

AMATEUR ASTRONOMY

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Ten Cents

The American Association of Variable Star Observers

ANNE S. YOUNG

For several years before the American Association of Variable Star Observers was formed, a few observers had been cooperating with Harvard College Observatory at the request of its Director, Prof. E. C. Pickering, reporting each month their observations of a selected list of variable stars for which the Harvard Observatory had furnished charts and a carefully selected sequence of comparison stars. It had long been recognized that the number of variables was so great that it would be quite impossible for the astronomers in research observatories to follow their light changes, and that only as we do have a fairly complete record of the changes can we hope to find a satisfactory explanation of their cause. More than once had it been suggested, especially by Professor Pickering, that there were in this country many amateurs interested in astronomy who might be willing to use their telescopes for the systematic observing of these stars if they realized what an important contribution to astronomy they could make in this way. In 1911 William Tyler Olcott, well known author of several popular works on astronomy and an enthusiastic observer of variable stars, published in the April number of Popular Astronomy an article entitled "Variable Star Work for the Amateur", in which he explained the methods of observation, told of the great value of such observations, and offered to answer questions and to assist in every possible way any one willing to undertake the work. By the end of that year an association of 15 members had been formed, a name had been chosen, and reports were being published each month in Popular Astronomy. Professor Pickering encouraged the group in every possible way and the editors of Popular Astronomy made it possible to have the monthly reports printed where they would be available to every one interested in variable stars.

When in 1917 a formal organization was effected, there were 81 charter members, several of them residing in foreign lands. The number of observations reported for the preceding month was 2600. In 1935 the total membership was not far from 400, and 54,000 observations were reported for the year. Of this

huge number, Mr. Armfield, well known to the amateur group in Milwaukee, contributed 2500. This rapid growth has been very largely due to the untiring efforts of Mr. Olcott, who has been secretary since the beginning, but there are others who deserve honorable mention for their part in it. In these days no astronomer working on variable star theories would fail to consult the reports of the AAVSO.

Since 1915 an annual meeting has been held every October at the Harvard College Observatory, where the generous hospitality of the director has always added greatly to the pleasure of meeting with fellow members. A spring meeting is also held, often at some institution with which one of our members is connected. These gatherings have always been characterized by great friendliness and are marked as red letter days on the calendars of those who have been able to attend.

With the cooperation of the Harvard and Leander McCormick Observatories, the committee on charts has prepared charts with revised sequences of comparison stars for several hundred long-period variables, and these sequences are now quite generally used by observers all over the world. The association owns a library of more than 1000 titles kept at Harvard but loaned to members upon request. The nucleus of this collection consists of books originally owned by Dr. Brashear, the famous instrument maker of Pittsburgh, and bequeathed by him to Charles Y. McAtee, railway engineer and a devoted variable star observer, who in turn gave them to the AAVSO that they might be more widely used. An excellent collection of more than 1000 lantern slides for the most part contributed by leading observatories and by members of this association, may be drawn upon by members and their friends for popular lectures, and much has been done in the way of interesting the public in astronomy. Several excellent telescopes have been acquired, chiefly by gifts, which are loaned to observers who do not have good instruments of their own and who have proved their ability to make observations of value.

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Photographic Notes

LYNN MATTHIAS

METHOD OF COMPARISON OF PATROL PLATES

A method, mentioned in Dr. King's book "Celestial Photography", which may be used for the comparison of finished patrol plates, is to simply superpose the plate which has just been taken with perhaps the original plate taken of the same area. The plates should be oriented so that corresponding stars on both plates are in coincidence. The plates are then shifted slightly with respect to each other so that each image appears double. The plates are then gone over with a magnifier, the object being to find an image that is single instead of double, or to find a large difference in the appearance of a pair of images.

It is necessary that all plates taken by one observer of a particular area be centered on the same star. This is automatically taken care of if the same guide star is always used when photographing the area. (provided the camera is kept mounted in the same position with respect to the guiding telescope). It is necessary that the plates always be centered the same so that the aberrations of the lens do not result in the images of corresponding stars on the two plates being compared being of different size or shape, or even being in a different relative position if the lens has appreciable distortion. If the plates are properly

taken it is a simple matter to superimpose them so that the images are coincident.

The easiest way to make the comparisons is to make up a box with an open top, or preferably an inclined open front, with the opening somewhat larger than the plates to be accommodated. A sheet of ground or flashed opal glass is fitted in the opening, and a 25 watt lamp is mounted inside the box to illuminate the glass. A further aid is a piece of good quality paper, or better, a piece of glass, ruled off in squares. This is fastened to the glass on the viewing box and the plates are placed on it. Then one square of images may be gone over at a time and confusion thereby prevented.

Members who are interested in astrophotographic work will welcome the opportunity provided by Dr. Shapley to obtain an astrophotographic outfit at a comparatively reasonable cost. This outfit includes a 3-inch camera arranged to use 8x10 plates, guiding telescope complete with eyepiece, and mounting complete with clamps, slow motions and electric drive. Those interested should communicate directly with Dr. Shapley at the Harvard College Observatory, Cambridge Mass., for complete details. 2121 E. Capitol Drive, Milwaukee, Wis.

Nova Program Notes

L. E. ARMFIELD

In the nova program notes for January, attention was called to D. W. Rosebrugh's practice of extending the survey of his nova field to the seventh magnitude through the use of low power binoculars. A communication recently received from him contains the following offer: "If any of the nova observers wishes to observe to the seventh magnitude, as I have started, and will send me a pencil, ink, or print chart of the stars down to the sixth magnitude in the area they are already observing, together with a stamped, self addressed return envelope, I will gladly add the seventh magnitude stars without charge and return the chart."

Due to the number of seventh magnitude stars generally found in any given area, Mr. Rosebrugh has also found that it does not seem feasible to observe fainter stars visually.

Having the now famous prediction of the end of the depression still sharply in mind, we pray earnestly that spring is not "just around the corner."

We gratefully acknowledge the following observations received for the month of January.

Observer	Group	Area No.	Magnitude of Faintest Star Visible				Total Nights
			7	6	5	4	
Abrahams	Milwaukee	24	..	1	9	1	11
Diedrich	Milwaukee	7	..	..	1	9	14
Doolittle	So. Norwalk	**	..	..	3	..	3
Gale	Iowa	49	..	..	3	..	3
Loepfe	Milwaukee	10	..	..	2	1	4
Rosebrugh	New York	57	7	3	..	2	13
Seely	New York	***	..	..	3	4	7

** Three areas for which numbers have not been assigned to date.

*** Two areas for which numbers have not been assigned to date.

2046 S. 59th St.,
Milwaukee, Wis.

Olivier-Hoffmeister Program

SUMMARY OF OBSERVATIONS FOR 1935

Wisconsin-Northern Illinois Region

L. E. ARMFELD

Richard Abrahams very deservedly achieves first place in the number of minutes observed during 1935, having accumulated the fine total of 4141 minutes. Mike Keuziah is second with 3462, Edward Legel, was third, with 1983, is followed by Ed Martz, Jr., in fourth place. Joseph E. Boehm was nosed out of fifth place by George Diederich by only six minutes.

The other members listed in the summary also deserve much credit for their worthy contributions to the program, and it is hoped sincerely that the good work may be continued during 1936.

