet. Had I a good northern horizon I would have observed both this object of mine and Mrkos Comet in Ursa Major. My northern limit is about 30 degrees. This, of course, blocked my view of the lower parts of Ursa Major and Leo Minor.

During the evening of August 13, I made a special trip to the country to observe the comet. Of course the first thing I saw was Mrkos Comet. I thought that this was the comet I had been observing since it was in the general path of my object. I knew that it was unlikely that a comet can brighten so fast, but I foolishly accepted it as the object I had been observing and looked no further. That was my big mistake. Undoubtedly, it was within a few degrees of Mrkos Comet.

Later, on the night of August 13, I received complete information about Comet Mrkos. I saw that they were two different objects and sent a radio message to Harvard College Observatory. It was two weeks before I received a reply. By then I had completely lost sight of the object, and as far as I know it has not been observed since. I suppose that the comet had disappeared into the glare of the sun sometime during August 14.

Did anyone else observe this object? If so, it would be greatly appreciated if they would report their observations to me and to Harvard College Observatory.

Recorded Positions of Comet (?)

Date	Time	R.A.	Dec.	Magn.
Aug. 10, 1957	22:00 E.S.T.	$20^h\ 34^m$	47°.2	6.2
Aug. 10	24:00	20 23	48.0	-
Aug. 11	22:30	17 43	73.6	5.1
Aug. 12	22:00	12 21	53.1	4.3

THE SIGNALS ARE SET, by Ralph A. Wright

This was a non-technical paper discussing an individuals ideas, motives, and accomplishments, and how they may be applied to a group such as the AAVSO. The idea of mutual cooperation, sociability, and the spreading of astronomical news was referred to and special reference made to the individuals part in the things to come -- that is, are we as a group and as individuals preparing ourselves for a new role in the artificial satellite era? (ED.)

SEMI-REGULAR VARIABLES, by Margaret W. Mayall

Red variables with small amplitudes tend to be semi-regular or even irregular. The light curves of RT Hydrae, U Persei, and Z Ursae Majoris are good examples of variables which appear to be regular for a while, then abruptly change amplitude. Some of them are constant for several years at a time. I have plotted amplitude against period for all long period variables on the AAVSO list. The stars that show definite peculiarities in light curve are plotted as open circles. The plot shows that the majority of stars with amplitudes less than 4 magnitudes tend to be semi-regular.

THE BONN RADIO TELESCOPE, by Waltraut Seitter

Miss Seitter visited Germany last summer and brought back with her a motion picture showing the construction of the new Bonn 84-foot radio telescope. This was an extremely interesting film, showing much detail, and we were fortunate in being able to see it. (ED.)

THE DANJON CAT'S EYE PHOTOMETER, by Harry L. Bondy

Harry Bondy suggested that a description of the construction of the Danjon Photometer might be of interest to members of the AAVSO because of its simplicity, ease of construction, and the good results obtained with it. The main components are two prisms and an adjustable diaphragm as shown in Fig.1. The prisms A and B are mounted in such a manner that <u>together</u> they may move around the axis of the telescope. Prism A, furthermore, may move through a small arc on an axis joining A and B. Prism B may move slightly on an axis perpendicular to the telescope axis also.

FIGURE 1

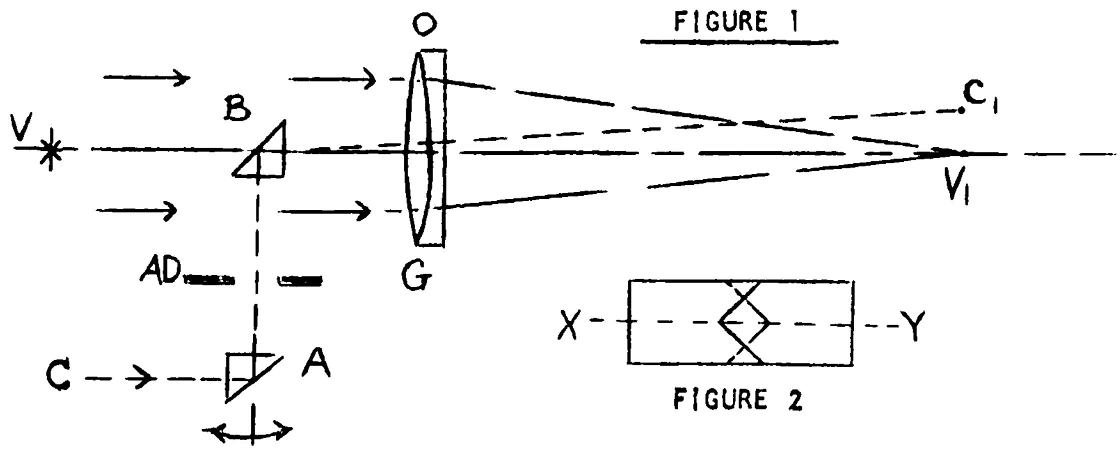

FIGURE 2

The cat's eye or adjustable diaphragm AD (Fig.2) is a variable square diaphragm, consisting of two plates with a 90° cutout, which can be adjusted micrometrically along axis X-Y. By adjusting the diaphragm, the apparent magnitude of a comparison star C can be made equal to the brightness of the variable. The light from the variable star V is brought to focus at V_1. A suitable comparison star C is brought to focus at C_1 through the prisms A and B, and close to V_1. By means of the adjustable diaphragm AD the brightness of C is made to match V_1. The calibrated scale on the diaphragm mounting gives the magnitude of the variable. The calibration of the micrometer is first obtained by careful readings on Polar sequence stars. Inexperienced observers have estimated magnitudes with errors not exceeding 0.1. Danjon claims to be able to make estimates to 0.01 mag. Conservative results of even 0.05 magnitude would be most desirable.