Observer	Address	Minutes	Meteors
R. Abrahams,	5046 N. 39th St., Milwaukee, Wis.	4141	316
Wm. Albrecht,	6645 W. Burleigh St., Milwaukee, Wis.	490	42
Donald Bartelt,	Joliet, Ill.	60	23
Wm. R. Binney,	315 N. Franklin St., Madison, Wis.	250	42
A. F. Boyd,	Pewaukee, Wis.	60	0
Jos. E. Boehm,	3511 N. Seminary Ave., Chicago, Ill.	1108	178
Kujawa Clemens,	2653 S. 15th Place, Milwaukee, Wis.	60	1
Frank Daniek,	Joliet, Ill.	70	20
Geo. Diederich,	3331 W National Ave, Milwaukee, Wis.	1060	91
Wm. Du Vall,	West Allis, Wis.	65	5
J. M. English,	2317 Oakridge Ave., Madison, Wis.	157	25
Mary Farogher and Lillian Hawkins,	Madison, Wis.	120	7
M. M. Feinsilber,	Three Lakes, Wis.	183	67
Joseph Gabris,	West Allis, Wis.	631	58
Gene Gale,	831 39th St., Des Moines, Iowa	123	24
Kenneth Gallogly,	Camp Minnikani, Hubertus, Wis.	120	18
Edward Halbach,	2346 N. 47th St., Milwaukee, Wis.	308	44
Mike Keuziak,	825 S. 39th St., West Milwaukee, Wis.	3147	431
Joseph Ketarkus,	Racine, Wis.	856	64
George Knott,	726 E. Linus St., Milwaukee, Wis.	645	45
Max Konowalik,	West Allis, Wis.	60	38
John Luczka,	1977 S. 69th St., West Allis, Wis.	870	109
Edward Legel,	6026 W. Orchard St., West Allis, Wis.	1983	178
J. F. Loepfe,	2054 S. 58th St., Milwaukee, Wis.	762	73
Ed. Martz, Jr.,	726 N. Elmwood Ave, Oak Park, Ill	1440	184
Ed. Mittendorf,	Chicago, Ill.	467	62
Darrell Moore,	1502 S. 35th St., Milwaukee, Wis.	60	5
Robert Price,	Joliet, Ill.	60	9
Marjorie Preucil,	Joliet, Ill.	120	15
Kenneth Parske,	2054 S. 59th St., Milwaukee, Wis.	249	22
Jack Schmid,	1947 N. 36th St., Milwaukee, Wis.	981	73
Wm. Schofield,	Joliet, Ill.	240	52
Luby Sidoff,	4529 W. National Ave., West Milwaukee, Wis.	852	93
Leon Sikorski,	2703 S. 15th Place, Milwaukee, Wis.	91	1
Steve Vihnicka,	Joliet, Ill.	130	25
Wm. C. Woodley,	Joliet, Ill.	60	4
Observers, 36		22079	2443

SHOWER METEORS

George Diederich,	3331 W. National Ave., Milwaukee, Wis.	54	36 Per
Wm. Elliot,	Camp Minnekani, Hubertus, Wis.	125	65 Per
J. M. English,	2317 Oakridge Ave., Madison, Wis.	129	19 Ori
Kenneth Gallogly,	Camp Minnekani, Hubertus, Wis.	125	57 Per
Mike Keuziak,	825 S. 39th St., West Milwaukee, Wis.	315	75 Per
		121	36 Aqr
George Knott,	726 E. Linus St., Milwaukee, Wis.	125	26 Per
John Luczka,	1977 S. 69th St., West Allis, Wis.	91	25 Per
Darrell Moore,	1502 S. 35th St., Milwaukee, Wis.	180	36 Per
Observers, 8		1265	375

The Field of V Canum Venaticorum

HANS D. GAEBLER

In the August 1929 number of *Die Himmelswelt*, four available star fields are suggested by Friedrich Lause as being especially fruitful for the amateur to observe. They are V Canum Venaticorum, TW Pegasi, RW Virginis, and SW Virginis. A number of observations of V CVn (131546) have been reported in the AAVSO reports in *Popular Astronomy* although there is as yet no association chart for this field. It is a variable belonging to spectral type M5e with a period of about 192 days and fluctuates from magnitude 6.8 to 7.9 although this star, a Mira type variable, is reported by others as having a period of 186.1 days and fluctuating from magnitude 6.4 to 8.4 (Lause). Special attention is called to the irregularities of its maxima and to its secondary minima. During the series of observations of this star suspicion fell upon one of the comparison stars as not being constant. This comparison star is No. H. D. 116475 (Henry Draper Catalogue), and its magnitude was determined photometrically to be 6.92. Its spectrum is Mb and Dr Van Biesbroeck of the Yerkes Observatory suggested that it might be worth while to keep a record of this star as compared with other comparison stars in the field as well as comparing it to V CVn.

The two chief observers of V CVn had been Dr. Lause (then at Heidelberg) and Dr. Kanda of Tokyo. These gentlemen were both consulted as to whether they had used the comparison star HD 116475 in their observations of V CVn, and if so, whether they had noticed any variation in it. In the Nishni Novgorod April 1929 bulletin Lause published the results of his observations of V CVn, mentioning the fact that as early as 1914-15 he noticed that this star's light curve was quite different from what it was in 1928-29. Accordingly he was asked to consult his observations to see whether he had used the comparison star HD 116475, and if so, whether any variation was noticed by him. He submitted his complete records, and the most that

may be concluded is that there was a possible fluctuation of 0^m.2 at most, and more observations are needed before much will be known definitely. Dr. Kanda, who observed V CVn since 1923, also used the comparison star HD 116475 when V was at maximum. When asked about its constancy he admitted that there seemed to be a fluctuation of about 0^m.5.

It would be an interesting star, therefore, for some of our members to follow and at the same time make observations of V CVn. Sweeping down from the end star of the handle of the big dipper brings one to the field, 30' E 3° S from eta Ursa Majoris. Use Beyer-Graff atlas for want of a Harvard blue print chart, find V, then try to locate the comparison star HD 116475 about 6^m.9, a star forming the western end of a small triangle of stars 2° N of V CVn. If Hagen's charts and the Draper catalogue are available there will be no mistake. Who will be the first to notice a fluctuation of this little star?

Report of Observations.

It has just been called to our attention that no recognition was made of several newcomers to the list of our observers, and we sincerely beg pardon for this oversight. Upon going over the reports we notice that we failed to mention the addition of the following observers: Keuziah, Knott, Katz, Sidoff, and Stosick, in August last; Gallogly, Guenther, and Schmid in September; and Luczka in the December issue of the bulletin. While two of these observers failed to send in their records, and while only one observer has sent in his report at this writing, some better way of controlling this branch of our endeavor would be welcome. Let's have your suggestions.

Observations for January; S. J. Fairbanks 6, E. A. Halbach 13, J. F. Loepfe 2, George Knott 2, George Diedrich 10, L. Armfield 52, Richard Hamilton 135, Lewis Doolittle 105.

404 8th Street,
Watertown, Wis.

Observatory Section

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sky opening. Two good examples of this class are those of Woods and Watson in Baltimore and George Croston in Tacoma, whose observatory is motor operated. Since the straight line observatory offers little difficulty to the average

amateur, at some future time we will develop the dome-type observatory in greater detail if this information seems to be in demand amongst our readers. Valley View Observatory,
Pittsburg, Pa.

Loan Bureau

WM. CALLUM

As secretary of such a club as ours we come in contact with many people who are interested in astronomy. Some of them display great interest and enthusiasm and would take part in an observing program if they had the use of an instrument. They are mostly young men who are attending high school or college and who have not the time or money to make an instrument of their own. One never knows when he may kindle the spark of genius in some of these young men and thereby spread the knowledge of the science which has ever been in the forefront of intellectual development. It is beyond question that the knowledge of astronomy and the kindred sciences broadens the thinking and raises the ethics of those who have come under its influence.

Mr. Armfield has asked us to establish a Loan Bureau for the AAAA, so we request those who have telescopes, mountings or mirrors which are not being used and which they are willing to loan, to communicate with us. Unfinished mirrors and equipment will be welcomed and put in working condition. It is perhaps asking a great deal to request the owner of optical equipment to loan it to some one else but he can be assured that it will be placed in good hands and that it will be used to advantage.

1319 W. 78th St., Chicago, Ill.

Silvering Method

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or two precautions. The rouge should be washed by flotation to remove grit and the finest part dried on a glass in a dust free place. The chamois should be the softest part of a new piece that has never been wet. This is wrapped over a tight wad of dry cotton and impregnated with the rouge by rubbing it on the glass on which the rouge was dried. The final precaution is to touch the mirror as lightly as possible the first time over. The second time a little more pressure can be used, and after that it is possible to bear down quite heavily to complete the burnishing.

The question of lacquering the finished surface is one of personal preference. It is the choice between more frequent silvering or a slightly less brilliant surface at the beginning. If it is to be lacquered a colorless lacquer is diluted with eight parts of amyl acetate, poured over the mirror, drained off with the mirror on edge, and allowed to dry.

6811 W. Cedar Street,
Wauwatosa, Wisconsin.

The AAVSO

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For several years Harvard College Observatory has prepared and sent to active members a bi-monthly bulletin with information regarding variables. Complete reports of observations made have been published in Popular Astronomy. Beginning with 1936 a different form of report is to be used. In 1924 the first number of "Variable Comments" appeared; this is a four-page quarterly containing reports of meetings, occasional scientific articles and personal items intended to promote the acquaintances of members.

Many astronomers, members, and other friends have been most generous in their help, but most of all the association is indebted to Prof. E. C. Pickering, the late director of the Harvard Observatory, and to Professor Shapley, its present director. An attempt to raise an endowment fund of \$100,000 as a memorial to Professor Pickering proved to be beyond the resources of the AAVSO, but with the aid of the Harvard Observatory such a fund has been set aside for variable star astronomy, and Prof. Leon Campbell of the Harvard Observatory staff officially assumed the duties of Recorder in 1931. Professor Campbell had been for years untiring in his efforts to promote the best interest of the association.

The last annual report is an encouraging one, but the field is almost limitless and there is much more that needs to be done. Dr. Shapley has consented to serve as President of the Association for this year and new recruits are needed to help carry out the ambitious program that he is planning for us. We hope that many members of the AAAA will want a share in this important work and will use their telescopes in making these fascinating and worthwhile observations. Any one wishing further information regarding variable star work may obtain it by writing to Prof. Leon Campbell, recorder of the AAVSO at Harvard Observatory, Cambridge, Mass.

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Send all communications to the above address.

A A A A Notes

We heartily welcome the well organized and active Louisville Astronomical Society to the Association. The Louisville Star Notes, appearing in the pages devoted to the affiliated societies, contain a very interesting report of their many activities.

The A A A A takes great pleasure in cordially welcoming the following new memberships received during February, which are listed below.

New memberships received during December and January will appear in the April issue of this magazine.

We deeply regret the withdrawal of the splendid Missouri-Southern Illinois observers and their publication, the Astronomical Discourse, from the association. We highly respect their opinion in that the Astronomical Discourse can more adequately serve the individual members of their region as space in Amateur Astronomy is more costly than mimeographing and is necessarily limited by the financial resources of any affiliated society. The association also greatly appreciates the large part Mr. Simpson and his organization played in the original formation of the A A A A. The M-SIO has the association's hearty good wishes for continued success in their many endeavors.

Memberships Received During February

- | | | |
|------------------------------|------------------------------|-------------------------|
| Miss Louise E. Ballhausen | 1 Gilmore Court | Scardale, N. Y. |
| George R. Barnum | 17 Morgan Avenue | Norwalk, Conn. |
| R. N. Buckstaff | 678 Algoma Blvd. | Oshkosh, Wis. |
| S. W. Casey | 314 12th Street | Eau Claire, Wis. |
| Rev. Morgan Cilley | Box 384 | Romney, W. Va. |
| Donnelly's | 16 S. Main Stree | So. Norwalk, Conn. |
| Dick Emmons | 2713 W. Tuscarawas St. | Canton, Ohio |
| Vincent Francis | 25 Plymouth Street | New Bedford, Mass. |
| Amelia Giuntini | 1906 Powell Street | San Francisco, Calif. |
| A. L. Harding | Rowayton Beach | Rowayton, Conn. |
| Carl F. Hellweg | 5246 Cote Brilliante Ave. | St. Louis, Mo. |
| Lancaster Hiett | | Hedgesville, W. Va. |
| Norman C. Hurd | 1069 Emerson Rd., Pk. Hills, | Covington, Ky. |
| P. E. Jacobs | 15 Grunman Avenue | Norwalk, Conn. |
| Miss Willie D. Lepping | 1415 Goddard Avenue | Louisville, Ky. |
| James A. Longman | 2318 Sunnyside Avenue | Chicago, Ill. |
| Louisville Astronomical Soc. | 1827 S. Third Street | Louisville, Ky. |
| Thomas L. McDonald | 9 Colebrooke Terrace | Glasgow, W. 2, Scotland |
| Dr. Walter Lee Moore | Box 163, R.F.D. 1 | Coral Ridge, Ky. |
| Dr. Edwin J. Nestler | Belle Island | So. Norwalk, Conn. |
| Russell W. Porter | 615 S. Mentor Street | Pasedena, Calif. |
| Norwalk Library | Mott and Belden Avenue | Norwalk, Conn. |
| Henry Allan Price | | Silvermine, Conn. |
| Franklin W. Smith | | Glenolden, Pa. |
| South Norwalk Library | 10 Washington Street | So. Norwalk, Conn. |
| Chrales Strull | 2100 Murray Avenue | Louisville, Ky. |
| A. D. Sylvester | Belle Island | So. Norwalk, Conn. |
| Rowayton Library | Rowayton Avenue | Rowayton, Conn. |
| S. F. Thorpe | 815 Perennial Drive | Louisville, Ky. |
| Paul S. Watson | 425 E. Lake Street | Baltimore, Md. |
| Floyd Weed, Jr. | | Jefferson City, Tenn. |
| J. L. Woods | 4102 Westview Road | Baltimore, Md. |

Chicago News

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chine and has started another 8-inch mirror. When the weather moderates we hope to have the usual attendance. It is planned to have George Warner give a series of short talks on optics at these meetings and there will be many opportunities for discussion.

George F. Kernan has charge of the nova program for the Chicago area and will soon have charts for distribution.

Because of the ice age in which we are now living or rather existing, amateur activities have been curtailed and we have not much to write about. We could use the old standby and discuss the weather, but our remarks about that subject would be entirely out of place in this very respectable publication.

1319 W. 78th St.,
Chicago, Ill.

NAS Star News

(continued from page 36)

At the time of writing this article (February 15), four beautiful sun spots were observed on the sun. Two were very close together.

Variable star observations (January 15-February 15) total 246. Richard Hamilton, 135; Lewis Doolittle, 105. We wish to welcome an enthusiastic newcomer, the Rev. Clifford H. Vessey, who is sending his initial report of six observations to the AAVSO headquarters at Harvard.

P. O. Box 341,
So. Norwalk, Conn.

Tri-State News

(continued from page 36)

dition will endeavor to direct the photographic program.

New members in the Tri-State area include Franklin W. Smith, Glenolden, Pa., the Rev. Morgan Cilley, Romney, W. Va., Paul S. Watson, Baltimore, Md., Dick Emmons, Canton, Ohio, and Lancaster Hiatt, Hedgesville, W. Va.

Negotiations have begun with the newly organized Philadelphia group, under the sponsorship of Dr. James Stokley, Director of Fels Planetarium, Philadelphia, with the prospect of interesting that highly promising group in an observing program. Undoubtedly Dr. Stokley's progress will be heard from in a large way in 1936.

Valley View Observatory,
Pittsburgh, Pa.

Milwaukee News Notes

MILWAUKEE ASTRONOMICAL
SOCIETY

We take this opportunity to express our appreciation to a member of the MAS who has contributed funds for the additional space required to publish Mr. Hedengren's article which appears below.

The Massive Stars

T. R. HEDENGREN

A KEY TO THE STRUCTURE OF THE
UNIVERSE?

On February 7, the daily papers contained a news dispatch from the Harvard Observatory to the effect that Dr. Sergei Gaposchkin, a member of the Observatory's staff, had succeeded in determining the mass of the eclipsing binary 29 Canis Majoris, which was found to be 70 times the sun's mass, the components "weighing" 40 and 30 times as much as the sun, respectively. Through a typographical error 29 Canis Majoris was claimed to be the "heaviest star known", while the official statement merely termed it the most massive known eclipsing binary. Not only are some of the spectroscopic binaries probably considerably more massive than 29 Canis Majoris, but the super-giant class O stars in certain galactic clusters studied by Dr. Trumpler of the Lick Observatory are very much more massive.

Up to very recently the quadruple star 27 Canis Majoris, studied by Dr. Otto Struve of the Yerkes Observatory in 1927, was supposed to be the most massive star, the combined masses of its components being estimated as between 950 and 2,000 solar masses. However, in a recent letter to the writer, Dr. Struve calls attention to the fact that in an article published in the *Astrophysical Journal*, Vol. 81, page 345, 1935, he has given his new results concerning the star 27 Canis Majoris. It appears from the observations, covering eight years, that the velocity curve does not precisely repeat itself, and that, accordingly, the variation in velocity is due to a phenomenon that has not heretofore been observed and that cannot be explained on the basis of known physical phenomena. It is fairly safe to say that the curve does not represent orbital motion and that the mass function, on which the original estimate of the exceptionally great mass of this star was based, must have a physical interpretation which is not identical with the ordinary conception of mass. While this makes the star even more interesting and peculiar, Dr. Struve concludes, it definitely removes it from the list of the most massive stars.

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The accompanying table gives some condensed data concerning the eight most massive star systems known to the present writer.

It may be in order to point out here that the eight stars listed in the table are rare exceptions as far as weight is concerned. By far most of the many millions of stars (as far as known) have masses varying within comparatively narrow limits, between, say, five times the sun's mass for the heaviest, and about one fifth of the sun's mass for the lightest. But when it comes to luminosity, or radiation, it is quite another story. There the range of variation is enormous. The faintest star known, Wolf 359, named after the German astronomer Max Wolf who died only a few years ago, has a luminosity of only 1/50,000 of that of the sun, while the most luminous stars, like S Doradus, and the brighter components of Pearce's and Plaskett's stars, listed in the table, have luminosities of approximately 300,000 times the sun's luminosity, thus 15,000,000,000 times brighter than the faint Wolf 359.

But even these extremely luminous super-giants appear to have been put in the shade by Dr. Gaposchkin's new discovery. The dispatch from Harvard indicates that 29 Canis Majoris is about 20,000 light years distant from the earth. This great distance, in combination with a fairly large visual magnitude of 4.9, and the reported high surface temperature ("one of the hottest stars", presumably about 28,000° K as for class O stars) would give the components of 29 Canis Majoris luminosities of from 3 to 5 million times that of the sun, or about 10 to 15 times more brilliant than the brightest stars known heretofore. So 29 Canis Majoris is truly a record breaker.

A study of the location in the sky of the eight most massive stars reveals some highly significant facts. First, they all cling closely, within a few degrees, to the Galactic Equator, or expressed in plain English, they are located near the plane of the Milky Way. Second, and still more significant, they form distinct groups, with the members of each group lying in exactly the same plane. Using the reference numbers appearing in the accompanying table, if the stars are plotted on a galactic chart, it is found that the stars numbered 2, 3, 5 and 6 lie within 66° in galactic longitude (in the constellations Monoceros, Gemini, Canis Major Puppis) and in a straight line (which means one plane) inclined about 11½° to the Galactic Equator. Similarly, the stars numbered 4, 7 and 8 are found to lie in another plane of the Milky Way.

How may we explain this very interesting peculiarity? Accepting the now pretty well adopted theory that the stars were "born" from an enormous mass of gas in rapid rotation, the writer would attempt to explain the above mentioned phenomenon in this way: these massive stars, due to their great mass, have been more able than ordinary stars to stay in their original paths and maintain the motion imparted to them by the rotating parent mass, without being to a great extent deflected, as apparently has happened to the multitude of ordinary and less massive stars.

The writer next undertook to project this "System of Massive Stars" upon the plane of the Milky Way, and again a most singular thing happened. With reference to the first mentioned group of four massive stars, which we tentatively call Group A, the positions of three stars were fixed by knowing not only their direction in galactic longitude, but also their parallaxes or distances. Through these three fixed points a curve can be laid, a sort of an elongated spiral, emanating from the central nucleus. The intersection of the radius vector from the sun in the direction of the galactic longitude for star number 6 (V Puppis) with the "spiral" gives the hypothetical location of the star. Its distance can be directly scaled off and found to be about 15,300 light years.

If we measure the distance between the stars on our spiral, we find them to be equally spaced, with one star missing, exactly half way between Nos. 2 and 5. For the second group, which we may call B, consisting of stars Nos. 4, 7 and 8, we unfortunately know the parallax (or distance) for only one star, No. 4 (AO Cassiopeiae). But if we draw a similar spiral like the one for group A and let it pass through the fixed point representing star No. 4, and find the hypothetical positions for the other stars on the spiral, they again come out equidistant, with two stars missing between Nos. 4 and 7.

At the time of writing this article, 18 stars in four different spirals have been investigated, and the equal spacing as found in spirals A and B is invariably maintained, or divided in geometrical progression (the divisors always being 2, 4, 8, . . . , never 3, 5, 7, . . .). The writer has tried to find a reason for this apparent congruity, and to his mind it can be easiest explained by assuming it to represent a period at which the stars are produced and started "in their courses" by the parent nucleus. Another startling regularity manifests itself when comparing the masses of the massive stars. The "heaviest" ones, Nos. 1

AMATEUR ASTRONOMY

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Ten Cents

Oculars and Powers for Observing Variable Stars

Rev. TILTON C. H. BOUTON

Nearly 30 years ago the writer, in conversation with one of the famous makers of telescopes, remarked that he had for some time been grinding lenses and constructing eyepieces which performed very satisfactorily.

The reply was wholly unexpected and a damper to the amateur's pride in his work: "Any old thing will do for an eyepiece; the all-important factor in a telescope is the objective".

That the objective or mirror which demands the extreme of care and skill in working is of far greater relative importance than the ocular can not be questioned; but one must not take seriously the statement that, "Any old thing will do for an eyepiece." A poorly constructed ocular will greatly handicap the most perfect objective. Especially is this true in estimating variable stars. In some lines of research a single lens in the hands of a skilled observer may accomplish splendid results. It is said that Sir William Herschel for much of his work employed the single double-convex lens in preference to any combination of lenses then used; but the fact that, excepting in the center of the field, there is a marked distortion of the star images, makes a single lens worthless for a member of the AAVSO.

The late Prof. Edwin Brant Frost in "Let's Look at the Stars" (the finest book on astronomy for young beginners), writing of objectives and eyepieces, says, "Both must now have two lenses, each made of a different kind of glass." This statement might lead the amateur to think that he must have one or more of those expensive achromatic or orthoscopic forms of oculars in order to do good work, which is far from true. The advantage afforded by any of these special designs over the standard Ramsden and Huyghenian oculars is exceedingly slight, and of no practical value in work on variables.

Dr. Frost wrote from the standpoint of the professional astronomer, who can be satisfied only with the most perfect possible equipment. Either the Ramsden or the Huyghenian eyepieces will meet

every requirement in work on variables. Astronomers usually prefer the latter for mere seeing; but after 24 years in observing variables, the writer has come to prefer the Ramsden because of its slightly broader and flatter field. It will show any star which can be seen with a negative eyepiece, and unless the field is very bright the "ghost" is not seen.

As to the powers to be used in observing variable stars, no fixed rules can be given. Eyes so vary that one observer may see better with a given magnification than another. Only a few general statements can be made. Where the observer can afford only one ocular, he will probably obtain the best results with one giving a magnification of about 10 to the inch of his objective. This will cover a fairly large field and will show fainter stars than a lower power. To do the best work, he should have at least three eyepieces: one magnifying six to the inch, but never lower than five, another of medium magnification, and another of about 18 or 20 to the inch. The last will show the variable when fainter than can be seen by the lower powers. The lower the power, the brighter is the field, and the faintest stars cannot be seen.

As far as the writer's experience goes, a $\frac{3}{4}$ -inch ocular will show a faint star better than any ocular much lower or higher. Such an eyepiece seems to give the best proportion between the light and magnification. This has held true in using several telescopes ranging from $2\frac{1}{2}$ -inch to 7-inch. Some experienced observers use much higher powers when the stars are very faint but probably the only advantage gained is when the faint variable is very close to other very faint stars. The high powers give wider separation and so aid in identifying the variable; but at the same time they give lessened light and the stars are dimmed. Undoubtedly the majority of observers will find, if they are able to make the test, that an ocular of a $\frac{3}{4}$ -inch focus will show any star they can see with a higher power, and that certainly it will

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The Venus Observations of the Mayas

ED MARTZ, JR.

Sometime in the period between 1000 B.C. and 1000 A.D. there was developed on the peninsula of Yucatan in Mexico, a civilization that in many respects rivalled that of the rest of the world. Without any apparent contemporary contact with Europe or Asia the peoples of the Maya built magnificent cities and temples; developed an extensive written language of glyphs; and conceived a numerical system, a calendar, and astronomical observations and tables equal and superior to any elsewhere at that time. Their number system used simple glyphs to represent digits, and they utilized position to give value to the symbols. Thus, a bar was equal to the number 5; a dot to the number 1; and a bar and a dot meant 6. Similar combinations were used up to 20, indicating that the system was vigesimal rather than decimal, and that their base was 20 rather than 10 as is ours. It was however, almost as convenient as Arabic numeration, and certainly vastly superior to the clumsy Roman and similar types. The Mayas also made a great mental step in conceiving of a symbol for zero, long before it was recognized in Europe. Their calendar was an arbitrary one of days and months to record events, and did not coincide with the seasons. They divided their 'year' into 13 'months' of 28 days each. Similarly, the heavenly Zodiac of ecliptical constellations had 13 parts instead of 12; and the star constellations as conceived by the Mayas were purely imaginative local associations. However, chiefly because of their practice of counting "elapsed time", rather than "present" as we do, their time interval records are highly efficient, and their day count is quite similar in many respects to the Julian Day Calendar used by variable star observers.

Among the deities worshiped by the Mayas of Yucatan, the planet Venus held a principal place, and numerous religious ceremonies were devoted to it, and observations made of its position with respect to the Sun. There are two ancient Maya codices (or books) which in addition to recording pictorially the passage of Venus through the Zodiac in conjunction with the constellations, indicate that one of the methods of astronomical observations was naked eye 'sighting' by two observers through notched or crossed sticks. Jungle covered ruins of "Round Towers" with astronomically oriented windows point to the possibility that they were used to find dates such as the equinoxes from the setting points of the Sun.

The supreme god of the Mayas was Kukulcan (or "Quetzalcoatl" of the northern Mexicans) who was intimately connected with the planet Venus. When he died (for he was a deified human ruler) he was said to have 'become' the planet Venus, after a disappearance of eight days. The Maya universally looked upon this period of eight days (which was at the time of invisibility of Venus during inferior conjunction) as a time of ill omen and fatality. In addition to the codices noted above, several temples apparently dedicated to Venus have been found. Stelae (inscribed columns) erected periodically by the Mayas, often have signs referring to the planet, associated with date glyphs. One of these was found over a glyph meaning "a new fire". When the accompanying date glyph was changed to the corresponding Christian date by Dr. Spinden of Harvard, it was found to coincide with a helical rising of Venus. (The time when the planet first becomes visible as a morning or evening star four days after inferior conjunction). About 50 such inscriptions are reported, on Spinden's correlation, to yield coincidences with Venus phenomena. However, for some purposes, such as in reducing certain Maya solar eclipse records, the Maya-Christian correlations of Goodman, Teeple, and Martinez are much more satisfactory in yielding correct coincident dates. By continuous and prolonged (over a period of centuries) recording of helical morning and evening risings of Venus the Maya Astronomer-Priest discovered that five Venusian synodical years at 584 days are equal to eight vague solar years at 365 days. Pages 46-50 of the Dresden Codex record this fact by date glyphs of the intervals of 2920 days (ie: 8×365 days) in the following manner: Each 2920 days is divided into five parts of 584 days each, a page being given to each part. (It should be noted that 2920 days is five synodical revolutions of Venus). Also: Each period of 584 days is sub-divided into four parts of 236, 90, 250 and 8 days. Now the synodical observational revolution of Venus consists of four parts also, namely: a 236 day period of visibility between inferior and superior conjunction with the Sun; a 90 day period of invisibility between superior and the next helical rising; a 250 day period of visibility after superior conjunction; and, finally, a period of 8 days of invisibility during inferior conjunction due to proximity to the Sun (as seen from earth). The

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The Venus Observations of the Mayas

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discrepancy in the periods of invisibility is due to difference in distance of the planet from earth (apparent size), the Venus phase (and hence brightness), and the relative motions of the two planets increasing or reducing that period at the different positions in their orbits. Associated with these tables are Venus signs and other glyphs most of which are as yet undeciphered. Several authorities have attempted to demonstrate, from these tables, that the Maya recognized the true character of the solar system and the orbits of at least earth and Venus. To the present writer, this appears hardly possible since the determination by observation of the synodical year is comparatively simple from the long series of observations the Mayas recorded, with no necessity for the difficult concept of heliocentrism arising in the still rather primitive minds of the observers. It is true that in using the slightly longer apparent synodical year of 584 days (the true modern determination is 583.92 days) an error creeps in which will shift the times of helical risings 5.2 days in 104 years. Martinez endeavored in 1932 to show that this could be corrected (as he believes it was by the Mayas) by use of supplementary tables derived from apparently extraneous dates at the bottoms of pages 24, 46, and 47 of the Dresden Codex. These he interprets to be records of transits of Venus across the Sun's disk, because of the correspondence between the date intervals and such transit intervals. However, the data given seems too meagre and coincidental to form a satisfactory proof of his thesis that the Mayas corrected their Venus Ephemeris by that means. Spinden has similarly endeavored to demonstrate a connection of the Venus Ephemeris with the Maya Lunar and Equinoctial records. Here again, the evidence seems scanty, and the methods of numeration appear to be mere coincidences justifying no elaborate interrelationship. There does seem to be some evidence of a coordination between the Maya solar eclipse saros tables and the Venus Ephemeris.

726 N. Elmwood Avenue,
Oak Park, Illinois.

Amateur Records

HANS D. GAEBLER

At this inventory time of the year it might be well to look at our records. Little attention has been given to uniformity of entering records of variable star observations among our members. Those of us who are members of the AAVSO are guided by the circular of instructions sent from Harvard. So much for our own record books. The methods of reporting our observations to Harvard are also uniform because of the standard form which is furnished to all contributors. Let us look at the form of entry which our foreign amateurs use.

The British use a column for recording the comparison with each comparison star. For example, 19-3, 22-1, means that the variable was 0.^m3 fainter than the comparison with each comparison refer to Hagen's atlas), and that the comparison star number 22 was 0.^m1 brighter than the variable. In the French records we find the same method of Argelander recorded, i.e. f 3 T 1 g meaning that the star f and g are comparison stars and T the variable. The Russians of Nishni Novgorod publish only a few columns, such as name of observer and number of observations and magnitude, as do the Japanese, while the leading German amateur journals, *Die Himmelswelt*, *Die Sterne*, and *Das Weltall*, do not publish records of observations at all. In fact many amateur observers over there, so I am told, merely enter their estimates by the Argelander step method and send them to the professionals at the observatories to be worked up there and magnitudes determined from these estimates. Our own records which are published in *Popular Astronomy* give only name, date and magnitude. If we become interested in any particular variable and perhaps in finding its light curve we shall have to consult all the AAVSO records, but as already shown (see this bulletin for September 1935) this is very incomplete and the addition of foreign records will help to furnish a more complete story of the star.

The question has rightly been raised whether it is worth while to send to this section the records of our observations or merely the totals. Perhaps the solution to this question lies in the cultivation of friendships among amateurs, and when there is interest in some one particular variable the thing to do is to write to the person who has done the most observing of it and exchange notes. Such contacts are very stimulating, and the writer has had much enjoyment from corresponding with an observer in Ger-

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A German Planetarium in the Service of History

HANS D. GAEBLER

Professor R. Hennig's article in the November, 1929 issue of "Die Himmelswelt" describes a unique application of the planetarium at Duesseldorf to history and literature.

On the 3rd of July of that year some eight hundred visitors to the planetarium, all students of Greek literature, were given a demonstration of what certain lines in Homer's Odyssey meant to the Greek of one thousand years before Christ. The Homeric sky was reproduced in the planetarium showing how much higher some of the stars, which now are low in the southern horizon, were at that time.

That famous line in the Odyssey (E.272) tells how all the northern stars dipped into the ocean on part of their journey around the pole except the big bear (Ursa Major). To quote from Spencer's Faerie Queen 1.11.1.

"By this the northern wagoner had set
His sevenfold teme behind the steadfast starre
That was in ocean waves yet never wet,
But firme is fixt, and sendeth light from farre."

At the latitude of Greece the two end stars of the handle of the Big Dipper disappear below the northern horizon but in Homer's day they were circumpolar, describing a smaller circuit around the pole which was some 20° lower than now.

Theo. Cooper in an article in the Open Court Magazine for August 1910 (Vol.

24, p. 500) refers to the higher position of the southern stars, especially the Southern Cross, in ancient times. He cites the Bible (Job IX.9 telling of the Southern Cross stars visible at much higher latitude than at present. Cooper figured them visible at about 35° north latitude in the year 500 B.C., at 38° in 1000 B.C., and at about 40° north in the year 1500 B.C. when seen above the horizon of a large lake or ocean.

Professor Hennig further describes the use of the planetarium in explaining another passage of Homer and visualizing for the students of Greek literature the passages they were reading in which constellations were referred to. In book 5 of the Odyssey, where the hero takes leave of Calypso he guides his ship toward the land called Scheria, always keeping Ursa Major to his left. This the planetarium showed to be an east by northeast course, and both theories, the one identifying this land as Corfu, the other as Tunis, were then discussed in the light of what the planetarium showed.

Whether the secondary school classes in this country studying the classics are large enough to justify the special program of the planetarium as at Duesseldorf is for the directors to decide. In Germany they seem to regard it a useful adjunct to the history or literature instruction of their youth.

404 - 8th Street,
Watertown, Wisconsin.

Oculars and Powers for Observing Variable Stars

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reveal a star fainter than can be seen with any much lower magnification. The author's 7-inch refractor will rarely reveal a star as faint as 12.^m5, when a 1 7/8-inch ocular is used, but under the same observing conditions it will reach to 14.^m0 with a 3/4-inch eyepiece. Occasionally a star of 14.^m5 can be glimpsed.

St. Petersburg, Florida

Amateur Records

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many and one in Japan both of whom happened to be interested in the same variable over a period of years. After all, these more or less human interest sides of our hobby rather than the serious scientific ones lend themselves more graciously to our status as amateurs and will do much to keep amateur astronomy alive as a hobby, an avocation rather than a vocation.

404 8th Street,
Watertown, Wis.

Nova Program Notes

L. E. ARMFIELD

We heartily welcome initial contributions to the nova program received from Richard Hamilton, 4 Union Park, Norwalk, Conn., Frank Preucil and Everett Shaw of Joliet, Ill., and Floyd Shaffer, 12 Grubb St., Poughkeepsie, N. Y. Low powered binoculars were used by the latter in reviewing his area.

We gratefully acknowledge the following observations received for the month of February:

Observers	Group	Area No.	Magnitude of faintest star visible					Total Nights
			7	6	5	4	) 4	
Hamilton	So. Norwalk	**	—	2	5	2	—	9
Preucil	Joliet	35	—	—	1	7	—	8
Rosebrugh	New York	57	10	1	—	—	—	11
Shaw	Joliet	27	—	—	1	1	3	5
Shaffer	New York	**	—	4	2	—	—	6

** Areas for which numbers have not been assigned to date.

2046 S. 59th Street,
Milwaukee, Wisconsin.

Occultations

R. D. COOKE

The following occultations occurring in May are predicted for Milwaukee and vicinity:

Date	Star	Mag.	Immersion	Pos. Angle
May 1	e Leonis	5.1	11:22 P. M.	115°
May 3	370B Virginis	6.0	7:41 P. M.	80°
May 6	9G Librae	6.5	12:26 A. M.	137°
May 22	3 Geminorum	5.8	8:28 P. M.	50°

We have hopes of soon working out some plan whereby Amateur Astronomy will be able to publish predictions for a number of different centers in the United States. To this end it is desirable to have occultation leaders in each of the affiliated groups of the AAAA. Will any who want to participate in this program please correspond with the undersigned.

6811 Cedar St.,
Wauwatosa, Wis.

Photographic Notes

LYNN MATTHIAS

We may confidently expect better observing weather with the advent of spring. The availability of more fruitful areas for observation by those engaged in the patrol program should stimulate activity in this promising field. During the winter months considerable interest was manifest by observers who have small cameras available, however no great number of patrol plates were taken due primarily to the very poor conditions and the difficulties of getting equipment installed and in adjustment. Those observers who have been fortunate enough to complete this preliminary work should be in an excellent position

to do worthwhile work during the coming months.

The establishment of a photographic section in the AAVSO should stimulate activity in the photographic investigation of variable stars. This work, of course, requires cameras of somewhat longer focal length than those adapted to the AAAA photographic patrol. An announcement and discussion of the proposed AAVSO photographic program will appear shortly in 'Amateur Astronomy'.

2121 East Capitol Drive,
Milwaukee, Wisconsin.

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Amateur Astronomers Association of Pittsburgh,
 Pennsylvania.
 Amateur Astronomers Association of Rutherford,
 New Jersey.
 Amateur Telescope Makers of New York, N. Y.
 Astronomers Guild of Jamestown, New York.
 Chicago Amateur Astronomical Association, Chi-
 cago, Ill.
 Long Island Telescope Makers, Wantagh, N. Y.
 Louisville Astronomical Society, Louisville, Ky.
 Madison Astronomical Society, Madison, Wis.
 Milwaukee Astronomical Society, Milwaukee, Wis.
 Norwalk Astronomical Society, Norwalk, Conn.

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 and double stars.

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AAAA Notes

A NEW SOCIETY

At the Amateur Astronomers booth at the recent American Association for the Advancement of Science convention held in St. Louis, names and addresses were obtained of persons who seemed sincerely interested in amateur astronomy and telescope making. A total of 40 names was obtained and these people were invited to attend a meeting at one of the public libraries on Jan. 22.

Prof. W. L. Upson, president of the St. Louis Museum of Science and Industry, after hearing of our plans to form a society, suggested that we become affiliated with the Museum. This was later accomplished and we are now known as the Astronomical Section of the Museum. We were given use of an assembly room where we can hold our meetings and a basement room for our workshop. We are very grateful for this consideration and are now equipping the workshop with grinding pedestals and testing equipment for making telescope mirrors.

Our official name is the St. Louis Amateur Astronomical Society. The

officers are: W. L. Godin, president; J. L. Clarke, vice-president; C. F. Hellweg, secretary-treasurer.

The successful organization of this new society is due to the many helpful ideas and suggestions given by our good friends, Leo and Larry Scanlon of Pittsburgh, who attended the AAAS convention. We also want to thank the Milwaukee, Pittsburgh, Dayton and Indianapolis groups for sending copies of their by-laws and offering their help in getting this group organized. We hope to join the AAAA as soon as conditions permit.

Carl A. Hellweg,
 5246 Cote Brillante Ave.,
 St. Louis, Missouri.

The association is happy to introduce Franklin W. Smith of Glenolden, Pa., as leader of the American Amateur Astronomical Association's meteor section. Mr. Smith comes to the association highly recommended by Dr. Charles P. Olivier and it is comforting to know that the activities of the meteor section will be guided by so capable a person.

The association also takes great pleasure in announcing the establishment of an exhibition committee with the chairmanship in the ever able hands of Leo J. Scanlon, Valley View Observatory, Pittsburgh, Pa. Mr. Scanlon is well known to the amateur and professional astronomers alike for his devotion to the amateur astronomy movement. He has been remarkably successful in presenting many splendid astronomical exhibits in various parts of the country which have contributed much to the dissemination of astronomical knowledge to the interested public.

In a recent communication received from him, and, in his ever inimitable manner, Leo informs the members of the association that they are only too welcome to use any of the interesting material he has available for exhibition purposes, whenever and wherever an exhibition is scheduled to be held. The only obligation being that the material must be returned to the source after the show, which is fair enough.

The following new members received during December and January are cordially welcomed to the AAAA.

Memberships received during March will appear in the May issue of this magazine.

Memberships Received Before February

AAA of Rutherford, N. J.	131 Park Avenue	East Rutherford, N. J.
James S. Andrews	33 Franklin Place	Rutherford, N. J.
H. Ashford	118 Dearing Avenue	Jamestown, New York
Prof. Vincent Batha	Carroll College	Waukesha, Wisconsin
Mr. Beede	Florida & Hillman Ave.	Youngstown, Ohio
Alfred Bidwell	131 Park Avenue	East Rutherford, N. J.
Frank Biribauer	322 E. 56th Street	New York, New York
J. C. Brat	Route 2	Jamestown, New York
Charles Brockmeyer		Fredonia, Kentucky
James Buchanan	61 Overhill Avenue	Youngstown, Ohio
John H. Chase	69 Benita Avenue	Youngstown, Ohio
G. W. Cooke		Wynnewood, Pennsylvania
Robert Cox	1074 Park Place	Brooklyn, New York
L. L. Doolittle	P. O. Box 341	So. Norwalk, Conn.
Clinton B. Ford	904 Forrest Avenue	Ann Arbor, Michigan
E. E. Friton	6542 Smiley Avenue	St. Louis, Missouri
Bertram M. Froehly	41 W. 184th Street	Bronx, New York
W. E. Gaines	400 E. 9th Street	Winston-Salem, N. C.
Mrs. Clara Gordon	6210 Oakland Avenue	St. Louis, Missouri
David E. Griffith	3841 Second Avenue	Minneapolis, Minnesota
Walter H. Haas	Miller H., Mt. Union Col.	Alliance, Ohio
Paul J. Hagar	131 W. Newel Avenue	Rutherford, N. J.
W. J. Hall	3814 N. 29th Street	Milwaukee, Wisconsin
Edward Hanna	83 East 121st Street	New York, New York
A. Hanson	76 Aherns Avenue	Jamestown, New York
Bert Hanson	530 Stone Avenue	Jamestown, New York
Herbert W. Harris	6948 74th Street	Glendale, L. I., N. Y.
Marshal Hedstrom	529 Stone Avenue	Jamestown, New York
Julius Henriksen		Columbus, Wisconsin
G. N. Hinchman	422 Bonpart Avenue	Webster Groves, Mo.
Dr. Charles D. Humbert		Barnard, Missouri
Albert G. Ingalls	24 West 40th Street	New York, New York
K. M. Johnson	36 Scioto Street	Jamestown, New York
Dr. J. H. Kusner	University of Florida	Gainsville, Florida
John Loebbeck	310 Union Street	Carlstadt, New Jersey
Louis Lojas	1510 White Plains Road	Bronx, New York
Paul Loofboro	Reedsburg High School	Reedsburg, Wisconsin
G. H. Lutz	18420 Keswick Street	Roseda, California
E. A. Miller	1321 Foster Street	Youngstown, Ohio
T. J. Murphy	120 West 89th Street	New York, New York
P. O. Parker		Cohutta, Georgia
Royal Perkinson	2216 Hammons Avenue	Fresno, California
Harry G. Phair	364 Page Avenue	Lyndhurst, New Jersey
Prof. W. H. Pickering		Mandeville, Jam., B. W. I.
Rev. C. J. Renner		Trenton, Ohio
D. W. Roseburgh	3 Yates Boulevard	Poughkeepsie, New York
Walter C. Ross	1051 Bankers Bldg.	Milwaukee, Wisconsin
Irving Rothstein	1163 Summit Avenue	Jersey City, New Jersey
Leo J. Scanlon	Valley View Observatory	Pittsburgh, Pennsylvania
Roy A. Seely	560 West 231st Street	New York, New York
Floyd C. Shaffer	12 Grubb Street	Poughkeepsie, New York
Prof. C. R. Smith	Aurora College	Aurora, Illinois
Henry Smith	c/o B. W. Lamson	Medeira, Ohio
J. R. Sundell	529 East 5th Street	Jamestown, New York
J. Robert Theaman	501 Madison Avenue	New York, New York
T. K. Tomkins	215 Cricket Avenue	North Hills, Pennsylvania
Bert Topham	105 Regent Street	West Toronto, Ont., Can.
Theodore Treadwell	113 S. Midland Avenue	Arlington, New Jersey
Ben Trout	120 East 1st Street	Burbank, California
C. R. West		Timpas, Colorado
David White	725 N. Water Street	Milwaukee, Wisconsin
Adrian Williamson		Monticello, Arkansas
Latimer J. Wilson	1606 Woodland Street	Nashville, Tennessee
Herbert Zang	1165 Gerard Avenue	New York, New York

Metropolitan Notes

NEW YORK AND NEW JERSEY REGION

JAMES S. ANDREWS, Regional Organizer
33 Franklin Place, Rutherford, N. J.

METROPOLITAN ASTRONOMICAL SOCIETY

A committee meeting was held at Planter's Restaurant in New York on Friday evening, Feb. 28 to discuss the details relative to the organization of the Metropolitan section of the AAAA.

Leaders from a number of local groups attended and went over various points at the dining table. It was decided to go ahead with a definite working program, and to this end a lecture meeting will be held early in April at which a permanent organization will be formed.

The groups signifying their intention of joining were the Amateur Astronomers Association of Rutherford, N. J., the Amateur Astronomers Association of Teaneck, N. J., the Astronomers Guild of Jamestown, N. Y., the Amateur Telescope Makers of New York, and the Long Island Telescope Makers.

AMATEUR ASTRONOMERS ASSOCIATION OF RUTHERFORD, N. J.

JAMES S. ANDREWS, President

The February 24 meeting was addressed by Irving Meyer, on "Minor Planets and the Problems Involved in Computing Their Ephemerides". Several members are working on these computations and hope to be of assistance to science in determining and observing the positions of these tiny bodies. The first meeting in March was addressed by N. J. Heins of Paterson, N. J., who discussed, "Solar Observations". He accompanied his talk with many charts, diagrams, photographs, and demonstrated with equipment just how this interesting work is accomplished.

AMATEUR TELESCOPE MAKERS OF N. Y. LEW LOJAS, President

1510 White Plains Road, Bronx, N. Y.

The weather has been so poor that observing has been almost at a standstill and meetings have had to be postponed. We have four new members.

ASTRONOMERS GUILD OF JAMESTOWN, NEW YORK

HAROLD ASHFORD, President
118 Dearing Avenue, Jamestown, N. Y.

The observatory has been completed on Marlowe road on top of English Hill. The dome, a hemisphere, is 16 feet in diameter and sets on ball bearings in channels. It is covered with heavy can-

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Milwaukee News Notes

MILWAUKEE ASTRONOMICAL SOCIETY
R. D. COOKE, President

Dr. Forrest Ray Moulton, formerly of the University of Chicago, who, with Dr. Chamberlain formulated the planetesimal hypothesis, spoke at the February meeting of the Society. It was a special privilege for the society members to hear Dr. Moulton, as he is internationally known.

The Milwaukee Astronomical Society was invited to exhibit as a unit of the Milwaukee Hobby Council at the fourteenth annual Home Show held in the Milwaukee Auditorium, March 14-21. The Society's representative in the Hobby Council, Edward Halbach, arranged the exhibit with the assistance of Scott Houston, Herbert Grunwald, and Russel Bautz. The exhibit centered around telescope making and included a lens grinding machine, a revolving display showing steps in making a mirror, cross-sectioned reflecting and refracting telescopes and photographs and literature pertaining to telescope making. A 4-inch and a 10-inch reflecting telescope made by Mr. Bautz were on exhibit. Astronomical lantern slides loaned by the Milwaukee Public Museum were shown on a ground glass screen.

Members of the society were in attendance throughout the week. Considerable interest was shown by the public. Approximately 100,000 persons passed the exhibit, and hundreds stopped for more detailed information.

Due to lack of space in the March bulletin notice of Herbert W. Cornell's talk at the public museum the latter part of January had to be omitted. He spoke on the mythology of the constellations. His talk was one of the regularly scheduled museum lectures.

L. E. Armfield spoke at the Immanuel Lutheran Educational Society on "A Journey Through Our Corner of the Universe", and at the West Allis Presbyterian Church on "Astronomy for Young People".

Roy Lewis has purchased a 5-inch refractor from Charles Ridel of Yerkes Observatory.

Scott Houston demonstrated telescope making at the Fifth Street Social Center, March 11.

At the March meeting in the absence of the president, Herbert Cornell, vice president, presided and introduced the speaker, T. R. Hedengren, one of the members of the society. Mr. Hedengren's talk was an explanation of his recent studies of massive stars and their distribution in our galaxy. This talk

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Planetary Section Notes

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SUNSPOT OBSERVATIONS

By JOHN D. LUCZKA, West Allis, Wis.
January, 1936.

Number of days of observation: 7
Average number of spots per day: 10.1
Average number of groups per day: 2.7
Average number of new groups per day: 1.4
Predominantly active hemisphere: Northern.
Faculae and sunspot 'bridges' numerous.
726 N. Elmwood Avenue,
Oak Park, Illinois.

Metropolitan Notes

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was on iron rib work. In time, it will house a 16 $\frac{1}{2}$ -inch telescope, but now has a 10-inch Newtonian reflector, equatorially mounted in a lattice tube. The observatory will be opened to the public as soon as weather permits.

Newly elected officers are, Anton Hanson, president; K. H. Johnson, vice-president; and Marshall Hedstrom, secretary-treasurer.

LONG ISLAND TELESCOPE MAKERS

A. R. LUECHINGER, President
Box 214, Wantagh, N. Y.

The Long Island Telescope Makers was organized in July 1934 in the interest of telescope making. Four members belong to the AAVSO. Two of our group have observatories, one housing an 8-inch and the other a 10-inch reflector. A 6-inch Cassegranian, a 6-inch Pyrex clock driven and several other 6-inch reflectors and a 5-inch refractor comprise most of our equipment.

Meetings are held at three week intervals at members' homes.

OBSERVATIONS FOR FEBRUARY 1936

AMATEUR ASTRONOMERS ASSOCIATION
OF RUTHERFORD, N. J.

Variable Stars Observed:			
Delta Librae	4	Nova Hercules	6
R Leonis	8	Mira	2
4 Stars — 20 Observations			
Planets:			
Neptune	22	Uranus	15
2 Planets — 37 Observations			
Minor Planets:			
2 Pallas	9	129 Antigone	2
60 Echo	2	207 Hedda	4
91 Metis	3	521 Brixia	2
6 Minor Planets — 22 Observations			

NOTE: All observations are recorded in detail as to time, position, etc.

Chicago News

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John McNeil reports that a new club has been organized in Evanston, called "The Amateur Telescope Makers of Evanston". The members have three 8-inch mirrors and one 6-inch under way. We wish them every success and assure them of our cooperation.

The response to the article on the loan bureau has been very gratifying. Ed Martz has loaned a 3-inch refractor which is being used by Miss Trimmier, a 6-inch mirror, polished but not figured, two tripods, a short tube for a 6-inch mirror, a substantial wood base on casters and a number of useful articles which will help some of the members to finish their telescopes. George Warner will loan a fine 6-inch mirror and mounting which can be put in shape for use.

Wm. J. Lovejoy, 9842 Avenue J, Chicago, reports seeing a fireball and sent in the following description: "Observed meteor fall 10:57 P.M. 3-3-36. Seen first a little above and to the left of Arcturus, although exact position uncertain due to sudden appearance. From 1/10 to 1/4 as bright as moon. Color, peculiar whitish brilliance of magnesium. A yellowish green halo or vapor surrounded it and waved like a flame as the meteor broke up. Several greenish yellow pieces broke off and trailed to the rear in the vapor as meteor went out. Fell at steep angle, perhaps from 60 to 70°. Came from east. No noise except possibly a faint swish which may not have belonged to it. Course appeared to be somewhat oscillatory in small degree. Size 1/4 to 1/3 diameter of moon."

1319 W. 78th Street,
Chicago, Illinois.

Milwaukee News Notes

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appeared as a special article in Amateur Astronomy last month.

We welcome the following to the membership, Mr. and Mrs. W. J. Hall, Miss Marcella Schneider. Mr. Hall is a science instructor at North Division High School.

This spring is the first time that the observing members did not have to wallow in mud in Mr. Armfield's backyard, due to the foresight of Edward Halbach who, with the assistance of the following members, Darryl and Frank Moore, R. D. Cooke, Harold Stamm, Julius Mueller, and M. J. W. Phillips, placed concrete aprons around the 10-inch and 13-inch telescopes. The telescopes were painted and the backyard prepared for winter. This happened during Mr. Armfield's visit in the east last October.

6811 Cedar Street,
Wauwatosa, Wisconsin